

Please explain:

a) The general concept of Business Intelligence,

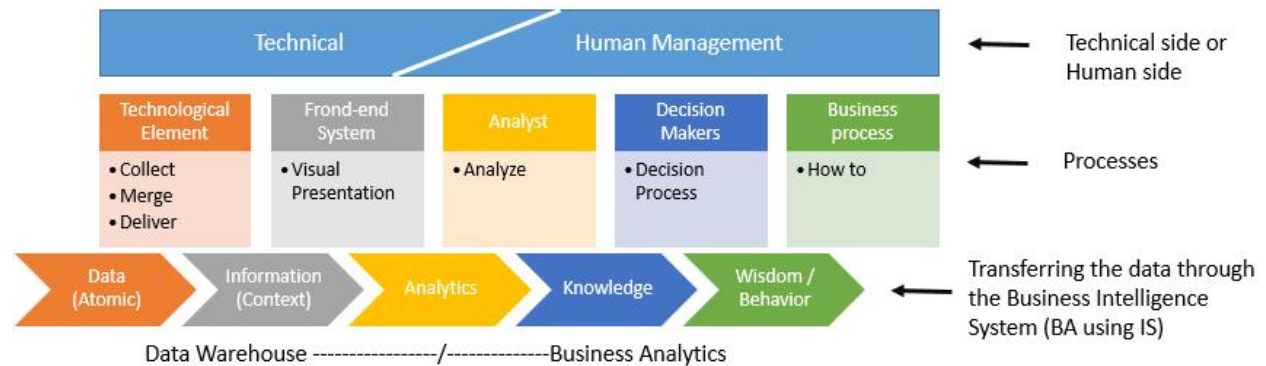


Figure 1

Business intelligence is about transition from data into knowledge and wisdom (see figure 1). Business intelligence can be expressed in different ways, but it is important to visualize it, so not only the IT-department have knowledge, but also that knowledge and wisdom can be created in the rest of the organization, meaning that all layers of the organization from ground-floor employees to top management can understand the use and goals of business intelligence.

More moving from the first steps (Data – information – analytics) to the next steps (wisdom / applied knowledge), less using the technological element (Technical) and more using human competencies (human management).

Corrections are made to the measurement in order to find a new and better strategy, and to find a new and better target. Better decisions are made in the management cycle: strategy -> target -> measurement -> corrections -> strategy ... etc. The most important part of the cycle is continuously improvement (in all four parts) and this is the base of the better decisions.

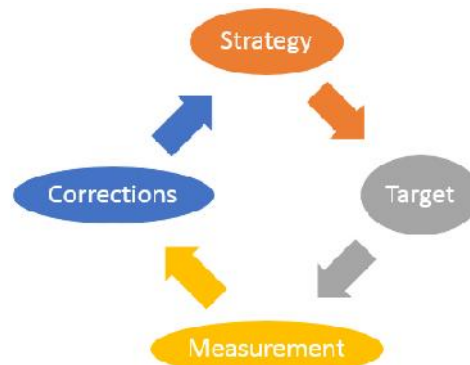
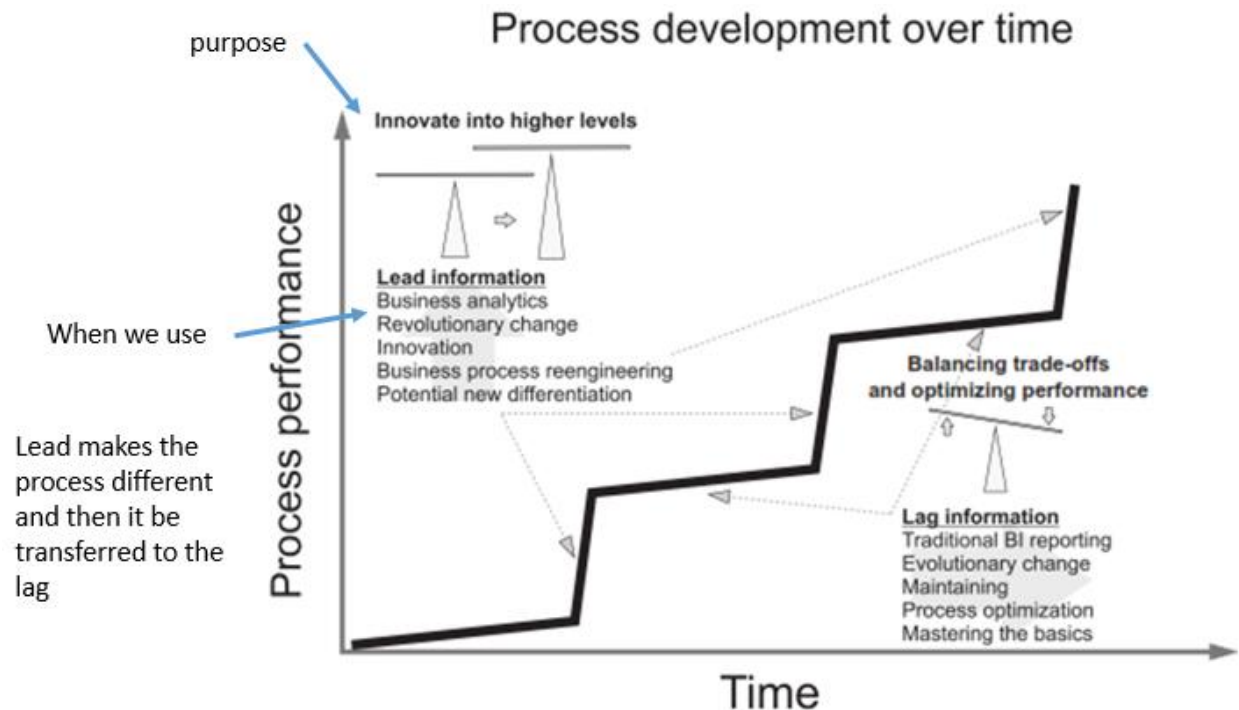


Figure 2

Business intelligence is more than an IT-project, but a continuously improving and transforming lag data into leading data (Figure 3); it is about sharing knowledge and wisdom from interpreting data. Using business intelligence in an organization is only feasible if the return of the investment is positive and can strengthen the company's competitive advantage.

The purpose of using business intelligence is to support better decision making and aligning the organization in moving towards the strategic goals of the company.



**EXHIBIT 1.1** The Stairway Chart: Emphasizing the Difference between Lead and Lag Information

Figure 3

Lead: when we are talking about the strategy. If we are talking about the measure of what it is about the history, or doing processes, or setting the measures. It is where that BI helps us.

b) IMSUK's role in the Business Intelligence process,

IMSUK uses the Business Intelligence in a traditional way. As The problems it has with the optimum and maximum use of its data are:

1. It uses just the last part of converted data (in a fixed format), but the business' needs in the industry are changing (in all industries), and they cannot continue with this traditional way.
2. The model of using data that IMSUK uses is about the final and fixed format of the information. This model do not allow the data-consumers to get an insight in a shorter time, and also the IMSUK itself cannot use selling the information in each step (figure 1).
3. It does not use suitable KPIs for detecting the exact points of sales in the industry, so it cannot find the right formats may it can sell to the information consumers. Also it has fired the sales managers who had some deep insights about the sales process, and may be useful for recognizing the exact formats of the data (for sales in the first steps).
4. It converts data manually and with the huge volume (and also variety and velocity) of nowadays data generation, it is not more responsive to industry needs (and maybe less accurate and more time consuming).

With above mentioned points, it seems more that the role of BI in IMSUK, looks like a reporting system that knows the final formats of demanded reports and just convert the source data to them. It does not even automate its data conversion processes.

#### c) How Business Intelligence can help IMSUK improve the competitive position

In fact the IMSUK does not use BI in a useful way. They can use BI concepts through:

1. Use **lag** information to produce the **lead** information. They just use lag information and do not use this information to **Business Analytics** (e.g. how they can use another data in the industry), **Innovation** (e.g. making some new reports), **evolutionary changes** (e.g. generating suitable data for other industries), **business process reengineering** (e.g. collecting data in a different way), **potential new differentiation** (e.g. using the same methods for entering other industries like media, designing new formats for data to prepared them for selling ...)
2. Move the first steps in the process (data, information, analytics ...) to the technical side and make them automatic. So the business analysts can think about the improvement of the Business.
3. With visualization, the BI can help the IMSUK to see what is happening in the industry, so it can help to decide (or even generate) about other points of decision making (e.g. public healthcare, the trend of consuming one special drug, the frequency of vesting doctors In a specific local area ...) that helps decision making in higher levels in the industry or even government.
4. It can help themselves with finding new KPIs for deciding about the new strategies, make some corrections to KPIs, and set some new targets.

#### d) The general role of a Data Warehouse (DW) in a Business Intelligence solution

The point of having a data warehouse is to give the organization a common information platform, which ensures consistent, integrated, and valid data across source systems and business areas. This is essential if a company wants to obtain the most complete picture possible of its customers.

A data warehouse consists of a technical part and a business part. The technical part must ensure that the organization's data is collected from its source systems, and that it is stored, combined, structured, and cleansed regardless of the source system platform. The business content of a data warehouse must ensure that the desired key figures and reports can be created. The purpose of a data warehouse is to collect information required by the organization's business side.

Because the DW use some facts that it measure them in some contexts (dimensions), the most valuable benefit of using this kind of architecture is the combination of the information (exits is fact tables as numeric measures) that are meaningful in different contexts. DW use some measures Business analytics is not possible without access to a combined data foundation from the organization's data-creating source systems. In fact, that is exactly what a data warehouse does.

#### e) The role of a Data Warehouse in the IMSUK-business

While all works in IMSUK is manually (ETL process: Extract, Transform, and Load), if there is a DW, the company can integrate all various types of its data into a common information platform, which ensures consistent, integrated, and valid data across source systems. This can help the company in that they do not need to do the (ETL) process manually. And they can process other types of data (e.g. Media industry) if their strategies allow them.

The DW can help IMSUK to make the ETL process automatic (e.g. as a routine night task). Furthermore it can help analyst to decide about the contexts they can measure numbers (dimensions) and combine these dimensions to decide about their strategies.

e) How you would design a Data Warehouse Architecture to support the business of IMSUK,

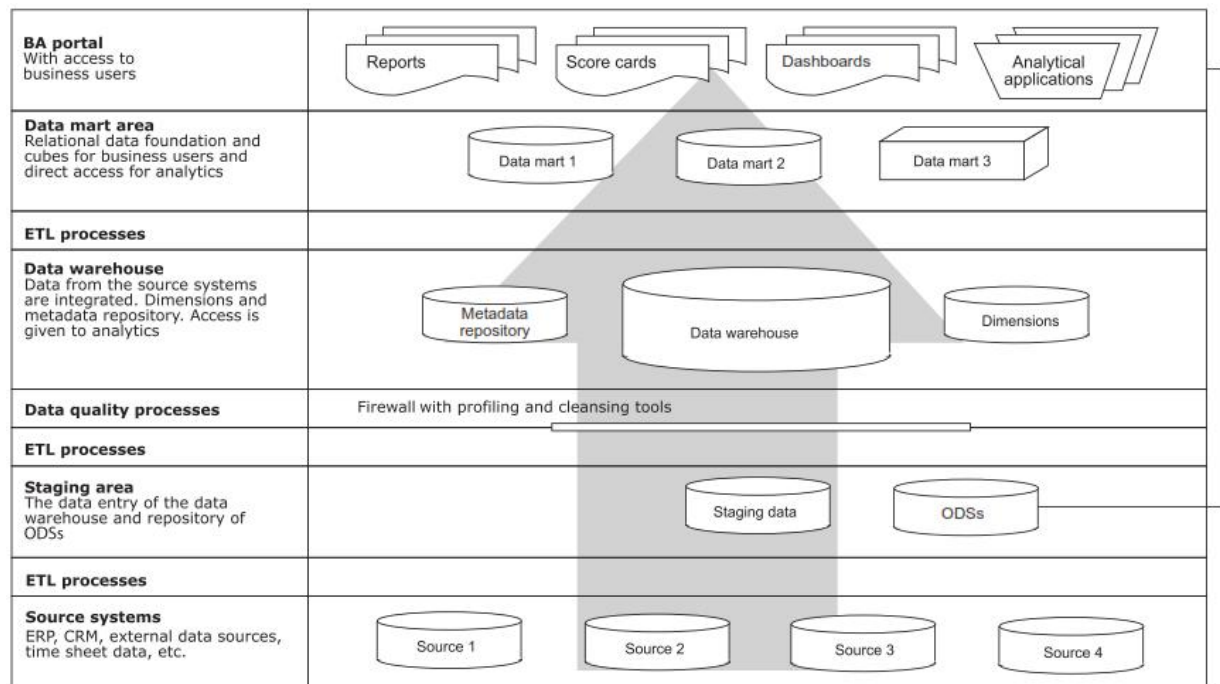


Figure 4

I used the architecture (simple drawing) in the book “Business Analytics for Managers” maybe with some changes. Regarding that the steps in figure 1 the data passes, in the figure 4 is from down to up.

It could solve some problems that IMSUK has:

1. Different source systems: the DW hide the variety of different sources systems from the users of the information.
2. The process is manual: the DW make the process automatic. Because the final format (just in the current situation of IMSUK) is fixed, we have just different source systems of data. So after converting their format to be suitable for saving in our DW structure (Cube – OLAP), the process can continue automatically.
3. Making the data clean is time-consume. We can use some techniques for make the data clean and it can be done automatically.

We use this architecture also for making data marts (the bases of getting queries from our DW) easier from the structure of DW. This variety of data marts (that is generated from the structure of dimensions and facts in DW), can help the IMSUK to get a variety of desired formats (needed for foreign buyers of information). Also it can easily make some visualized reports to show to its customers and may it can sell them to current and future customers.

The structure of DW can help IMSUK to think about changing its strategy about the new formats (in different steps of converting data – figures 1, 4) and new customers. Furthermore it can decide about moving in its supply chain (we do not know how the buyers of information use them and for what purpose).

#### g) The BI/DW Methodology in general

The BI/DW Methodology in general is the way the BI/DW is implemented in the organization. Methodology includes the structure of steps and the process inside each step, inputs and outputs of each step (the documents). And the level and type of information we have at the end of each step. It is more comprehensive from a DW general architecture, because it looks for embracing all processes and the infrastructure of different steps and processes.

It starts from the source systems, the technical side that the data is extracted, loaded and converted to the staging steps and cleaning the data and make it prepared to the structure of the DW. After that it moves to the visualization step (presentation layer) and show it in various formats that make the comparison and seeing the trends of data in special contexts, much easier. So finally the information that has been analyzed (with help of more human side rather than technical side) converts to knowledge and wisdom (when they are helping decision making at the most top levels of organizations – according to figure 1).

#### h) Which specific development methodology you would recommend in the current situation

We know that the IMSUK has started a very successful business, but because of not proper using of BI/DW methodology they confront with some problems. **The first problem** is they suffer lacking a deep insight of their business and their competition. There is a very famous BI/DW methodology that builds the common appearance of the BI/DW structure by starting and focusing on business users and what they need to do their jobs. So the methodology systematically work backward through the reports, applications, databases, and software, finally arriving at the most physical layers of the implementation. This contrasts strongly with technology driven approaches, which proceed in the opposite direction.

So for solving the first problem the IMSUK confronts with, we suggest the below architecture:

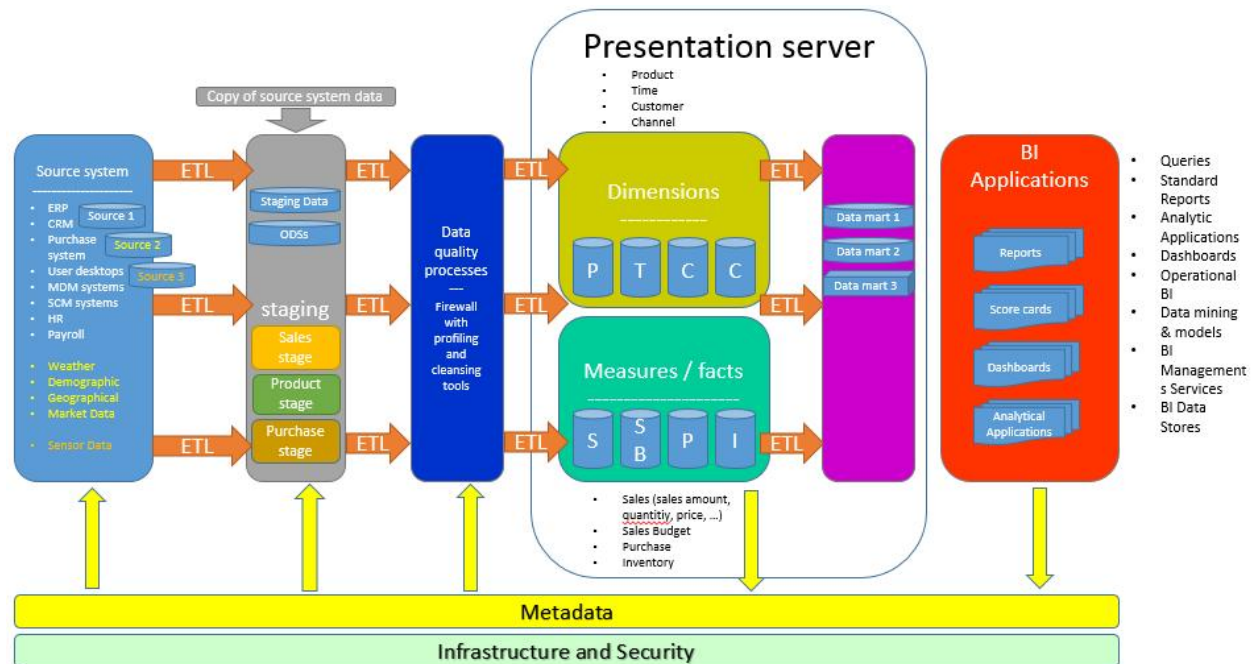


Figure 5

The definition of different parts of the architecture:

### 1. Source Systems

In order to gather information about our customers from many different systems to generate a 360-degree profile based on the information we have about our customers already, we have to join information from a large number of independent systems (that we call them **core source systems**), such as:

- Billing systems (systems printing bills)
- Reminder systems (systems sending out reminders, if customers do not pay on time, and credit scores)
- ...

Source systems are divided into three groups: internal (ERP, CRM ...), external (weather, demographic, geographical ...), and sensor (it is a kind of data that is generated in production).

### 2. User Groups

As long as this term means the **business requirements** we apply them to all steps and layers from selecting right data from **source systems** to **presentations server** and making **dimensions**, to **BI Applications**. After **segmentation** the user groups by their business requirements, we have to apply all four **Rights** for them (the right information at the right time, at the right place, and in the right format). Furthermore there is some access issues that we have to consider through the **Infrastructure and Security** bus (channel).

### 3. Presentation Server

The business analytics (BA) function receives input from different primary **source systems** and combines and uses these in a different context than initially intended. We show our data model here (the relation between dimensions and **fact tables**). **Contexts** are our aggrements about what we are **measuring**. We present them (contexts) in **Dimensions**. we show the data model in this layer.

#### 4. Staging

We load our data into each dimension in a separate stage. For example we load dimensions of sales fact and then we load dimensions of purchase fact. If we recognize that we have to add a new dimension (e.g. gender) we have to decide about it that it must be a separate dimension or can be added as an attribute to an existing dimension.

Load mechanism is completely different between dimensions and facts. Maybe we use hardcode for doing it.

Using the concept of data warehouse, we can integrate dimensions of the separate business units and then use them in other business contexts (e.g. using customers in sales and purchase).

#### 5. BI Applications

We have to use some BI Applications that fit to business needs. There are a variety of BI tools for different users and different presentations for them.

#### 6. Metadata

We think about metadata as all the information that defines and describes the structures, operations, and contents of the DW/BI system. There is three main categories of metadata: **technical**, **business**, and **process** metadata. Technical metadata is primarily definitional, while business and process metadata are primarily descriptive.

The second problem is their time (just like me in the exam), because they has started very good but their competitors are passing them. So we can use agile method (not methodology – some papers have mentioned that the agile method is not a methodology).

Agile method is for overcoming the problems the traditional methodologies have (specially the waterfall model):

1. System and **software requirements**: captured in a **product requirements document**
2. **Analysis**: resulting in **models**, **schema**, and **business rules** (specifications)
3. **Design**: resulting in the **software architecture**
4. **Coding**: the **development**, **proving**, and **integration** of software
5. **Testing**: the systematic discovery and **debugging** of **defects**
6. **Operations**: the **installation**, **migration**, **support**, and **maintenance** of complete systems

The problems with this model:

1. Hand over paper: we deliver papers to the next group and it is not clear that the next group generate documents in the same way with the last group.
2. When we have a general model, we have to decrease the time as possible as we can to increase the value:



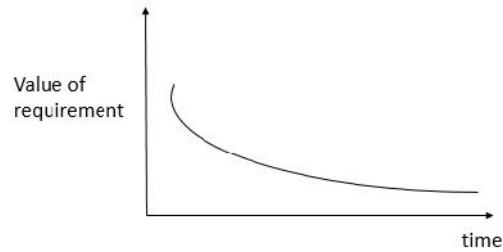


Figure 6

The solution is using an incremental model instead of a big bang model:

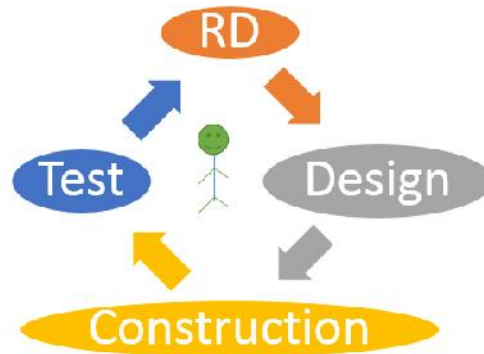


Figure 7

RD: Required Development

In the middle of the processes we have customer. Customer has to have a close collaboration with the team.

3. You cannot easily go back in the waterfall model. But in the incremental model, change means improvement.

So we have to use agile method:



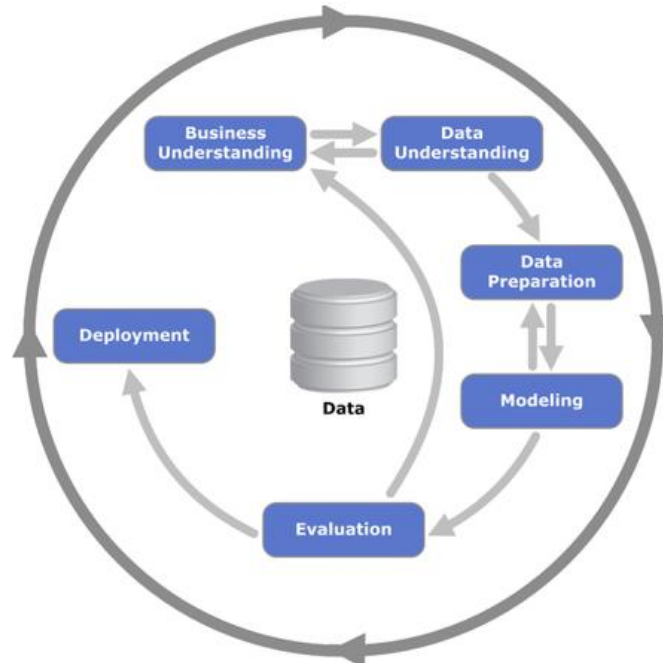


Figure 8

Agile method use the traditional architecture for complete picture of the system but it has some iteration to prepare it and it does not complete the whole system in the first step. It helps to produce some **workable application** (here DW) in a desired **time** constraint.

### ***The definition of agile:***

Agile Analytics is marked by a highly iterative approach with a high degree of collaboration between developers, users, and stakeholders. Highsmith's Agile Project Management (APM) framework is based on an *Envision Explore* cycle rather than a *Plan Do* model. The significance of this paradigm shift is that it acknowledges that projects are subject to uncertainty and change, and good project teams seek to adapt to that change and uncertainty. The APM process (and Agile in general) is a highly collaborative one that encourages frequent interaction between developers, business users, and stakeholders throughout the project cycle.

Also agile has “user-story-driven” instead of “data-driven” approach.

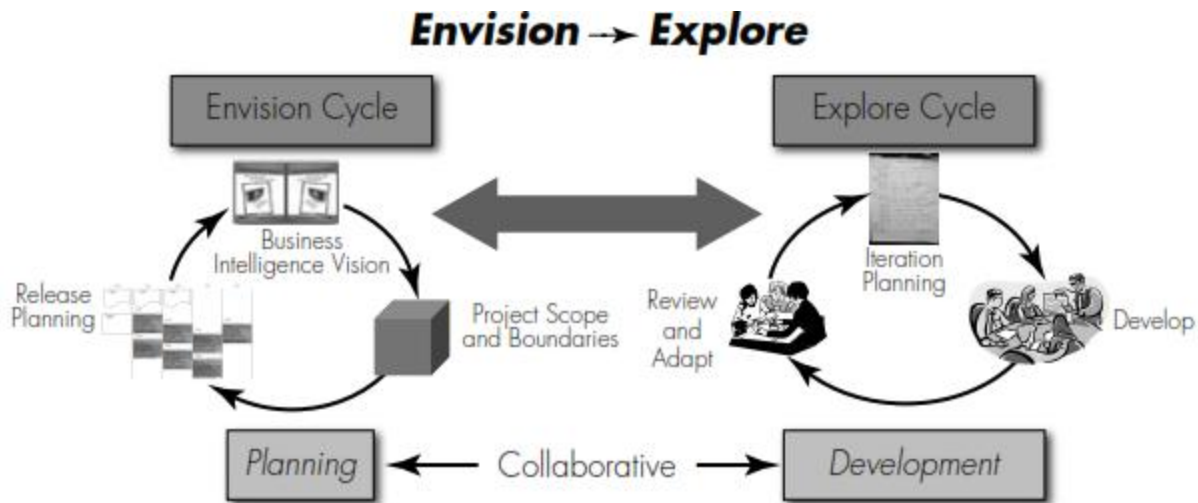


Figure 9

### Envision Phase (plan about it!)

Envisioning is the process of figuring out what is going to be done on the project and how. Envisioning consists of establishing a *vision* of the project outcome, and then *speculating* about how to incrementally accomplish that goal. The objective of this phase is to answer these questions:

- What is the customers' vision of the project outcome (product, system, or solution)?
- What are the scope, boundaries, and constraints of the project?
- What is the business case supporting the project?
- Who are the right people to include in the project community?
- What will the solution development and delivery strategy look like?

The approach is a highly collaborative, low-fidelity, low-tech process. For most projects there has been some preliminary business case analysis prior to the **envision** phase. The business case has justified the allocation of resources to start the project. Although the business case may include high-level business requirements or objectives, it does not need to be a comprehensive set of functional requirements. For most projects the envision phase culminates in a two- to four-day **project-chartering** and **release-planning** session. Envisioning is most effective when the entire project community is involved in this kickoff—from end users to junior developers.

### Explore Phase

Waterfall type models include some variation of these phases: **requirements**, **design**, **implement**, **test**, and **maintain**. These are all important components of development, just not as organized in a phased/sequential manner as in waterfall. Instead, we need to do some analysis and enough design to get started, prove our design with working code, and do sufficient testing to convince ourselves that we did it right. Traditional development is task- or activity-driven (requirements, coding). Agile development is product-driven (small user stories). And these user-stories make the scope of the project.

The entire system are not going to be built correctly in one iteration of this cycle. In fact this simple process must be repeated many times until the designers can nurture the evolution of a high-value, high-quality, working DW/BI system. At each turn of the cycle it is critical to seek feedback and acceptance, and then adapt.

Each iteration through the explore cycle takes two weeks and results in one or more working business intelligence “features” that can be reviewed with the user community for feedback and possible

acceptance. The explore cycle is so-called because it provides us with an opportunity to explore, experiment, test ideas, evaluate, and ultimately settle on the right thing to build and the right way to build it. One of the great things about working in these short iterations is that the development doesn't get very far off track before the need for course correction becomes evident.

i) How you would document the requirement of IMSUK's customers (given your choice of development methodology)

We do not document the output of each step, because we are not sure about the same format in the next steps.

j) How you would organize the BI/DW-effort in order to support the business of IMSUK.  
See figure 8 , 9