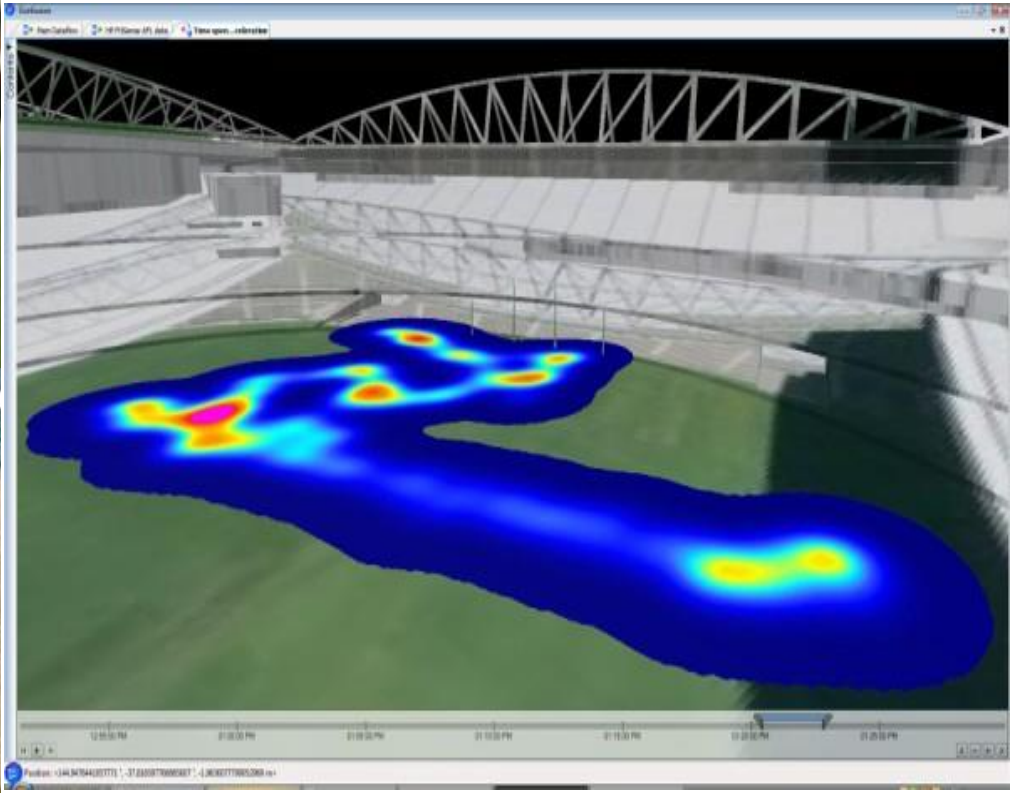
Module 2:

Business Intelligence lifecycle and Management

BI in Sport

BI in Sport

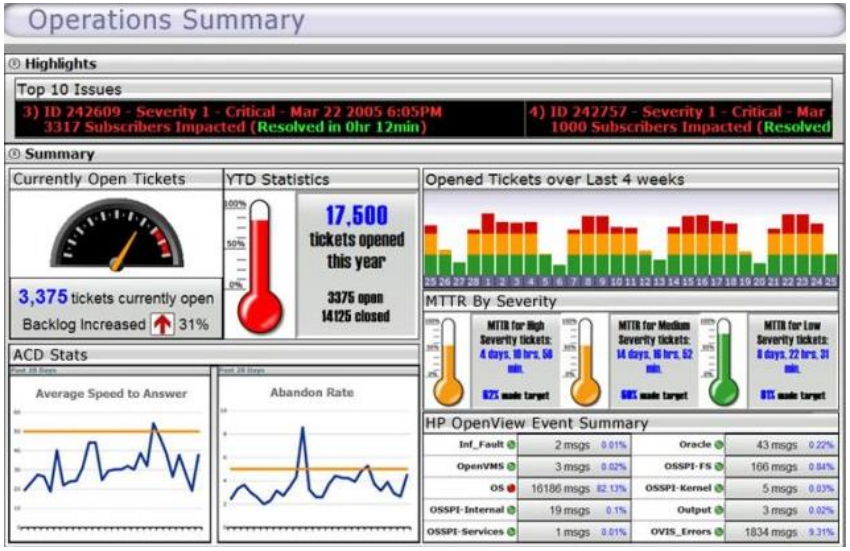


Learning Objectives

- BI Lifecycle model
- Iterative/evolutionary notion of BI
- BI roadmap and project management
- BI Competency Centre (BICC)
- Cost-benefit: Examining the cost for BI
- Examining the benefits of BI
- Critical Success Factors Framework for BI
- Master data management for BI lifecycle

BI aims to deliver the right 1?
at the right 2? to the right 3?
and in the right 4?.

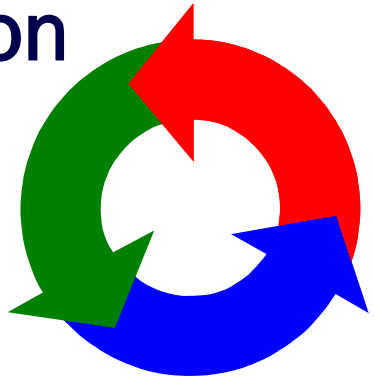
BI aims to deliver the right information at the right time to the right people and in the right form.



BI Lifecycle Management

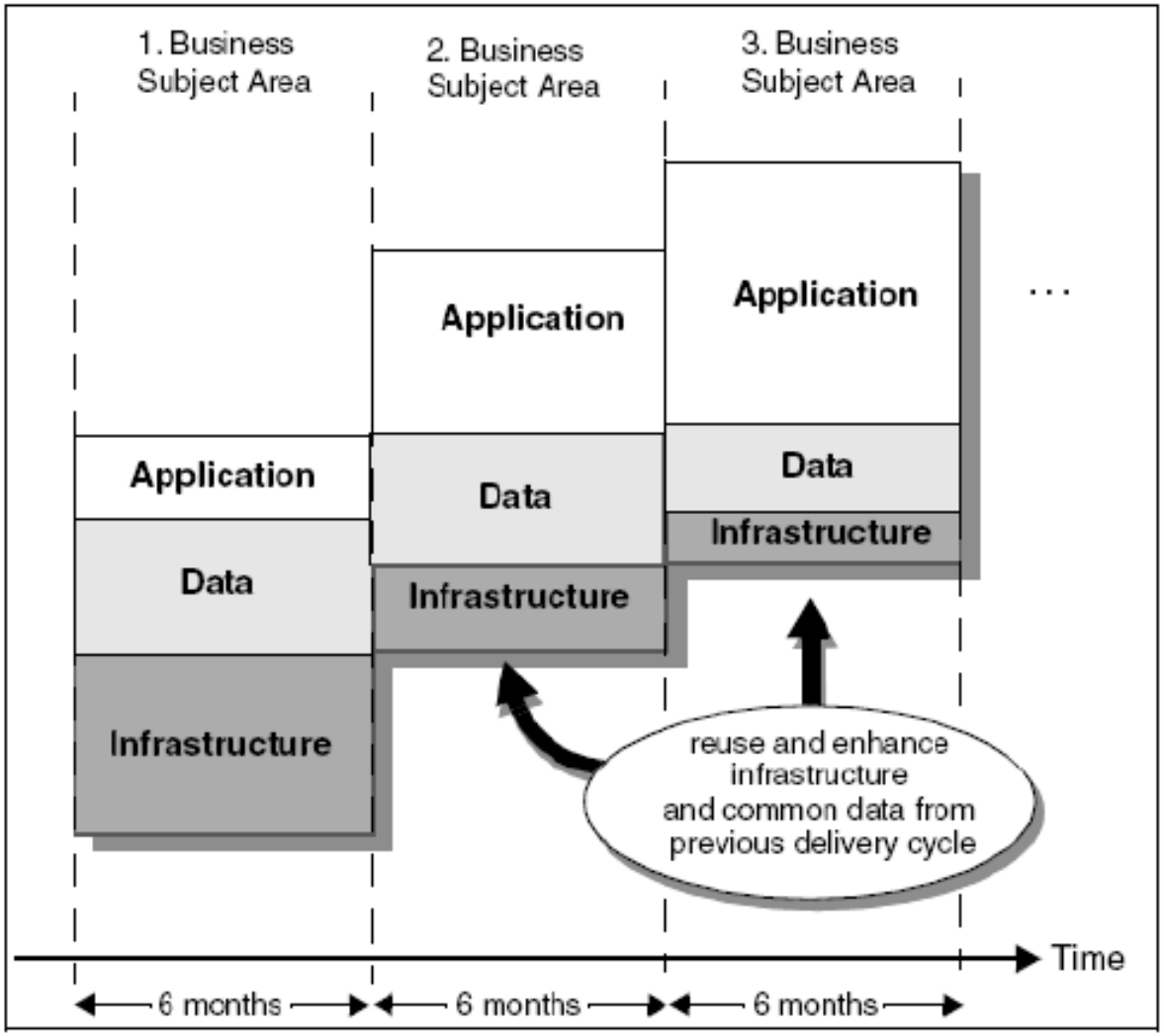
Business Intelligence

is a journey, not a destination

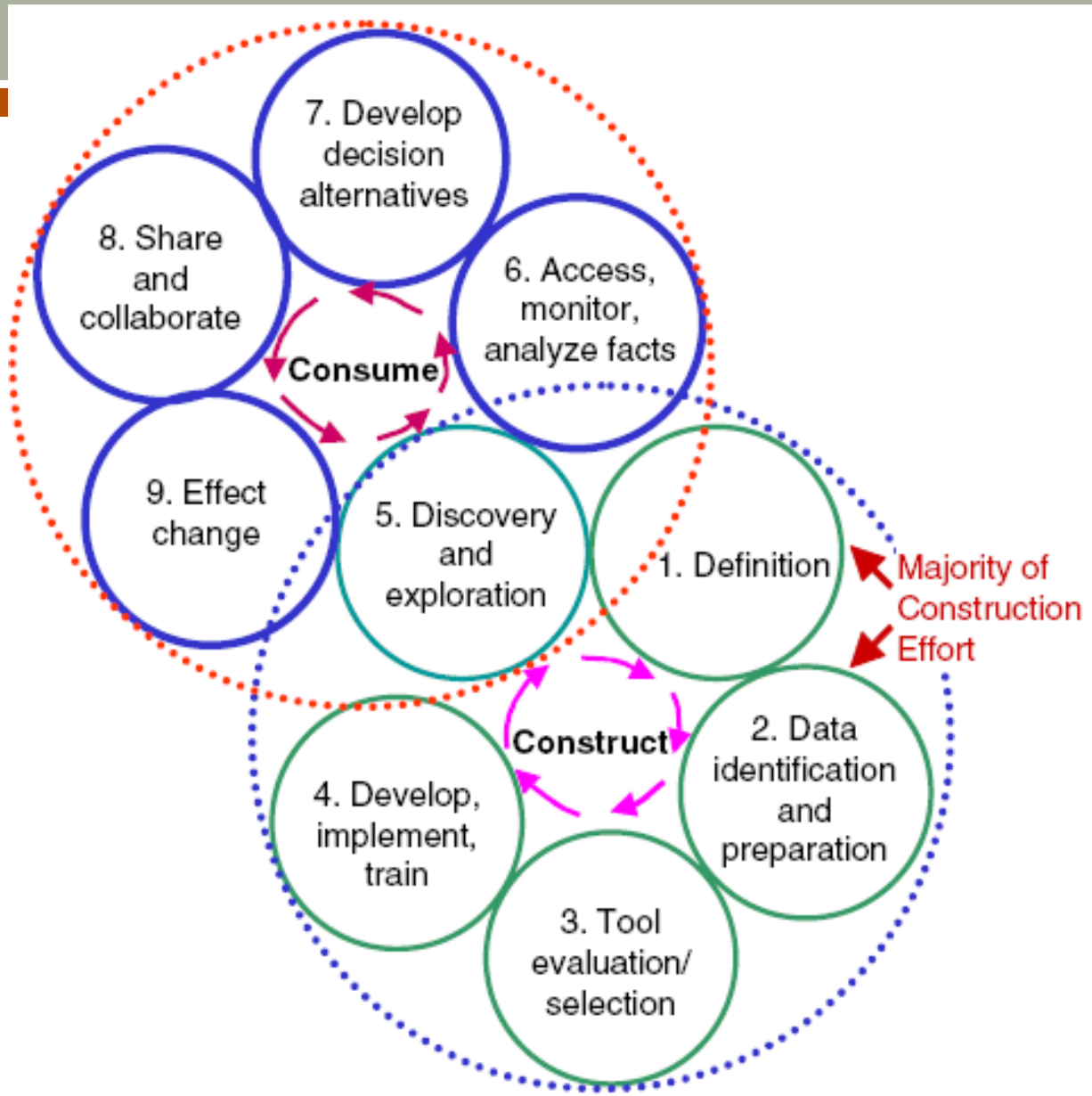


It is a *process* in which People, Organisation, Resources, and Technologies are Integrated to turn data into useful information for better decision making.

BI evolutionary/iterative development



Gartner's BI life cycle model

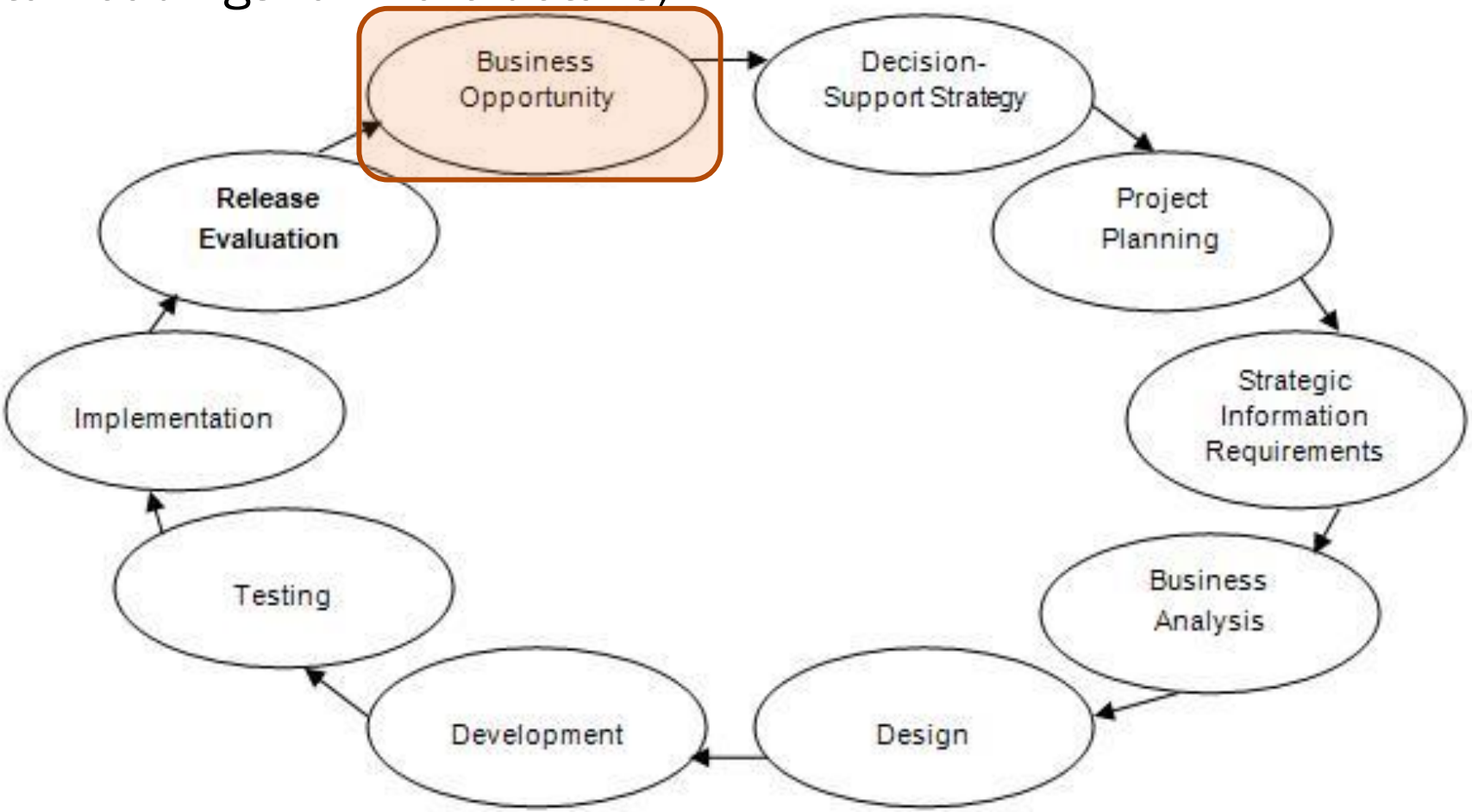


Gartner's BI life cycle model

- Gartner identifies nine significant steps in the life's of a BI deployment.
- They derive this BI life cycle model based on the best practices.
- The BI model is divided into two distinct, but intersecting cycles: *construction* and *consumption*
- The model embraces the ideas and concepts associated with concurrent engineering and **'iterative' development methodologies.**
- In contrast to conventional structured system development methodology, this model replaces those traditional barriers with a **more-fluid cycle**, where all parties are simultaneously involved in the various steps to achieve rapid 'time to action'.

Understanding the evolutionary notion of BI systems

- The BI application evolutionary release methodology (*refer to Readings for more details)



Understanding the evolutionary notion of BI systems

- BI applications are mostly triggered and driven by ***business opportunity***.
- BI applications implement a ***cross-functional*** decision-support strategy rather than departmental decision-support silos.
- BI requirements are mostly ***strategic information*** requirements rather than operational functional requirements.
- Analysis of BI projects emphasises ***business analysis*** rather than system analysis, and analysis is the most important activity when developing a BI decision support environment.
- Ongoing BI application release evaluations promote ***iterative*** development and the *software release* concept rather than big-bang development.

BI must be Business driven

What's wrong with this picture?

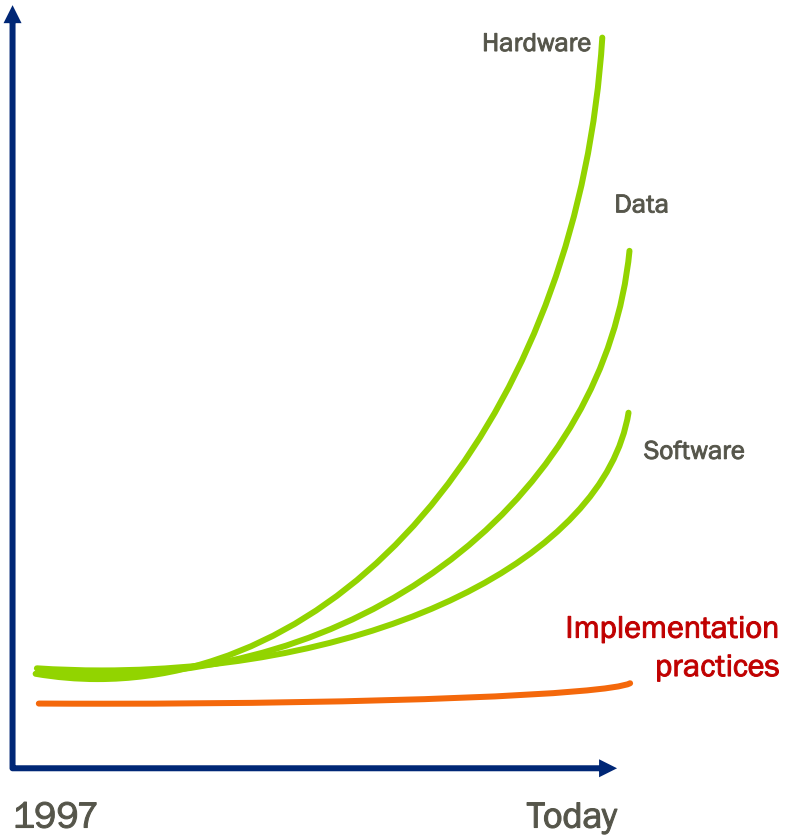
- Hardware capability has improved by a factor of 800
- Structured data has increased by a factor of 50 - 100
- Software functionality has been enhanced dramatically

but

- Sometimes BI & DW projects seem to take even longer to deliver than they did over 10 years ago

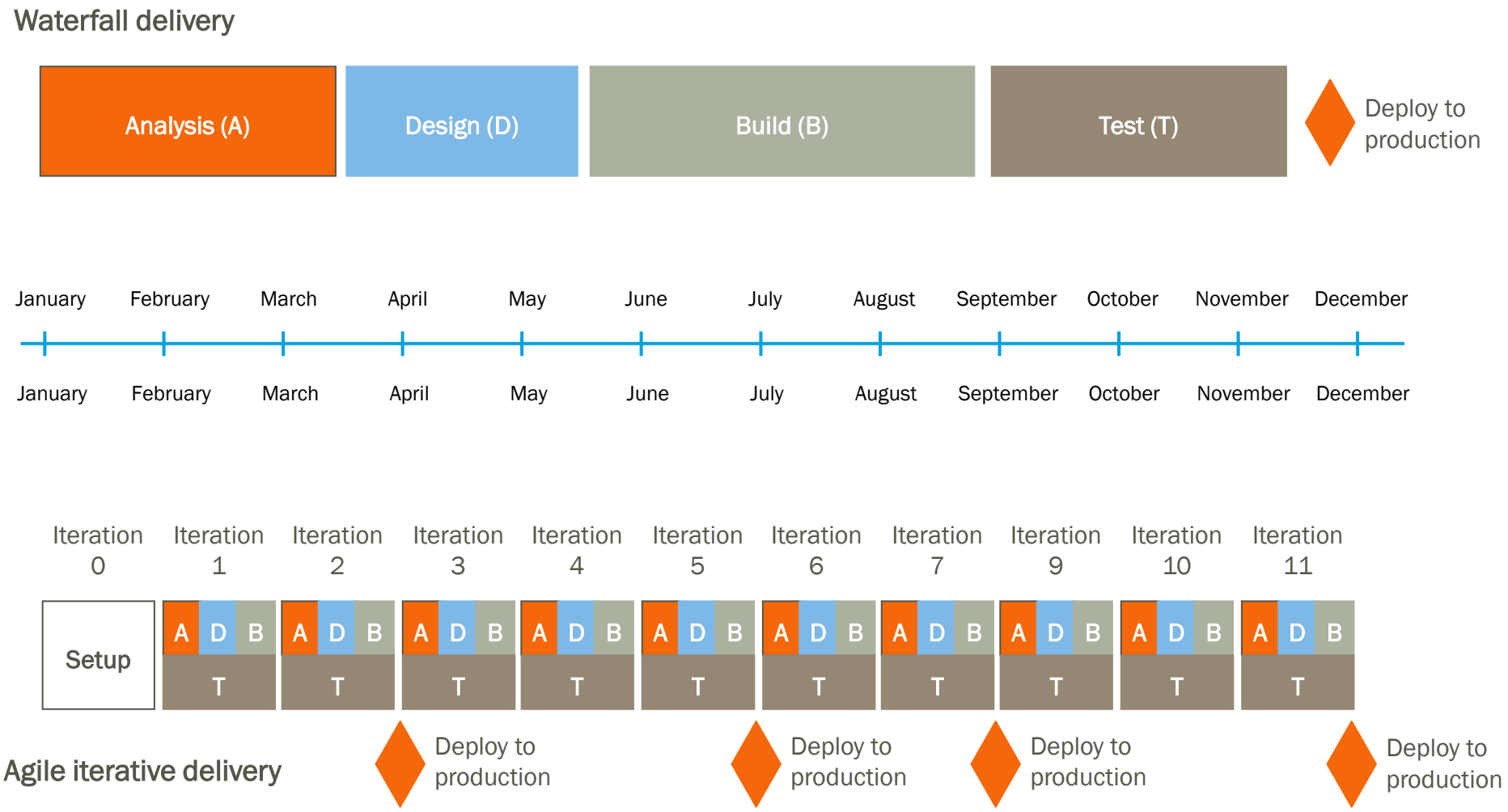
this means that

- while we have dramatically improved the tools and materials we work with;
- we often fail to improve **how** we work with these tools and materials to *deliver* results



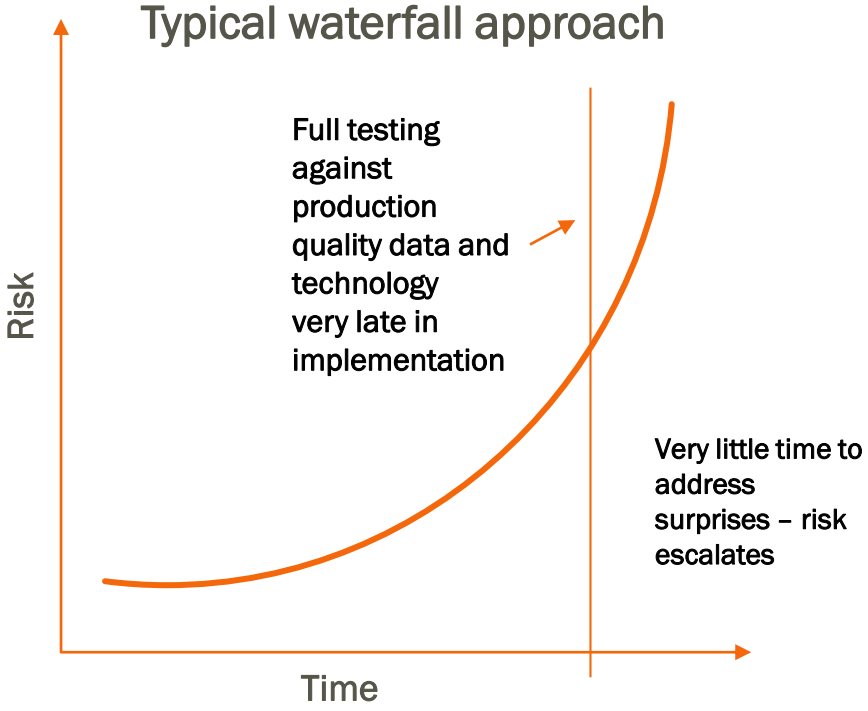
Source: Deloitte

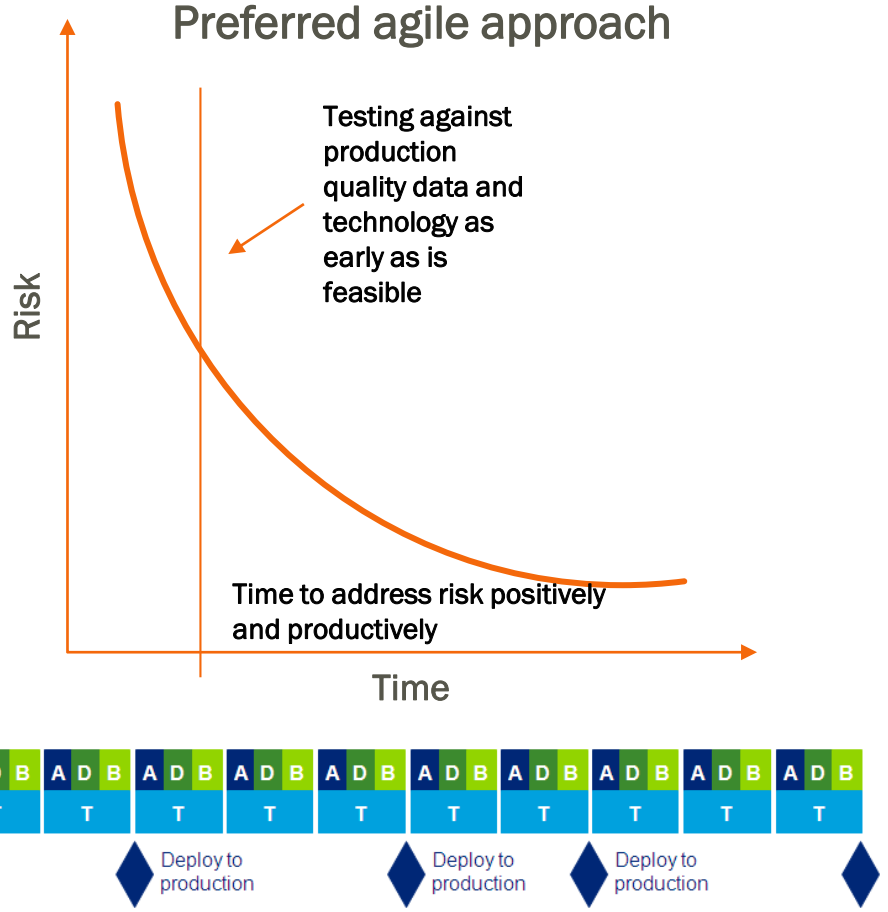
Illustrative Agile comparison to Waterfall delivery



Source: Deloitte

Agile methods *decrease* overall risk





- **Agile:** Balancing risk and opportunity

Source: Deloitte (2014)

Intro to Agile Agile Product Ownership in a Nutshell

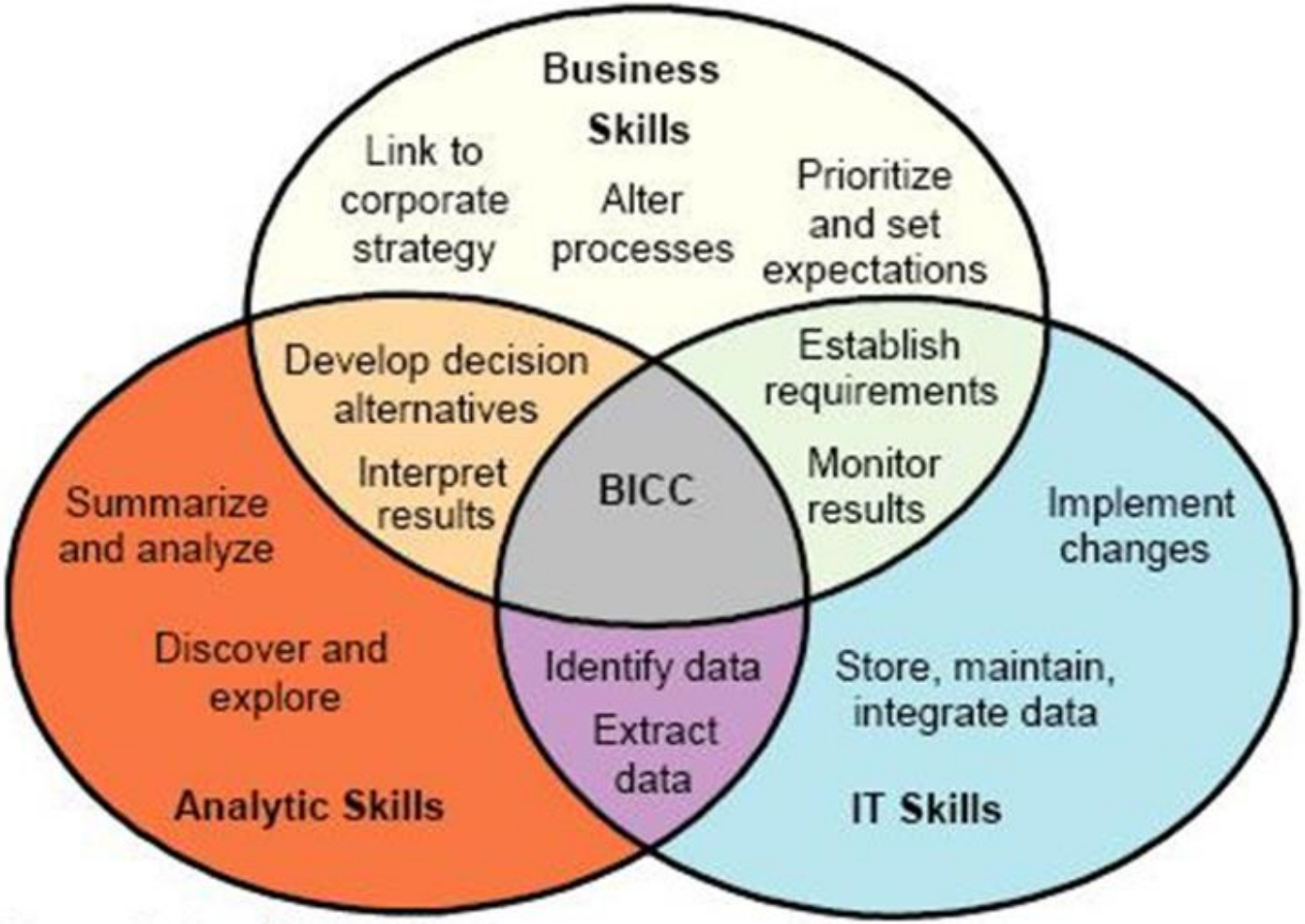
Cross-organisational perspective

- During the implementation process, substantial development steps must be performed from **a cross-organisational perspective.**
- Hence the project activities undertake a cross-functional dimension, and the participants of those activities should include **domain expert from other lines of business** to ratify and validate the policies, strategies, business rules and standards of the BI project.

Project-specific vs Cross-organisational steps

BI Development step	Cross-organisational	Project-specific
• Business case assessment	✓	
• Enterprise infrastructure evaluation	✓	
• Project planning		✓
• Project requirement definition		✓
• Data analysis	✓	
• Application prototyping		✓
• Meta data repository analysis	✓	
• Database design	✓	
• ETL design	✓	
• Metadata data repository design	✓	
• ETL development	✓	
• Application development		✓
• Data mining	✓	
• Meta data repository development	✓	
• Implementation		✓
• Release evaluation	✓	

BI Competency Centre (BICC)



BI Competency Centre (BICC)

- Successful BICCs are chartered to link the business-driven objectives of the enterprise with the information, applications, processes, training, policies and technology the organisation can provide and support.
- The BICC should be **a cross-organisational group** that encompasses a wide range of users, including business analysts and technology-skilled resources.
- The BICC **develops the overall strategic plan** and priorities for business intelligence and performance management, **defines and implements the requirements (including data quality and governance),** and helps the organisation to interpret and apply the insight to business decisions.
- This strategy must be **driven by clear business objectives,** and be able to evolve the corporate objectives.

Business skills

- **Understanding of line-of-business (LOB) needs**, such as finance, sales and marketing, human resources and supply chain
- Understanding of cross-LOB issues (such as customer profitability)
- Ability to communicate at executive level and **link BI with the enterprise's strategic goals**
- Helping business managers set and balance priorities by analysing consequences of choices and creating business cases
- **Understanding the organisation's strategic business objectives** and the role action oriented information plays in achieving the corporate objectives
- Stewardship skills to drive standardisation of official hierarchies, **business vocabularies** and other relevant business terminology, and to participate in semantic reconciliation and ongoing data-quality efforts (e.g. student vs International student)

Analytics skills

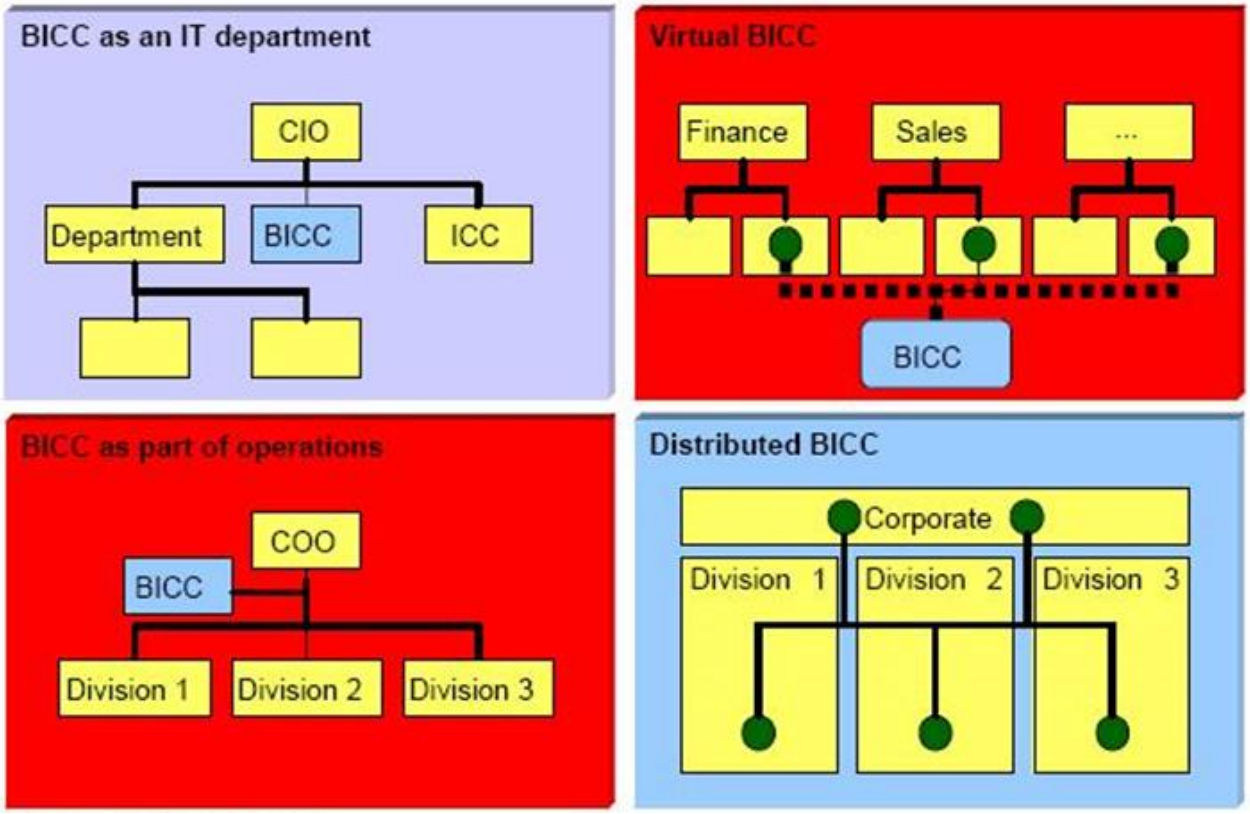
- Fluency with key analytic applications
- Researching business problems and **creating models** that help analyse these business problems
- **Exploring the data and discovering patterns, meaningful relationships, anomalies and trends**
- Working with the IT department to develop insight into how to identify data for a specific analysis or application
- **Using a palette of techniques, ranging from simple data aggregation via statistical analysis to complex data mining**
- Distilling the relevant parts and producing sound recommendations, based on the right set of metrics
- Skills to train the users in how to transform data into action-oriented information and how to use information

IT skills

- Ability to understand the business intelligence infrastructure implications of business and analytic requirements (for example, design changes that may be required to accommodate new data sources)
- **Deep understanding of how to access and manage data required to support business and analysis requirements**
- Deep understanding of diverse business intelligence and performance management **tools and technologies** (such as analytic applications, BPM, data mining, reporting or custom BI applications)
- Understanding of the differences in design and access characteristics of **diverse data sources** (such as DW, transactional DBMS, real time data sources and operational data stores)
- Data governance, architecture and management skills
- **Data administration and metadata** management skills to support lineage, transparency or related compliance requirements to verify and attest to BI results and outputs

Reporting and Accountability in the BICC

- If the BICC is placed too high in the organisation (reporting directly to the board), it runs the risk of becoming disconnected from the real world by its exalted placement.
- If placed too low (within a specific unit), the BICC risks losing its overarching view.



Quiz

- Recently the Woolworths Group reported $60.8bn in total sales and a net profit after tax of $2.4 billion. The company is also Australia's largest Internet retailer, completing $1.2 billion in online sales .....
- Online was flagged in the financial report as a key growth area and Web-based offers exceeded expectations in the past year at 3 million items delivered each week.
- **So, which BICC structure would you recommend to the CEO?**

Woolies video

Quantium leap for Woolworths

PUBLISHED: 02 MAY 2013 00:05:21 | UPDATED: 02 MAY 2013 04:54:22

The equity stake in Quantium reflects Woolworths chief executive Grant O'Brien's strategy to put in place enablers for a new era of growth. **Photo: Glenn Hunt**

Woolworths' 50 per cent stake in analytics firm, Quantium, is helping the supermarket giant tailor the shopping experience to the needs of customers, its CEO said $20M for 50% stake: http://www.quantium.com.au/

Cost-Benefit Analysis: Examining the costs for BI

Type of cost	Cost items	Detailed cost items
One-time	Hardware	• Disk storage • Processor • Network communication
	Software	• Extraction, transformation, and loading (ETL) software • Database management software (DBMS) • Metadata management tools • Monitoring tools • Data warehouse design/construction tools • End-user data access/analysis tools
	Professional services	• IT staff (e.g., database administrators, data modellers) • Business and end-user personnel • External consultants & Trainers

Examining the costs for BI: Recurring cost

Type of cost	Cost items	Detailed cost items
Recurring	Data refresh	• Maintenance and update of data warehouse and metadata infrastructure
	Data warehouse administration	• Periodic verification of the conformance to the enterprise data model • Servicing data mart requests for data • Capacity planning • Monitoring of activity and data • Occasional reorganisation and restructuring of data • Archiving of data • Summary table usage analysis • Security administration

Factors Affecting the costs for BI

The development costs may vary from one organisation to another. Hence, the actual dollar figure relies on a number of factors:

1. The organisation's size (e.g. Bank of Queensland vs HSBC) .
2. The amount of data to be kept in the data warehouse
3. The level or granularity of data required.
4. The sophistication of the end users.
5. The competitiveness of the organisation.
6. The speed with which the data warehouse is to be constructed.
7. The current state of technology within the organisation.
8. The type of data architecture to be adopted - centralised or distributed.
9. The decision-making culture of the organisation (e.g. Guanxi vs Fact-based).

Saving examples for each type of the benefits

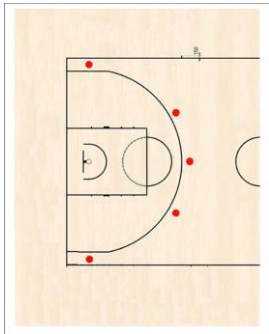
Type of benefit	Detailed saving examples
Data mart consolidation	• Reduction of multiple decision support platforms • Hardware and software cost savings • Operational efficiencies
Time savings	• Less time spent by IT personnel downloading data for users • Less time spent by IT personnel writing queries for users • Less time spent locating data • Less time spent by analysts responding to requests for information
More and better information	• Having information that did not previously exist • Users' ability to analyse data in new ways • Ability to think of the business in new ways
Personnel savings	• Redeployment of IT personnel • Faster company growth without adding personnel • Redeployment of operational personnel to higher-value-producing activities

Saving examples for each type of the benefits - 2

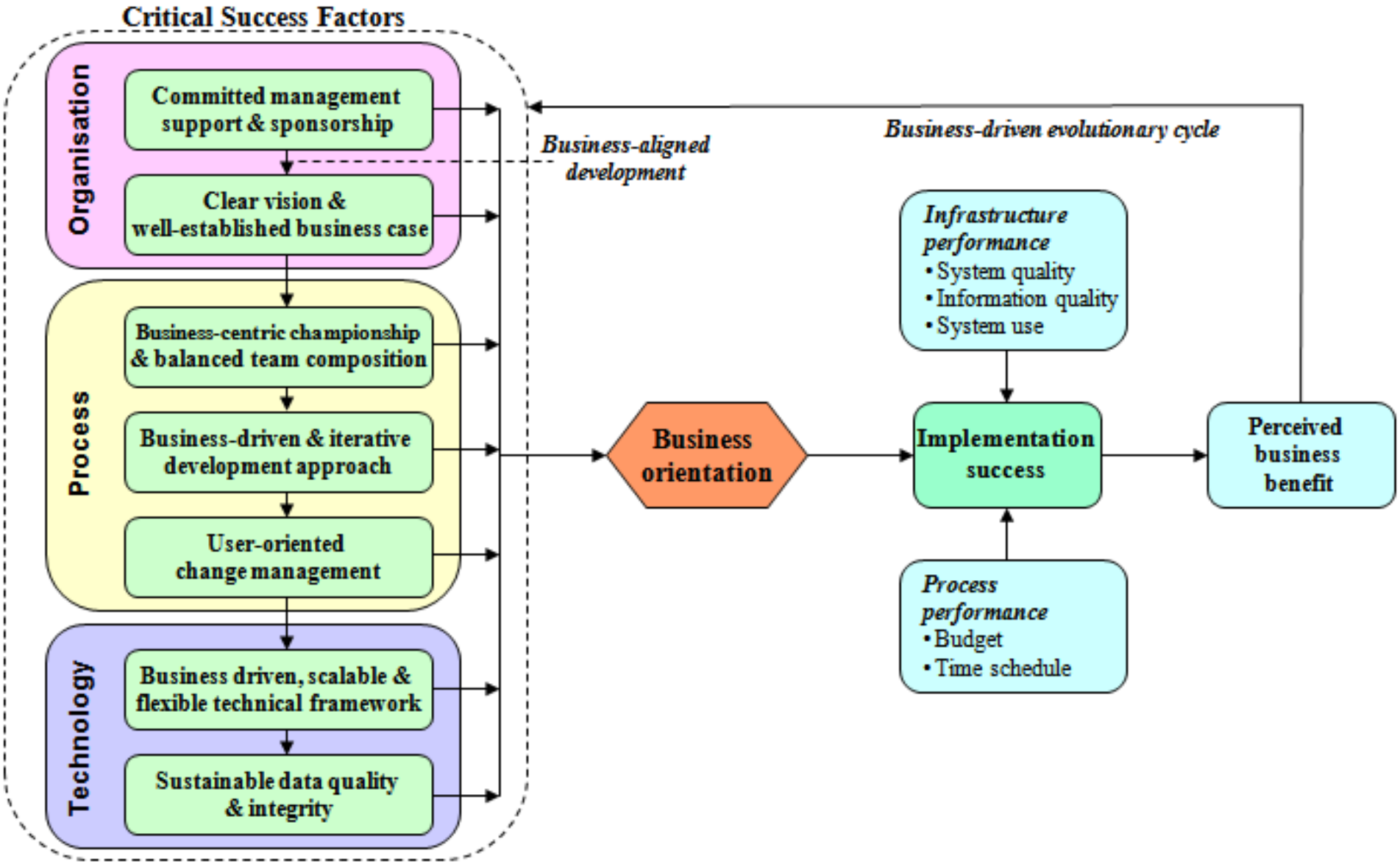
Type of benefit	Detailed saving examples
Improved decision making	• Decisions based on facts rather than intuition • Faster decision making • Ability to analyse alternatives better • Ability to identify and act on problems better
Business process improvement	• Redesign of jobs • Procurement savings • Shorter business cycles • Ability to identify and correct problems with business processes
Support for strategic business objectives	• Faster response to changing market conditions • Increased market share • Improved speed to market with new products • Supply chain integration

Intangible benefits of a BI investment

- Often, the overall benefits provided by the **intangibles are deemed to outweigh far more than the tangibles.**
- Many executives do not insist on a rigorous cost-justification for BI project because many of the benefits are considered intangible and thus hard to be quantified.
- Instead, many organisations emphasise on the "sweet spots" of BI project, where the greatest business value and ROI can be found.
- This is simply because it is **not feasible to estimate** all of the possible benefits from BI effort.
- Typical examples of intangible benefits include *competitive advantage, better control of the business, greater end user satisfaction, and better targeting of potential customers.*
- *BI Benefit Example video*



Critical Success Factors Framework for BI



Critical Success Factors

- **Clear vision and well-established business care**

  This CSF refers to the existence of a strategic business vision with a clear outline of business objectives. In implementing BI systems, a detailed business case is required to describe the BI initiative in qualitative terms, and more importantly it must be aligned with the business vision. The case should clearly outline the business needs, processes and inadequacies of the existing information infrastructure to address the core decision-support problems of the business.

- **Committed management support and sponsorship**

  This CSF refers to the commitment and sponsorship of top management to the BI initiative. This commitment is particularly required to overcome organisational challenges, including issues such as: flow of information, data ownership and technical framework development that is cross-functional, people issues, and consistent sponsorship of the initiative from the business side.

*Please refer to additional Reading for details

Critical Success Factors

- **Business-centric championship and balanced team composition**

  This CSF refers to a business-centric champion who views the BI system in strategic and organisational terms rather than in technical terms. Ideally the champion possesses strong business acumen, is technically knowledgeable, and committed to the leadership of the BI competency team. The team comprises cross-functional representatives from IT and business. They provide a central location to drive consistent BI deployments, and this ensures ease in coordinating and supporting BI and performance management initiatives that span multiple departments.

- **Business-driven and iterative development approach**

  The scope of the BI system implementation is clearly defined at the outset, and an incremental delivery ('iterative') approach is adopted. The project commences in those areas which can readily be impacted in order to get buy-in and where programs can be scheduled to deliver quick wins.

- **User-oriented change management**

  Key users and relevant functional managers are involved throughout the entire implementation process, and during the business-driven, iterative maintenance process to develop further improvements. Training, education, and consistent support from the BI competency team are in place to induce individuals to embrace new practices, procedures and technology throughout the period of the system implementation.

Critical Success Factors

- **Business-driven, scalable and flexible technical framework**

  This CSF refers to the establishment of a strategic, scalable and flexible technical framework covering both architecture design and data modelling in alignment with short and long-term business requirements, and including additional internal and external data sources. At the initial phase, a pilot prototype is used as proof-of-concept and stable source systems are in place.

- **Sustainable data quality and integrity**

  This CSF refers to business-led establishment of common definitions, measures and classifications that are used across the organisation, and the foundation of high-quality data at source systems, and a data governance framework is in place to monitor the data collection process

Data Quality Matters!

- Information is generated from business data which may come from many sources
- Need quality data to generate quality information "Garbage in, garbage out"
- Good quality information which is integrated, organised and provided in a timely fashion supports mangers to make good decisions

Some types of Data Quality Problems

Incomplete values

Violation of business rules

Multipurpose fields

Synonyms (Same object – different names)

Homonyms (Different objects – same name)

Missing values

Cryptic data

Inconsistent data types

Multipurpose fields

Non-unique identifiers

Invalid Values

Orphans

Misfielded values

Contradiction

Invalid keys

Out of range

Absence of data

Inconsistent Null rules

Pattern exceptions

Mismatched entries

Potential defaults

Inconsistent Data types

Definition mismatches

Dummy values

Rule exceptions

Duplicates

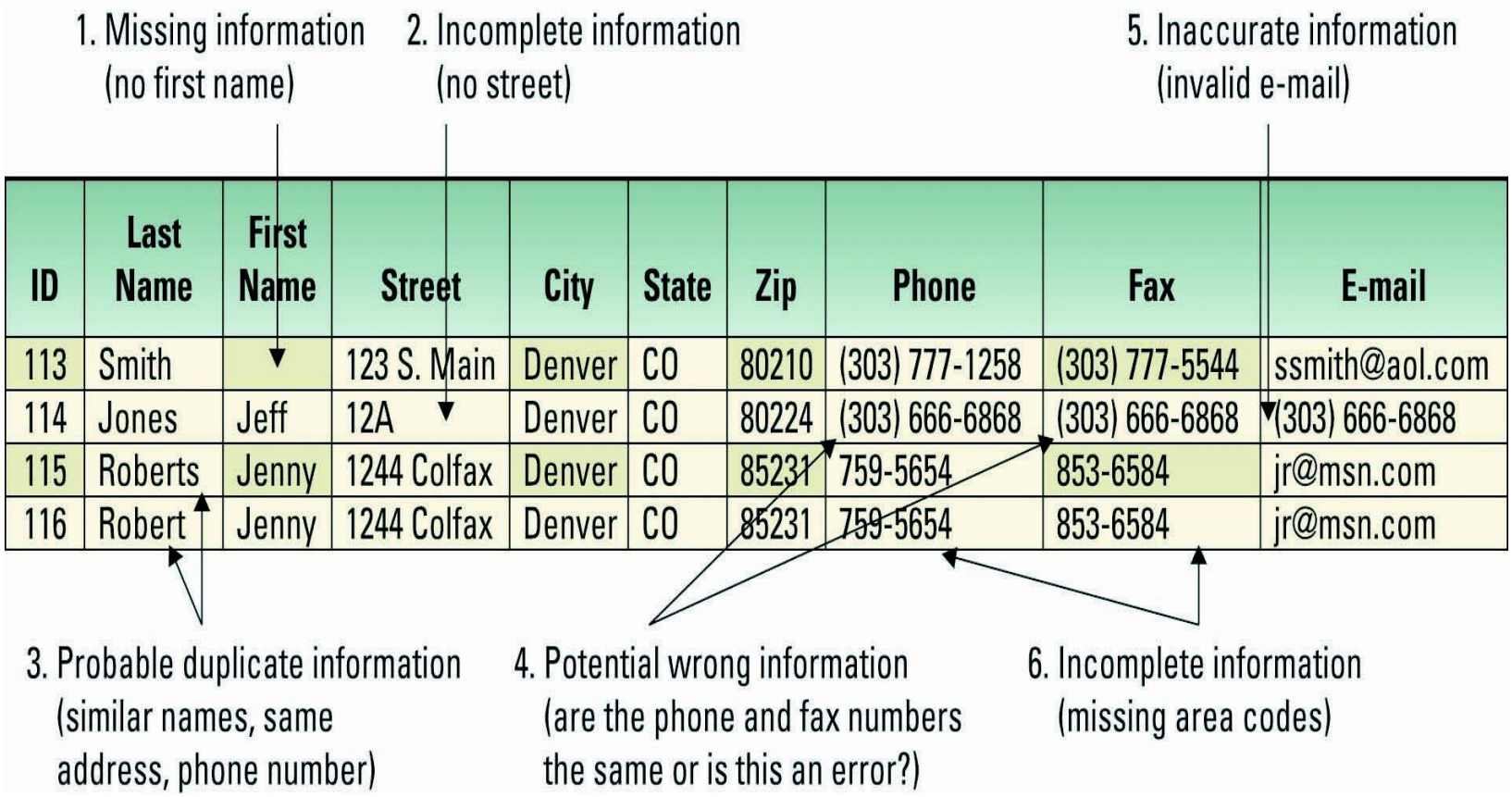
Spelling errors

Unused fields

Data + Business Rules = Information

QUALITY (Data + Business Rules) = Information

Individual Level: Low Quality Information



ID	Last Name	First Name	Street	City	State	Zip	Phone	Fax	E-mail
113	Smith		123 S. Main	Denver	CO	80210	(303) 777-1258	(303) 777-5544	ssmith@aol.com
114	Jones	Jeff	12A	Denver	CO	80224	(303) 666-6868	(303) 666-6868	(303) 666-6868
115	Roberts	Jenny	1244 Colfax	Denver	CO	85231	759-5654	853-6584	jr@msn.com
116	Robert	Jenny	1244 Colfax	Denver	CO	85231	759-5654	853-6584	jr@msn.com

Source: Haag et al

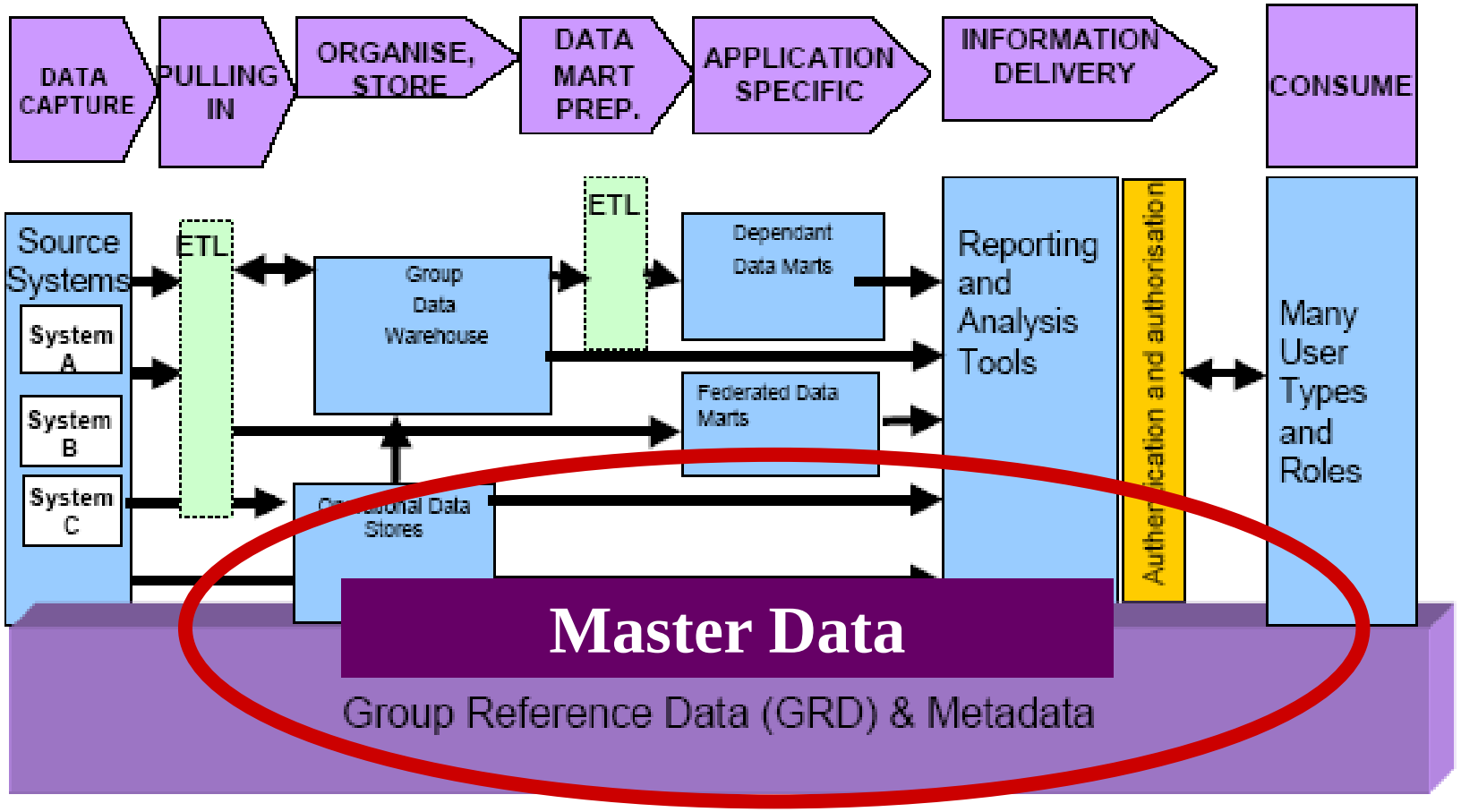
The Primary Sources of Low Quality Information

1. Online customers intentionally enter inaccurate information to protect their privacy.
2. Information from different systems have different entry standards and formats.
3. Call center operators enter abbreviated or erroneous information by accident or to save time.
4. Third party and external information contains inconsistencies, inaccuracies, and errors.

Potential Business Effects Resulting From Low Quality Information

1. Inability to accurately track customers.
2. Difficulty identifying valuable customers.
3. Inability to identify selling opportunities.
4. Marketing to nonexistent customers.
5. Difficulty tracking revenue due to inaccurate invoices.
6. Inability to build strong customer relationships.

Enterprise Level: Master Data Management



Common Reference: Measures

- Measures are FACTS
- Calculated according to business rules

Who's telling the truth?

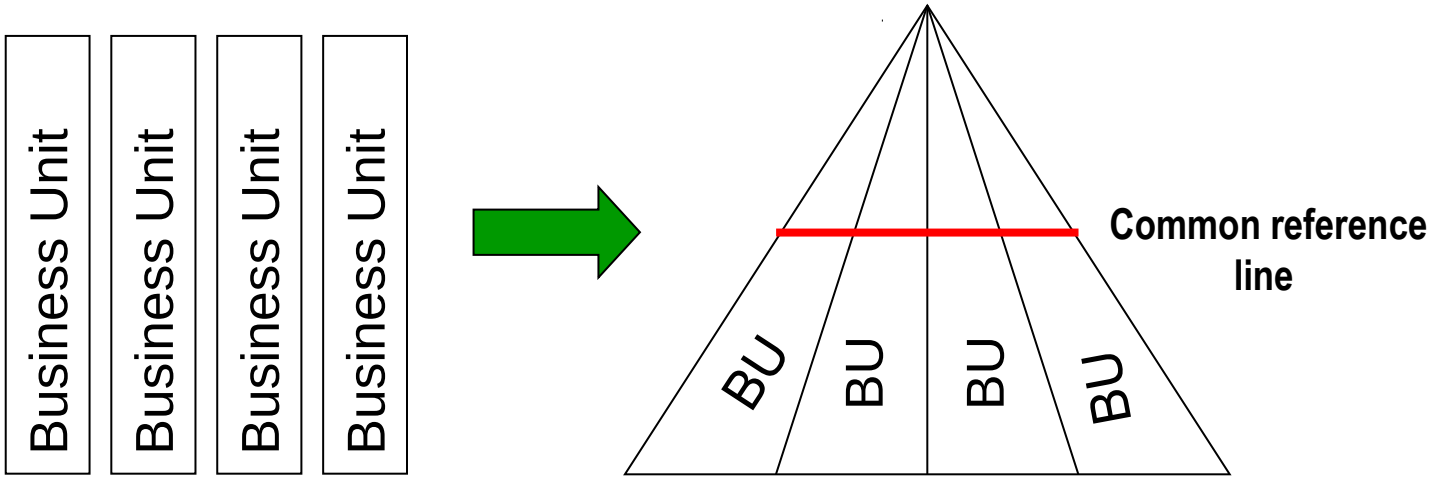
E.g: "Corridor" for Rail Company

- **Finance VS Maintenance VS Operation department**

Group Measure Definitions must be Agreed, Approved and Published!

Business–led establishment of common reference

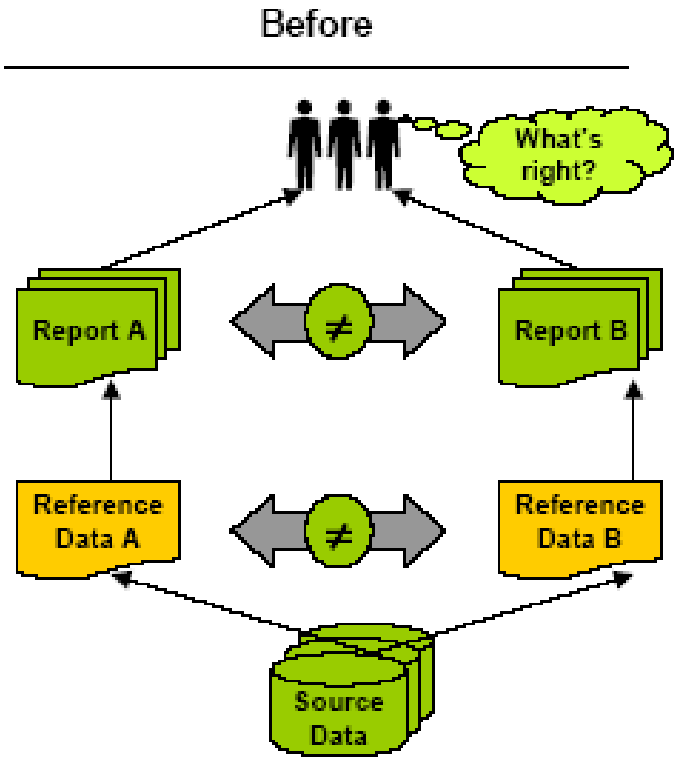
- Business side must lead to solve business/data issues
- Cross system analysis to profile a master data set
- Obtain a high-level of information confidence



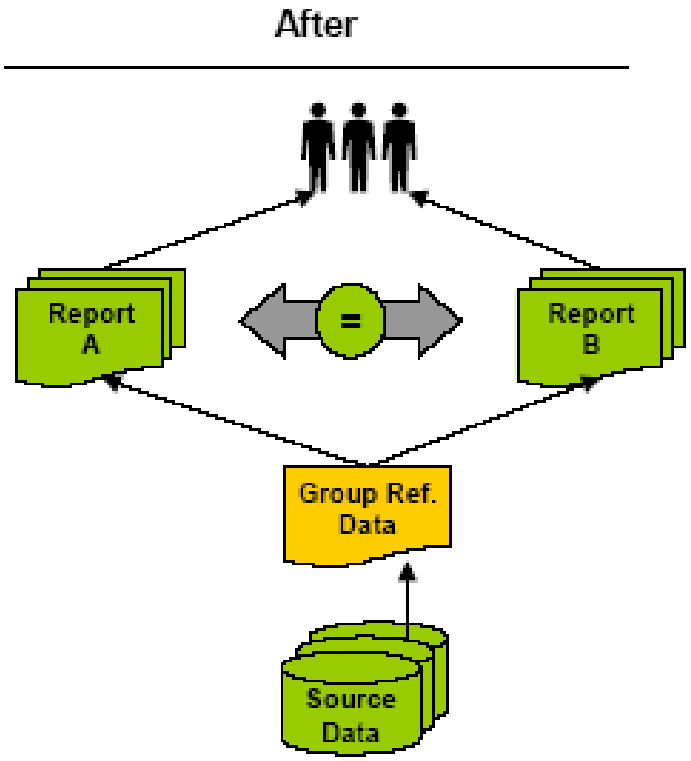
Making Measures Real

- Measure definitions must be *consistent*
- Measures capable of being *aggregated*
- Agreed measures may exist within a measure *hierarchy*
- All governed measures must be recorded & *published*
- The calculations developed must be *re-usable* by all IS
- Must posses a *unique* name. Anything uses this name must be calculated the same way, and
- .....STRONG governance

Master Data Drives Info Consistency → Management Efficiency



Duplicated effort, unnecessary reconciliation



High level of info integrity, reusable mgt information

Summary

- BI lifecycle is an iterative/evolutionary process
- The BI roadmap and project management is different from conventional systems
- BICC requires Business, Analytics, and IT skills
- BICC structure depends on organisational needs
- BI Competency Centre and team composition is unique
- Sound understanding of BI cost and benefits
- A set of Critical Success Factors influencing BI sucess
- Master data management for BI is critical to ensure consistent interpretation


SHCOOL

Research Insight: BI Traceability

- See JDM paper