



Business Intelligence and the Business Analyst

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Learning objectives

Grasp the concept of business intelligence

Your vital role as the BA on the BI project

Key tools and techniques to support requirements

Understand cubes, fact and dimensions



Concept of business intelligence

Provide better insights into data so that management and operational staff can make better decisions that are in line with strategic goals and objectives.

“40% of major decisions are based not on facts, but on the manager’s gut”

- Thomas H. Davenport and Jeanne G. Harris, Robert Morison, *Analytics at Work*

Key terms

Business coverage, Decision Models, Logical Data Model, Data Dictionary

Online Transactional Processing (OLTP) / Online Analytical Processing (OLAP)

Ad-hoc reporting, Data Mining, Dashboards, Scorecards

Extraction, Transformation and Loading (ETL)

Cubes, Facts and Dimensions



Business requirements

Conduct enterprise analysis with key stakeholders

Requirements are elicited through discussion of strategies, plans and objectives of the corporation

Key is to allow the business to drive the requirements

Fit in an organizational assessment to document transition and other stated requirements

Work on getting the real requirements documented and approved

Write requirements with Verb-Audience-Capability-Criterion syntax

Example, **Verb** → "To enable...", **Audience** → "...business users...", **Capability** → "...to generate customer reports...", **Criterion** → "...every week" - Learning Tree

Tools and techniques

Entity relationship models (in database circles)

Data profiling

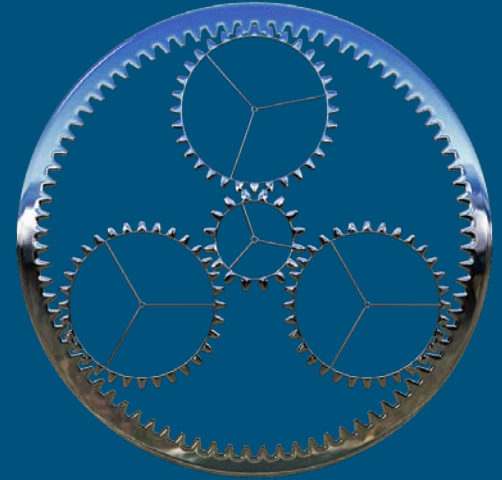
Logical and physical data model review

Past ETL practices

Process diagram analysis

Root cause analysis, past barriers to getting true reporting needs

Dimension modelling, functional use of data, decision models



Cubes, facts and dimensions

Cubes are a results of taking data from many sources, transforming the data and loading it into the analysis environment

Aggregation points

Fact tables store numeric data to be analyzed, called “measures” (sales, purchase orders)

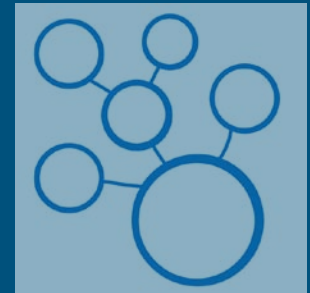
Dimension tables provide context to the fact tables (dates, times, countries)

Dimension tables can be built using data from Open Data sources

Business Process to Dimension Mapping

Business Process	Dimensions				
	Country	Date	Time	Supplier	Customer
Internet Sales	X	X	X		X
Member Management	X	X	X		X
Supplier Management		X	X	X	

Knowing the business processes and the dimensions that could be applied to them will help identify facts, i.e., Order quantity, Sales Amount facts for the Internet Sales business process



Key messages

Requirements driven by the business is vital to success of the BI project

Being an ambassador of change will help with cultural shifts to an analytical environment.

Take an enterprise analysis approach to data projects. Data is a corporate asset.

Use modelling tools effectively to deliver key concepts and increase understanding between IT (developers/solution providers) and Business (the users)

Limit the scope for quick wins. It is easier to work small and make adjustments than work big and struggle to fix issues once in production.

[SLIDE 1 - OPENING SLIDE]

Introduction

Good evening everyone. And thank you Preethi for that kind introduction. Bonjour tout le monde. Je suis très heureux d'être ici avec vous ce soir. Happy New Year.

I am glad to see some familiar faces here tonight, and meet some new people. Moeed, as I mentioned to Preethi earlier, thank you helping to slot in business intelligence as a topic tonight. I appreciate it.

I also want to extend a sincere thanks to the entire board of the Ottawa-Outaouais chapter of the IIBA for talking with you tonight. I also want to convey my thanks for the Ottawa Police Association for continuing to host the chapter events here and to [insert sponsor here] for sponsoring tonight's talk and providing the training literature and accessories. And I want to thank you, my colleagues and peers in the BA field for being here. I am glad you made it tonight.

As Preethi mentioned, my work at the Standards Council of Canada over the last 12 years spans not only the business analysis field but also the information technology arena covering database administration, software development and application support. In the past few years I have been working in the reporting and business intelligence area. I work with a lot of data, seeing many problems and I, as some of you might have experienced as well, have come across a plethora of challenges and bottlenecks faced by users reliant on existing reporting concepts and techniques. I extend an invitation to all of you now as I would be very interested to learn about your experience with data projects, so that we can continue to collaborate now and in the future.

[SLIDE 2] - Learning Objectives

Tonight I want to introduce you to, or if you have some experience already in the field, refresh your understanding of the concept of business intelligence through the BI perspective, what it is, what it is designed to do, and your vital role as requirements ambassador when eliciting business requirements from key stakeholders. I will go further to talk about some of the tools and techniques you can use to ensure good, quality business requirements are modelled, developed, drafted, circulated and understood by all who will take part in the building of the business intelligence solution. If you have been on a BI project, you may have used a favourite tool or technique that worked best. You might be open and wanting to begin experimenting with new techniques. Either way, you work with what you are comfortable with knowing which ones have worked best to achieve the desired results. I will conclude tonight's presentation with some key takeaways and impart knowledge that aligns with the BI perspective in the BABOK.

Business intelligence has many sub-specialties, and is called many things. I encourage you to follow up on some of these when you have the chance to do so. The BI field is large and has many subjects that we will be able to focus on only by continuing our knowledge gathering through additional presentations, workshops and focus groups. But often you will hear terms like big data and although I would enjoy talking about architecture, analytical tools, vendor-specific solutions and technologies, and dive into showing BI queries and multidimensional data cubes, I want to maximize our time here tonight focussing on the business requirements aspect and introducing terms and concepts to you so you can leverage them on your BI project, enhance your understanding of key tools and add to your arsenal of knowledge regardless of the size or magnitude of a data project in which you might find yourself now or in the future. Hopefully you will come away with a better sense of data sources, integration, enterprise needs, decision support and decision points and how they play into BI projects.

Like I said just a moment ago, business intelligence provides a unique opportunity for organizations of any type whether that type be a government body, a non-governmental organization, a private business small or large, or a non profit organization by leveraging advanced BI functions. Ask any key stakeholder from any of these types of businesses about why their business uses business intelligence and you receive a number of different answers. And this is normal depending on the industry in which they operate their business. They may want to discover new business opportunities, identify trends, support better decision making in line with strategic goals or objectives, achieve better forecasting and budgeting with financial data, or simply to improve existing business processes, just to name a few. This is the scope of change. This is certainly not an exhaustive list. We could literally spend the time allotted for this rest of tonight's talk just jotting down and exploring key opportunities for why businesses use or have a need for business intelligence. Often though, in my experience, stakeholders work under the shadow of inadequate static reporting queries that just don't cut it anymore in terms of providing deeper insights into what the data is telling them at a level consistent with expectations needed to effectively run their business, whether that be at an executive, management and process or operational level.

[SLIDE 3] - Concept of business intelligence

Before I delve into our discussion further, let me give you a statistic from research done by Thomas Davenport, Jeanne Harris and Robert Morison, knowledge leaders in the field of business analytics. Forty percent of decisions made by managers are taken from experience or gut feeling and not by looking at what the data is telling them. While making decisions based on experience can lead to benign results in some circumstances or even turn out to be good decisions, making them from gut feelings without adequate factual backup can turn a decision into a fiasco, with loss of market share, loss of revenue and other sorts of adverse results often generating questions from the board or shareholder community.

Using a real world example, too, if you are on social media like I am, which is usually not all of the time, you will see how data can influence what you see later on on sites like Twitter or Facebook. The things you like or share on Facebook for example is stored in their databases not only to show your followers and friends your selected interest and preferences, and generate those likes (laugh) but is also acting as input for the Facebook application to show you specific content based on those likes and shared interests the next time you search for specific content or access your home page. This is a form of business intelligence. While there isn't much human decision making going on here, other than perhaps your choice to click or not on specific content links, business intelligence can also be used for any type of decision making process, like tailoring of content to your passions and interests as part of a marketing program.

Our job as business analysts allow us to hear about many types of problems, issues, and opportunities and our role as change agents in this environment is to help the business get from point A to point B. Business intelligence projects are no different. We identify problems with data, assess the current data analysis maturity level and business situation, document where the business needs to be in the future, check and double check data, advanced reporting needs and the opportunities relevant to the business, analyze the gaps, and identify potential solutions that will add value to the organization. You will notice I did not say "sustain". Sometimes just sustaining business operations is akin to saying that a business is fine the way it is. In too many markets and industries, this kind of thinking can adversely affect an organization, suppress any drive for change and stifle innovative approaches to making business better through new ways of using and thinking about data. This is why we constantly challenge a business about why things are the way they are and strive to make things better.

The key point is that data presented to end users in the context of business intelligence allows them to take better action with the results. Data is definable and predictable. You can certainly make some decisions with generic reports and basic queries in some situations but business intelligence provides much deeper insights into decision making processes.

[SLIDE 4] - Key Terms

Given this, I should touch upon the minor and major differences between regular reporting and the dynamic nature of business intelligence.

Reporting and BI rely on the same basic foundations. They depend on data. They perform some action on the data and present it in a certain way to end users. But that is generally where the similarities stop. Regular reporting takes data from transactional databases (those that provide insert, update and delete functions) and presents the data, often as a snapshot in time to end users. A transactional database environment is often called online transactional processing, or OLTP. It's usually a report from one system or application source.

Data in a business intelligence form is built on queries but whose end reports are enriched with additional contextual data. Data comes from transactional environments but is presented to

users in an analytical processing environment and provides dynamic data summation and aggregation support at a level not typically found at levels in basic reports. Systems that support analytical processing are called online analytical processing (OLAP) systems. OLAP environments live in powerful systems and are designed to do just one thing: provide analytical foundations for fast, deep and broad data processing. I will touch upon analytical concepts shortly but here is where the terms cubes, facts and dimensions come in. These are terms that you as a BA on a BI project will need to understand. Just think of it this way for right now. Cubes contain information. Numeric Information is presented as facts. Facts are augmented with contextual details, or what us data geeks call dimensions.

BI solutions depend on good inputs. BA's generate outputs namely what business processes need to be covered or what the scope of change needs to be via enterprise analysis. Is it new or expansion on an existing solution. Information requirements are very important as these will lead insights into not only the types of decisions that are made but how the decisions are made. With scope and information requirements, BA activity can focus on the current and future logical data models and accompanying data dictionary that helps define key terms used in the BI sphere within the organization undergoing change. Logical data models feed the physical design in database management systems. Logical data models help design the conceptual information collection to be used to store vital business details used to feed decisions and help with operational success using data as change drivers. And keep in mind that the main difference between OLTP and OLAP systems is that OLTP systems support inserts, updates, deletes and selects. OLAP systems work only with selects. There is not transactional processing done within an OLAP system.

So why can't all BI be done in a regular reporting environment using standard queries? Typical reporting environments require tens, if not hundreds of queries developed by an IT team usually to satisfy the reporting needs of each line of business. It involves an intricate knowledge of table joins. Typically these kinds of reports are static in nature. And developing queries can take time and be quite sophisticated and lengthy to achieve the required results. Using generic queries often doesn't satisfy the need to answer key questions related to strategic goals and objectives, or provide data in such a way as to answer those deep, insightful questions executives, managers and operational support staff ask every single day.

[SLIDE 5] - Business Requirements

Before we as business analysts can model business intelligence requirements, or even write data requirements to support the project or understand information requirements such as communications methods or types of BI reports (scorecard or conditional alerts), we really need to sit down with key stakeholders first. We gather a list of stakeholders through org charts, interviews and other corporate documents. When we do meet with them, we should think in terms of enterprise analysis, a process where business requirements can be developed by understanding the strategies of the corporation, the qualitative goals and the quantitative objectives of the organization a leadership team wants to achieve, in terms of data they need to

operate their business efficiently and effectively. And what we need to elicit are not just the stated requirements but, as we all know the real requirements, the true needs of the corporation in terms of what data they need access to, how they use data now, where they get reports, how they interact with data, what they use data for, what they do with reports once reviewed and to whom they communicate these reports, just to name a few exploratory angles we can take. This is all output for decision modelling, architecture design, transformation and logical data modelling.

At this point I want to also emphasize that it is the business that drives the data requirements. IT is a vital aspect to help translate business requirement into technical solutions. Staff in the IT group are enablers. They are the facilitators. And yes, they are a key stakeholder in the business intelligence project. They take the requirements and develop the business intelligence environment using logical models assisted by data flow models and perhaps decision models too, to help turn those models into physical data models, using a database management system that comes with or can be supported by analytical processing. However, without the business driving the data project, the project will fall short of its stated goals. Sure, IT can ask key questions and learn the needs, but it is the BA, or group of BAs that bridge the business and IT communities. And it is the business that drives the development needs. IT is there to tell us how feasible a requirement is to implement. Business is a driver of IT change that underpins strategic enterprise analysis. You will need to think strategically as a BA on a BI project too, but that isn't a new trait. We all know this.

Often in a BI or any data project, the scope starts out large and without some governance or controls, becomes unwieldy. I have found that starting out working with a small subset of the scope, such as one business process like Sales, works best and future data needs can be factored in later using a change management scheme. The key here is to identify the data requirements that provide the highest beneficial returns. Start with these requirements to start the process where you dive deeper into ensuring they are clear and concise before working on the other requirements. These can be used to make up what I adapted to call the business requirements valuation matrix and is something I will speak about in a few minutes. If time and money are not an issue, move to other functional areas and understand needs; document similarities and unique needs. Assess whether functional lines need descriptive, predictive or even prescriptive analytics. Most organizations need some kind of descriptive/predictive solutions. Predictive solutions come with trend analysis and forecasting capabilities. Descriptive reporting is more historical in nature. Prescriptive systems tell you what the best solution or outcome may be among many, varied choices.

Not surprisingly, part of the business requirements elicitation process involves looking at management processes (those that support the strategic arm of the business), operational processes such as Sales, Marketing or in one of my cases at the Standards Council of Canada, technical committee member management, and supporting processes such as IT, Administration and Finance. I have often found that a review of business processes yields

requirements embedded in the wording of each step in a process, or is explicitly referenced in those processes.

It also doesn't hurt, if time permits to conduct an organizational readiness assessment to gauge an organization's preparedness and appetite to change from a static, generic reporting culture to one that supports a dynamic, business intelligence framework.

Readiness assessments can often yield, in addition to the details about an organization's analytical culture, transitional requirements that will help a BA understand what training, learning and further knowledge gains are required to get an organization from point A to point B in their data analysis maturity. I often ask myself during my exploratory questions about my organization how analytical our business culture is. While I can make assumptions, I need to confirm or deny those assumptions by learning more about the culture of analysis readiness and documenting the findings. I try to understand how they make decisions today and what they strive for in the future.

You can use the followings questions for example. What data is popular and why? What data is least used or requested and why? How do users think about data? Have they thought of using data in a specific way? How does their current job drive what data they need? Is there data missing from their current needs which can be developed for future needs? When they look at data, what questions do they ask about it? What level of granularity do they need? Can they get the answers from the data they are reviewing? How have decisions made in the past been affected by good or bad data? Does the business work with structured or unstructured data? And the cycle of questions should continue in that fashion. Structured data is usually found in a relationship database. Unstructured data is found in mediums like video, audio and images (even microfiche!).

Remember, not all organizations are analytical in nature in terms of data and nor do they all need to be. In other words, not everyone within an organization immediately thinks strategically and analytically and they all don't need to be. It can be a significant cultural shift to get an organization from thinking in terms of the traditional reports they get to "analyze" to being analytical by nature or just thinking analytically to help you draw out requirements for a BI project. BA's can provide that assistance. We need to continue our roles as elicitor and collaborator.

Often, I will get a request for a report on the stakeholder categories of specific technical committee members. These stakeholder categories represent the industry sector in which each technical committee member works. This could be government, science and technology, consumer advocacy and a host of other categories. Most of the time the request is to get a list of members by category, with email address and organization often as supporting data attributes. I often ask the questions back to the staff member about whether they need a breakdown by date, by login time, by region, by city, by province or by any other attributes. Often I get no as a response, which is fine. As a data analyst, I will provide the static report in

Excel. The point here is that by asking key questions I am putting my analytical hat on and it informs my analysis about the maturity level of analytical thinking within an enterprise and where data is coming from. Again, this is not to shed a negative light on this. It is merely to ascertain through an assessment of traditional requests the types of reports that may be needed in the future and lead to key findings about potential new uses of data. Take hold of interviews, focus groups, even workshops to get more details and draw out stated need. These inputs provide you with the information intelligence needed to ask deeper questions about BI and how business interacts, or prefers to interact with data. Remember, we are here to document current versus potential future needs as well and we can often get that from an analysis of current data reports available for review, which are widely available from users or from IT.

In my experience as a BA working also as a data analyst and database administrator, generic reporting environments are useful but faces challenges. The current state of reporting has shown that data in transactional databases is often bad, lacks sufficient aggregation (a fancy word for summarizations and grouping), comes from different systems and repositories such as text files, various database environments and spreadsheets. From a process perspective, data is often provided to users by IT in what I call an IT-to-Business hand off. IT then waits for requests from the business to update the query, make adjustments or create a new query only to provide a spreadsheet back to the user usually via email or some other method of hand-off. These spreadsheets are sometimes posted to a helpdesk request that may get read by the end user in a few minutes, a few hours, or the next day. I often ask myself that if the user then takes a day to access the report, how important was the request in the first place. It couldn't have been urgent, in my assessment. But this type of analysis of current processes and procedures can lend a huge amount of information into what a new BI environment should provide to users in the future. BI is more than just data; it is also about new ways of getting to data, processing it and taking action with little IT intervention as possible. There are requirements to be gathered, confirmed, assessed, validated and modelled.

On the flip side, though, requests for reports from staff to IT are often placed lower on a work item list as other competing demands on the IT analyst take precedent. This supply and demand type environment creates too many fluctuations in value proposition related to data needs. In today's dynamic environments, whether needing good insights to improve business processes based on a descriptive need, assess market competitiveness, find trends in customer demand using predictive tools or whatever the goal may be for an organization, the need for business to access an environment on demand is now the norm, or at least this is the way things are allegedly going or shifting towards.

And one of the reasons for this on-demand nature is that business want to increase the production of the organization's output for which they are responsible for managing. According to the website maximizer.com, the number one reason to employ business intelligence is just for that reason: to boost productivity. According to the site, they assert that "through traditional data gathering methods, users need to compile and analyze data and write related reports. This can be incredibly time consuming, especially for small businesses that may not have the

employees to do it. With a BI program, [staff] can pull data and create the reports at the click of a button thus freeing up time and resources allowing employees to be more productive on their own tasks.” For more details, please visit the site at maximizer.com and look at the seven reasons why business intelligence is vital to business success. While descriptive analytics remain useful, predictive analytics is being used increasingly because of the trending and forecasting capabilities.

Given this, taking the time to get the requirements right is our task in the project. We put on our ambassador hats, flip on our objectivity lamp, roll up our sleeves, sharpen the pencil or pop the cap off of the sharpie and get down to work.

[SLIDE 6] - Tools and Techniques

In order to do so, there are several tools and techniques at our disposal that we can leverage to facilitate our discussion with the business units about their real needs for how they want data accessed and presented in the future, and to help us elicit needs and document the requirements to satisfy those needs.

A few of these you may have used in your own projects and have become quite familiar with. These include sessions on functional uses of business data, data profiling, decision models, past outcomes of decisions, analyze logical and physical data models. Root cause analysis helps here. Data profiling takes statistics on the data in a database system and reports on details such as maximum and minimum values, frequency, uniqueness, null and empty values and more. If you can get your hands on data profiles, they add value to discussion about future data including what to migrate, how to format and what transformation may be required. Review business process diagrams, data flow model development, entity relationship models creation and a term relevant to tonight’s talk called Dimensional Modelling are all key tools and techniques we can use.

To me, dimensional modelling is one of the fun parts of designing a BI environment. The other, which I will touch upon shortly is the requirements needed for data transformation in a BI project itself from transactional systems to an analytical environment.

While I can’t speak about all of the techniques I mentioned beyond perhaps dimensional modelling, the data industry concept of entity relationship management or modelling (ERM) is important and is closely related to logical data modelling. ERM can help us as BAs answer questions that will lead to the formation of information cubes to be in the BI framework. It also leads us to an understanding of what facts and dimensions we will need in order to support the data project. This supports the functional use of business data. More on facts and dimensions shortly but the key here is to use the modelling techniques to draw out the core needs of the data project, and in a project as particular as BI, ERM can give you a good start on identifying the relationships between data entities and the data attributes that will be required to fill the facts and dimension tables. Taking the data requirements from a line of business or from all

units at an enterprise level whether through observation, focus groups or workshops, we can begin to formulate a model (both current and future) of the data requirements needed for a BI project. Working with a database administrator or data analyst, we can take our models and strengthen them because an IT expert can help us iron out any issues or gaps that come up. We can then turn around and present updates back to the business in terms understandable to them, which is our job throughout the whole process. The cycle continues until we have a good, solid model that accurately reflects what the business really needs and what the IT solution provider understands as to what is being asked for from stakeholders. A key output from this too is the data dictionary as it serves to standardize on the written meaning of key data terms.

[SLIDE 7] - Cubes, Facts and Dimensions

Next I want to introduce you to the terms cube, fact table and dimension tables. The focus is on the business meaning of these key BI concepts, not so much as how to build them in a logical or physical form. Recall that some of our work will need to take place at the enterprise level. Understand that you can build these models as a BA that emanate from this enterprise analysis. You touch upon a logical model a little as you build an entity relationship model or dimension model which is simple to conceptualize, whiteboard and document so that the business understands it but makes it easy for a DBA to translate into a BI solution or a working prototype, as I mentioned a moment ago.

Business Intelligence is where data is presented to users in information cubes, or just cubes for short. Cubes are built from data taken from a variety of sources. Our job as business analysts is to document these information sources. This means that we will need to talk to all users, and not just the IT team although the IT team can probably inform you of where a majority of the source files are located...hopefully. Our stakeholder list is probably going to identify a data modeller, power user, other BA's, data stewards, developers, database administrators and any executive sponsors or BI project steering committee members. I call this the organizational model from a data perspective. These can also help identify roles within the data reporting environment which contributes to security permissions and other access control planning, which feed our roles and permissions matrix.

With their help we can identify all data sources: internal or external. Some of these sources are common to everyday uses such as databases like Microsoft SQL Server, Oracle, Sybase, MS Access, MySQL. Others will be more familiar with text-based sources such as tab-delimited files using Textpad, Editplus or WordPad, or perhaps CSV files. Microsoft Excel is another popular source of data, in its many version iterations such as Excel 2010 and Excel 2013, for example. I heard at training class in which I attended that even microfiche can be a source of data. Mind you it might take some fine extraction and transformation of the unstructured data stored in the file, but I am sure it can be done. All of this data identification from sources is all going to be copied and restructured for query and analysis into an analytical environment. It does not matter what the source. If it contains data, it can be extracted, transformed and loaded

into an analytical environment. It just depends on how much time and money is available to extract that data and to turn it into a useful form going forward in a modern BI project.

Part of your analysis of data will be what it looks like, how good is it from a formatting point of view, its age and the size of specific data fields that store information, just to name a few things. Above all else, asking what the data is supposed to represent helps with requirements. Different answers from different people can yield a larger pool of stated requirements from which we can start working, and breaking down the requirements into manageable pieces. This is part of the activities associated with data quality management.

Another aspect of cube analysis is to identify what aggregations are required. Aggregation is the pre-calculation of data into summarized or group form. Examples of this include overall total sales, sales by region, sales by city, products sold by customer and similar types of numeric summations and data expansion points a user might need to dig deeper into during their analysis of the corporate data.

Another important point is to find out how frequent the cubes are to be updated from data pulled from the data sources. It doesn't hurt to ask this kind of question at this point. The questions could be asked later but getting it out of the way earlier serves several needs. It helps the developers of the BI solution with resource planning, how often to extract data from the data sources that feed the staging area where transformation of the data occurs before the data is loaded into the BI solution, ready for users to query the information cubes. More on extraction, transformation and loading in a second.

And at this point it is also a good idea to determine the roles and permission that users will need. In most BI project, users will only need to have read access in order to query an information cube.

In sum, cubes store details about operational data for all combinations of business aspects that should make up the BI reporting realm. Cubes also make it simpler for non-technical users to use and to get at answers they need to make better business decisions.

The next concept business analysts need to understand are the fact tables and dimensional tables that make up these information cubes.

First, fact tables.

Fact tables store the numeric details of our business domains under analysis. In my organization, for example, we often have requests for reports on technical committee members, number of national standards of Canada submissions or numbers on managing standards referenced in federal and provincial regulations. Your organization might have sales data, inventory data, customer help request details as part of a customer relationship management or CRM program, numbers on frequency of documents accessed on file server or a host of other

data that are represented as numbers related to a specific business domain. In the BI world we call these numeric data "measures". Most fact tables are just that, facts. They contain only numeric data. Our job is to ask the right questions of each line of business about what facts they need to have captured in the BI solution. Facts are often generated from an analysis of business or functional processes such as Sales, Inventory, Products, and Orders.

To note further, fact tables also have keys that not only uniquely identify a record in the fact table - called a surrogate key - but also point to data elements found in other tables making up the BI solution, called foreign keys. The foreign key references that point to unique identification records in other tables are what we refer to as dimension tables in the BI world. Structured data regardless of operational data store is built using keys in good designs.

Dimension tables give context to the fact tables. We must further elicit requirements from the respective business units about the methods in which facts will be sliced, diced, aggregated and summarized. Slicing and dicing is often used when using Excel pivot tables. You can use Excel to represent information cubes ready for analysis by the end user, thereby saving on license fees for procuring a graphical interface. Slicing and dicing are ways to view data at as much granularity as needed. This is one aspect of the requirements to understand the conveyance and communication of data through various methods and formats.

Take for example a fact table on sales. From an enterprise data viewpoint, we need to ask questions of the business about how they plan to see and dig into those sales. Typically I would ask a stakeholder whether they need insights into their facts by date, country, time, location, customer, product, or some other "dimension" to enrich the BI environment. It is the concept of "I need to report on my data by..." that feeds the dimension discussion and also helps us as BAs to model the dimensions as part of an entity relationship diagram or model. So what we are doing is asking business questions and translating the answers into a logical model that we can provide to the IT developers or solution providers, depending on who we have creating the BI solution for the organization.

Ralph Kimball, a proponent of data marts noted that dimensional modelling "is a logical design technique for structuring data so that it's intuitive to business users and delivers fast query performance." That quote was taken from The Data Warehouse Lifecycle Toolkit if you would like to learn more about Kimball and his work in the realm.

Also remember that as part of our data dimension analysis, we are not limited to using data and defining data attributes that only exist from within the organization. We should also ask questions to the business regarding appetite for augmenting factual data using open data from other sources such as Google, the United Nations or the Government of Canada's Open Data portal and other leading organizations that make available data for research and other purposes. The requirements elicitation process might yield a need for obtaining census data, information on demographics, or survey data that is either not available within an organization at

the time. Some of this becomes part of the solution architecture in terms of supporting data from outside physical data sources.

Recall that BI is about enriching the reporting environment to allow the business to make better decisions by adding value to the data on which they depend. The data that could be integrated from outside of a BI solution will depend on what the goals and objectives are of the business using the factual data that is taken from transactional systems. It is our main job to ask the questions needed to ensure that a BI environment that is built possesses the right inputs that generate the key outputs for helping a business make key strategic business decisions.

Let me give you another example of what I mean.

Imagine that you are looking at our sales data. Imagine if you had access to data that provided additional information to make decisions about expanding into a specific city, country or region. If you had access to specific dimension data coupled with additional data for specific cities and regions, the insights opened up could yield a better decision environment. This is a superficial example but I hope you get the point I am trying to make. Dimension data augments fact data by adding useful, publicly available or internally generated data to the information cube required for supporting further analysis, decision support and general improved information delivery, to help with decision making at various points of an operational lifecycle (daily, weekly, quarterly, fiscal).

[SLIDE 8] - Value-Feasibility Matrix Example

Knowing about which dimensions to make available for which business processes can be helped through a simple charting exercise. What this chart consists of is a listing of all of the business areas under consideration, such as Sales, and a list of all of the potential dimensional data that could apply to this business area (time, date, country, etc.). The potential application of dimensional data to business areas under analysis is your job as the BA. Asking the right questions to the right people for the right reasons will yield a healthy matrix for which further analysis can be continued with each business line underpinned with the support of an IT team conversant in the domain of facts and dimensions.

When you have this matrix built, you can also start an analysis of the requirements from a priority perspective. Remember earlier I said that this can help with scope management and can help govern what requirements are worked on first, subject to agreement from the lines of business and input from the IT team. Let me touch on some of this some more for a moment. For each requirement written, ask the business their perceived value of that requirement to their business. Not all requirements will be High priority. In the real world, typically all requirements being a high priority cannot possibly be implemented in one release or phase. Through negotiation and discussion, requirements can be put on a list and subjected to a scrutiny of questions about their relevance to an implementation schedule.

What helps with that implementation schedule is about asking the IT staff who will be responsible for building the BI solution how feasible it would be to implement that requirement. Document the findings. Not every requirement can be implemented with ease. I know. I have been there. You have been there. So after all of the requirements have been reviewed and a feasibility factor has been applied to each of those requirements, you can create another matrix that identifies the requirements that fall somewhere within the value-to-feasibility spectrum. We obviously want to implement those BI requirements that are valued High by the business and very feasible to implement by the IT solution providers. These, if all parties agree, could be the scope of the initial BI project. Those requirements that the business considers of lower value but IT believes is not feasible to implement, meaning it is difficult to implement and requires extra resources to get it done, might be put aside, ignored or dropped. Everything else that falls in between can be either put aside for implementation once the initial requirements are met or are put into a log for further discussion because of the uncertainty as to their feasibility. Feel free to discuss this with me at a later date or if time permits this evening.

And while we continue discussions about facts and dimensions with the business, validating and documenting data sources, we can also have some fun with stakeholders about how the data is to be transformed before it is served up to the end users. Transformation is basically cleaning up the data and formatting it to a consistent standard before it gets put into the BI environment. What that standard is becomes our responsibility. We need to identify any corporate policies or procedures that can help us with our transformation requirements elicitation, and if there aren't any, we need to elicit, document, validate and get approval on those transformation requirements. Transformation requirements are not to be confused with transitional requirements.

While I can spend a whole workshop on extraction of data from data sources, transforming the data in a staging area and use ERM and dimension models to act as inputs into the design and eventual loading of the data into the physical BI solution, remember that transformation is an important concept of the BI analysis. Transactional systems often have bad data in them especially if text-based database systems are used. It is our job to assist with identifying this bad data and making it better, cleaner and structured to a consistent format that will make the end users value the BI rollout. Bad data can lead to bad decisions and could result in gaining market share or losing market share. Bad data extracted from a transactional system and loaded into an analytical system in a format that is just as bad is a pointless exercise and a waste of valuable time and effort for a BI project. Assume you will work with bad data. Your source data quality assessment will either validate your assumption or reduce the amount of work needed to get quality data into the analytical environment.

No matter what the size of the organization, we can help a business using value proposition to achieve better gains into their data through trends, slice and dice analysis, decision making, etc., to support strategic aims, goals and objectives. Assess and validate each solution

implemented to ensure the requirements are continuing to be met and sustains value to the business.

The size of our task will depend on the scope of the project. Part of our enterprise analysis will consist of working with stakeholders to gauge whether a BI solution is to cover the whole organization or a subset of that organization. This is critical because the answer to that questions will drive whether we analyze a larger or smaller data source set, as I mentioned earlier whether we target a broad or narrow subject area and whether our task will be complex or simple.

[SLIDE 9] - Key Messages

Key messages I want to leave you with tonight are as follows.

As business analysts, we need to ask a ton of questions at the enterprise level. What are the goals of the organization in terms of data? What are the key objectives of the business and what data is required to help them make decisions that will achieve those objectives? In turn, will these achieve the goals set out by the organization? We must help a business answer these questions but we also must let them tell us what they need as business drives the need for IT solutions in a BI project. We need to find where the value is coming from.

The second key message is to understand that we must try to help an organization rethink traditional methods of reporting by laying out the benefits of a business intelligence concept. We need to continue to act as ambassadors of change, the drivers of a retooling of how data is to be perceived, used and understood by each stakeholder. Bi projects impact our planning and monitoring. Scope feeds our planning. A wider scope means more requirements, more dependencies, more inter-related requirements that require heightened monitoring.

The third message is whether data under analysis is meant for all stakeholders or is a subset of the organization. Determining the breadth of the data requirements will assist with scope management and level of effort required to effect and manage change to a shift to an analytical culture, or if the culture is already mature, get them to the next level of analytics.

We can only document requirements with the support of tools and techniques. We must engage the models at our disposal such as entity relationship models, data models and dimension models, and determining the bottlenecks and results of using traditional reporting methods in the decision making process through a use of as-is, to-be assessment. Nothing replaces the need for a current state - future state analysis during the analysis of the enterprise. An organization will always want to move from point A to point B. It is our business to assess how wide the gap is that requires intervention to fill the gaps and provide solutions that will help an organization move to point B. Our objective collaboration and motivation helps keep the focus and puts everyone on track, helping with design and solution delivery effectively.

And finally, work with less. Use the priority matrix as a guide to understanding which data requirements should be implemented first. Don't make life complicated by accepting a list of requirements as all that are required for implementation. Negotiations and further insights will govern which requirements get implemented first. There is always room for consensus and compromise in any project. It makes our life cycle management of requirements easier, and helps our needs at a level consistent with what's needed to effectively deliver a solution whether we have the flexibility to expand on an system architecture or face constraints to deliver within an existing one.

I hope that my remarks have kept us at a business level. There is so much to understand about BI and business analysis. I hope that in the future, and I leave this with the you and the IIBA leadership team is that we conduct workshops on this topic where we can leverage more time to get at some of the finer details that I presented here tonight.

And now I would like to open it up for questions, comments or statements from you in the time we have remaining.

Thank you very much.