BUSINESS ANALYTICS TOOLS

Course: Impact of COVID-19 to financial markets

Professor Nabijon Holov

LEARNING OBJECTIVES

Upon successful completion of this chapter, you will be able to:

- Explain the difference between BI, Analytics, Data Marts and Big Data.
- Define the characteristics of data for good decision making.
- Describe what Data Mining is.
- Explain market basket and cluster analysis.

BUSINESS ANALYTICS, BI, BIG DATA, DATA MINING - WHAT'S THE DIFFERENCE?

- Business Analytics – Tools to explore past data to gain insight into future business decisions.
- BI – Tools and techniques to turn data into meaningful information.
- Big Data –data sets that are so large or complex that traditional data processing applications are inadequate.
- Data Mining - Tools for discovering patterns in large data sets.

TEXTBOOK

- Making the Most of Big Data, Kandasamy & Benson, 2013
- Free download from Bookboon.com
- Bookboon's business model:
  - Free download
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BUSINESSES NEED SUPPORT FOR DECISION MAKING

- Uncertain economics
- Rapidly changing environments
- Global competition
- Demanding customers

- Taking advantage of information acquired by companies is a Critical Success Factor.

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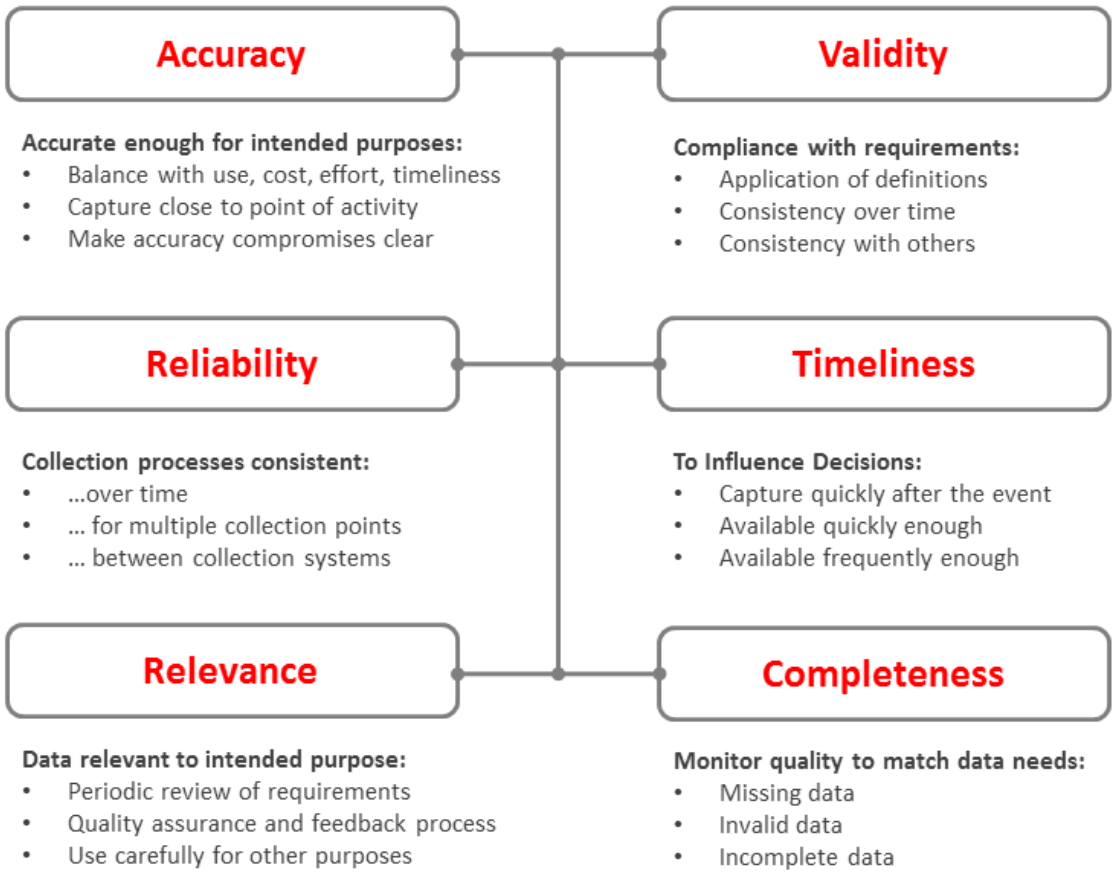
Better Quality Data – Characteristics



Source: speakingdata blog

THE INFORMATION GAP

- The shortfall between gathering information and using it for decision making.
  - Firms have inadequate data warehouses.
  - Business Analysts spend 2 days a week gathering and formatting data, instead of performing analysis. (Data Warehousing Institute).
  - Business Intelligence (BI) seeks to bridge the information gap.

DATA MINING

- "*Data mining* is an interdisciplinary subfield of computer science. It is the computational process of discovering patterns in large *data* sets involving methods at the intersection of artificial intelligence, machine learning, statistics, and database systems." - Wikipedia
- Examining large databases to produce new information.
  - Uses statistical methods and artificial intelligence to analyze data.
  - Finds hidden features of the data that were not yet known.

BI

- Tools and techniques to turn data into meaningful information.
  - Process: Methods used by the organization to turn data into knowledge.
  - Product: Information that allows businesses to make decisions.

BI APPLICATIONS

- Customer Analytics
- Human Capital Productivity Analysis
- Business Productivity Analytics
- Sales Channel Analytics
- Supply Chain Analytics
- Behavior Analytics

- Collecting and refining information from many sources (internal and external)
- Analyzing and presenting the information in useful ways (dashboards, visualizations)
- So that people can make better decisions
- That help build and retain competitive advantage.

KLIPFOLIO - SAMPLE OF A MARKETING DASHBOARD

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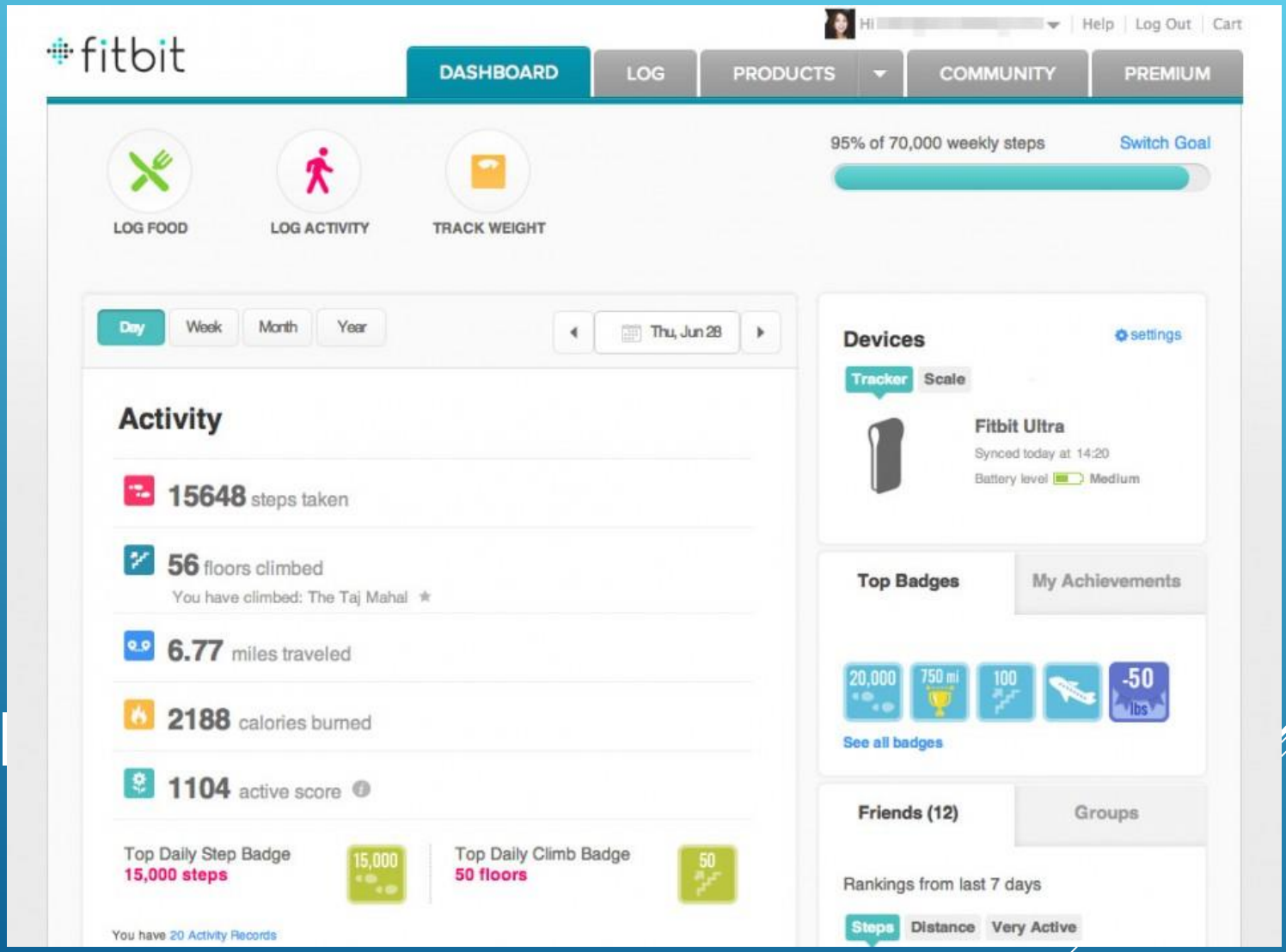
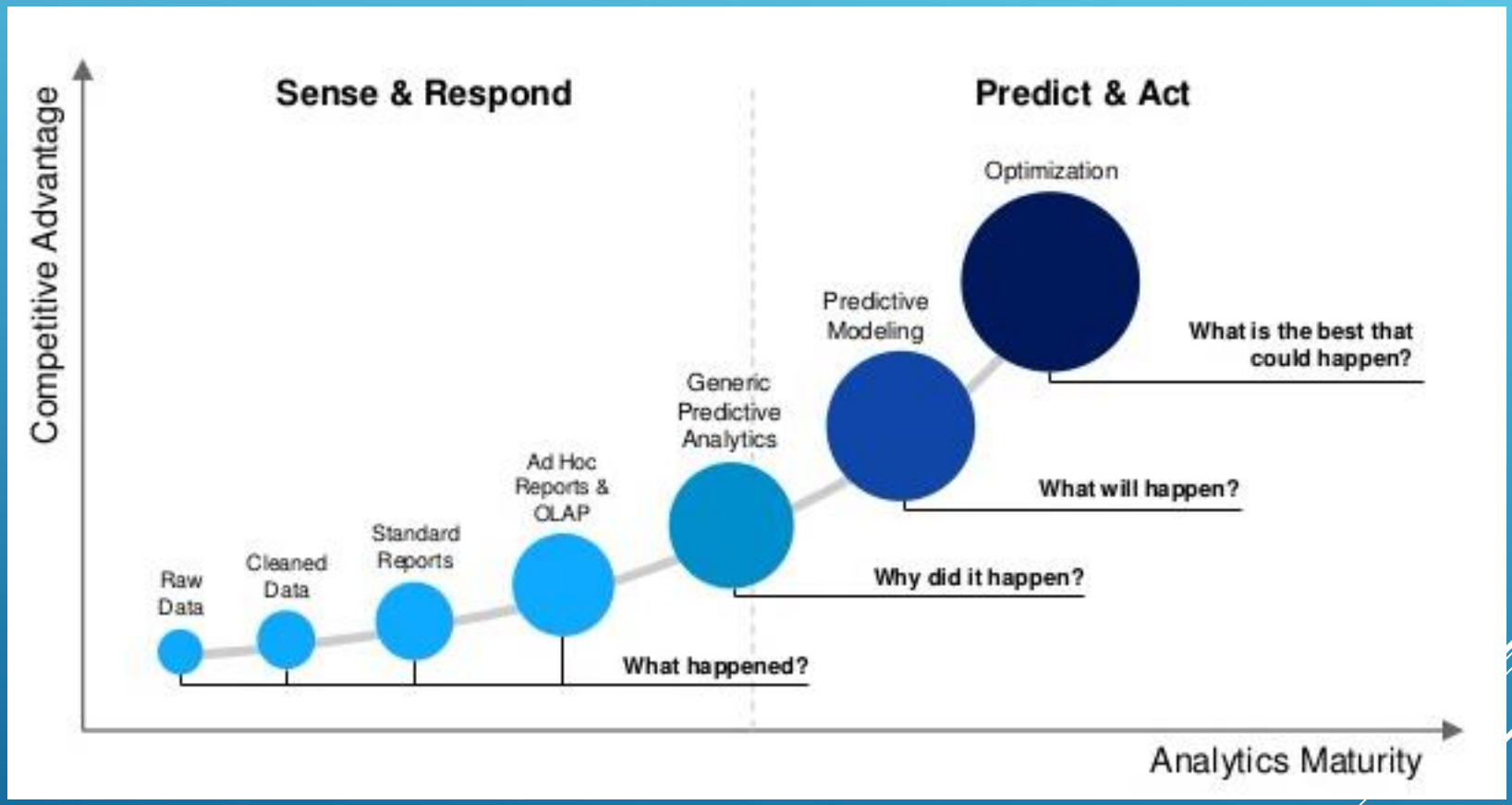

fitbit
Hi
Help
Log Out
Cart
DASHBOARD
LOG
PRODUCTS
COMMUNITY
PREMIUM
95% of 70,000 weekly steps
Switch Goal
LOG FOOD
LOG ACTIVITY
TRACK WEIGHT
Day
Week
Month
Year
Thu, Jun 28
Activity
15648 steps taken
56 floors climbed
You have climbed: The Taj Mahal
6.77 miles traveled
2188 calories burned
1104 active score
Top Daily Step Badge
15,000 steps
Top Daily Climb Badge
50 floors
You have 20 Activity Records
Devices
settings
Tracker
Scale
Fitbit Ultra
Synced today at 14:20
Battery level
Medium
Top Badges
My Achievements
20,000
750 mi
100
-50 lbs
See all badges
Friends (12)
Groups
Rankings from last 7 days
Steps
Distance
Very Active

BI APPLICATIONS

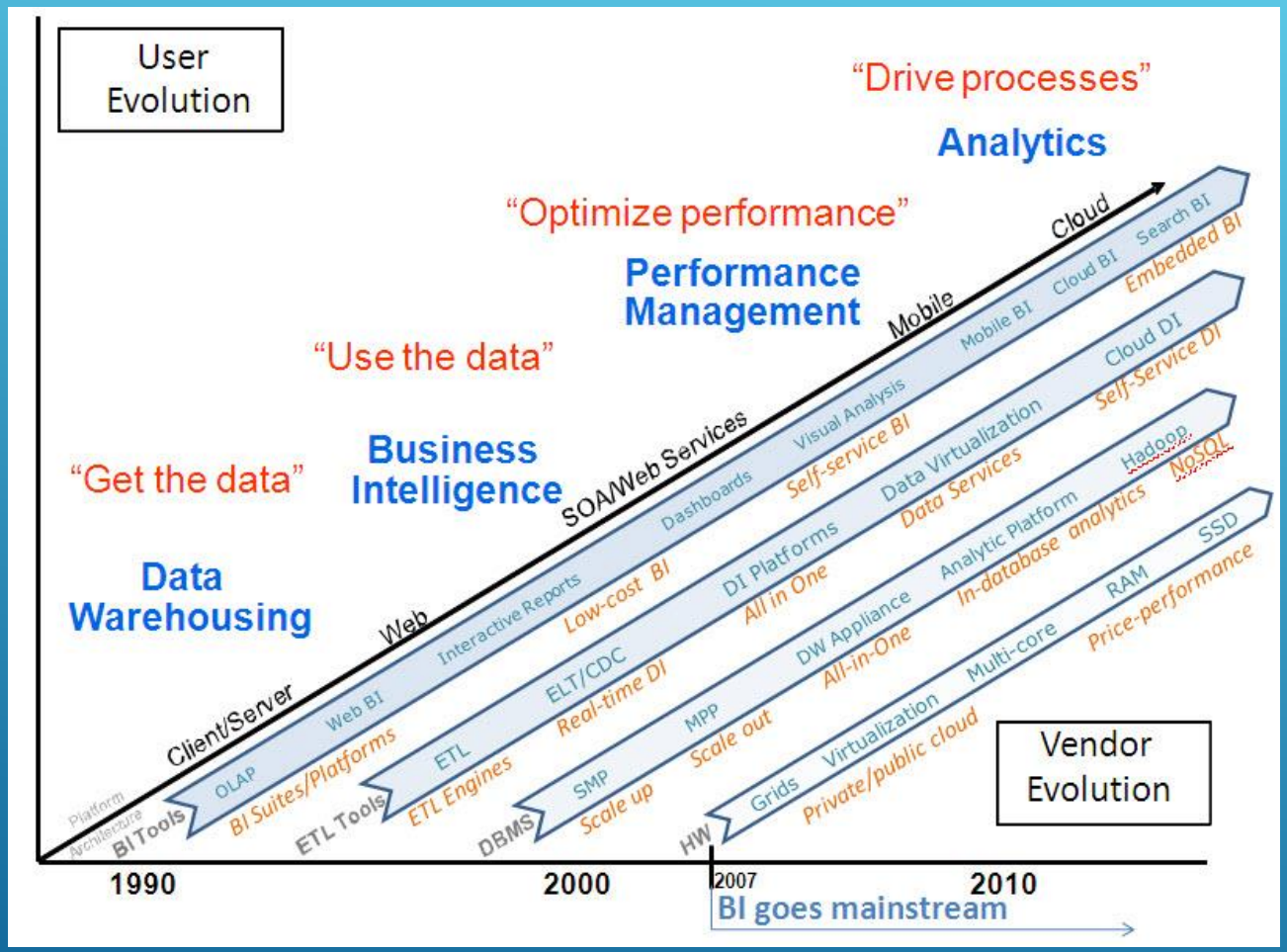
- Customer Analytics
- Human Capital Productivity Analysis
- Business Productivity Analytics
- Sales Channel Analytics
- Supply Chain Analytics
- Behavior Analytics

BI INITIATIVES

- 70% of senior executives report that analytics will be important for competitive advantage. Only 2% feel that they've achieved competitive advantage. (zassociates report)
- 70-80% of BI projects fail because of poor communication and not understanding what to ask. (Goodwin, 2010)
- 60-70% of BI projects fail because of technology, culture and lack of infrastructure (Lapu, 2007)



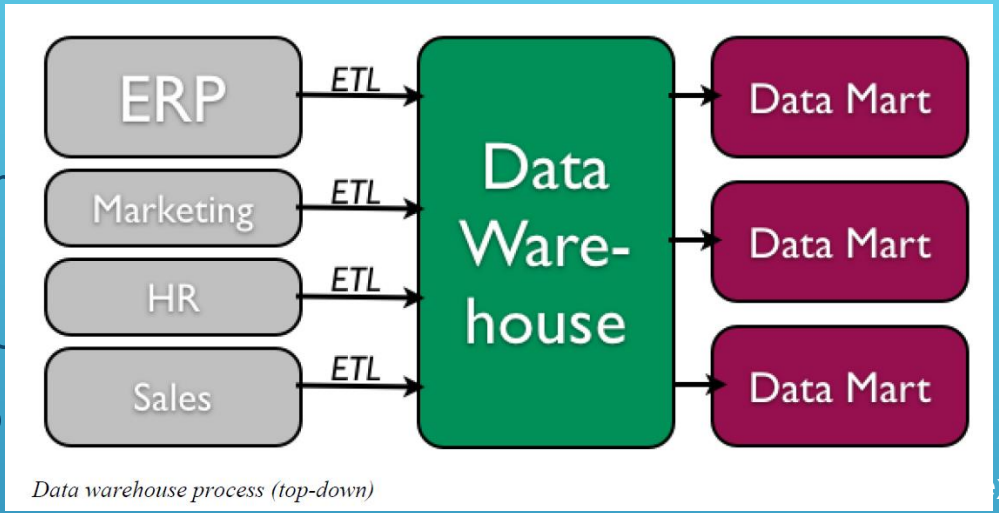
Source: Delaware Consulting



Source: b-eye-network.com

DATA WAREHOUSE

- Collection of data from multiple sources (internal and external)
- Summary, historical and r operations.
- Data "cleaning" before u
- Stored independently fro operational data.
- Broken down into DataMarts for use.



Data warehouse process (top-down)

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5 TASKS OF DATA MINING IN BUSINESS

- Classification – Categorizing data into actionable groups. (ex. loan applicants)
- Estimation – Response rates, probabilities of responses.
- Prediction – Predicting customer behavior.
- Affinity Grouping – What items or services are customers likely to purchase together?
- Description – Finding interesting patterns.

DATA MINING TECHNIQUES

- Market Basket Analysis
- Cluster Analysis
- Decision Trees and Rule Induction
- Neural Networks

MARKET BASKET ANALYSIS

- Finding patterns or sequences in the way that people purchase products and services.
- Walmart Analytics
  - Obvious: People who buy Gin also buy tonic.
  - Non-obvious: Men who bought diapers would also purchase beer.

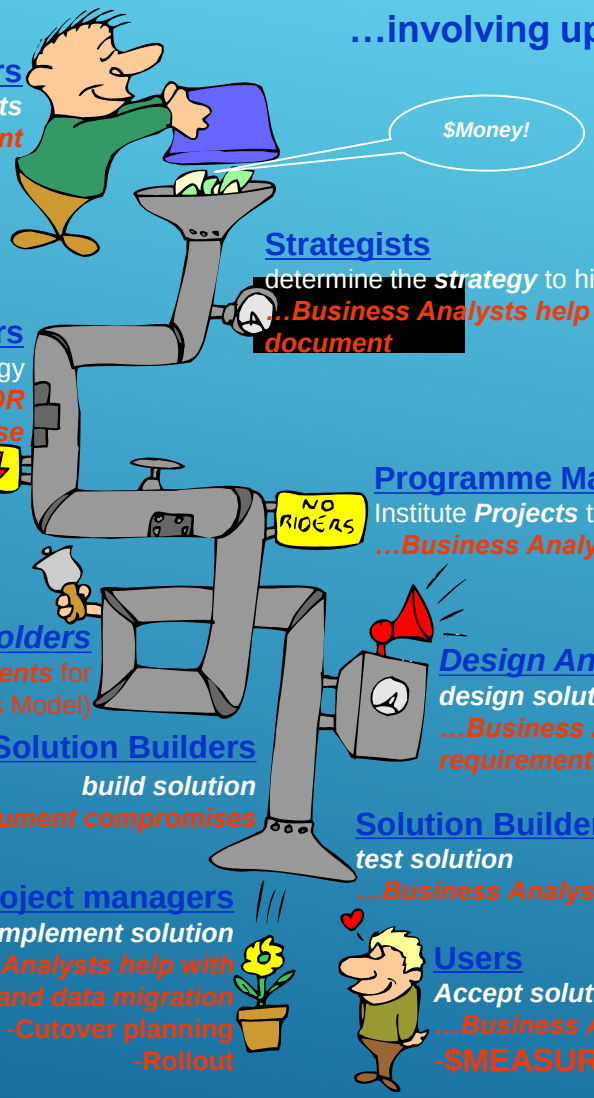
CLUSTER ANALYSIS

- Grouping data into like clusters based on specific attributes.
- Examples
  - Crime map clusters to better deploy police.
  - Where to build a cellular tower.
  - Outbreaks of Zika virus.

Setting the scene: scope of the Business Analyst role

There is a chain of reasoning that leads from the statement of a problem to the implementation of solutions…

…involving up to 10 groups of people…



Owners
defines measures of success and $***targets***
…Business Analysts confirm & document

Strategists
determine the ***strategy*** to hit the targets
…Business Analysts help do market research, create strategy, challenge & document

Sponsors
establish a ***Programme*** that delivers the strategy
…Business Analysts document Programme TOR and help build the Business Case

Programme Managers
Institute ***Projects*** that implement the programme
…Business Analysts document the Project TOR

Project Stakeholders
*…Business Analysts **specify requirements** for* Projects (in the Business Model)

Design Analysts
design solution that satisfies the requirements
…Business Analysts write functional specifications, protect requirements & document compromises

Solution Builders
build solution
…Business Analysts protect requirements & document compromises

Solution Builders & Business
test solution
…Business Analysts ensure tested against requirements

Project managers
Implement solution
…Business Analysts help with
-Process and data migration
-Cutover planning
-Rollout

Users
Accept solution
…Business Analysts help with
-$MEASURING $BENEFITS $REALISATION

POST-IMPLEMENTATION

Business Analysts feed back to the Owner how well their measure of success has been achieved

CHAIN OF REASONING:

Change Requirements must be assumed to be wrong until they are ***proved*** to be right

SCOPE OF ANALYSIS OF CHANGE REQUIREMENTS

- Change requirements can be for (amongst others)
  - Processes
  - Organisation units
  - Locations
  - Channel
  - Data
  - Applications
  - Technologies
  - Non-functionals

  …oh – and the valid intersections!!!

CHANGE REQUIREMENTS SCOPE - EXAMPLE

- We need to change how we take orders (process)…
- …by the tele-orders team (organisation unit)…
- …at our Leeds contact centre (location)…
- …by phone or email (channel)
- …to capture alternate delivery addresses (data)…
- …on the Chordiant system (application)…
- …running on the intranet (technology)…
- …and make it available 24/7/365 (non-functional).

FUNDAMENTAL COMPONENTS OF BUSINESS ANALYSIS

ALL THE LINKS IN THE CHAIN OF REASONING

Description

The problems / opportunities that the business face

Driver

Addressed as measured by

The measures and targets that will enable us to declare the change project has been successful

Project Objective

Delivered by

Definitions of what changes are required that will affect the measures of success (objectives) sufficiently for the project to be declared successful

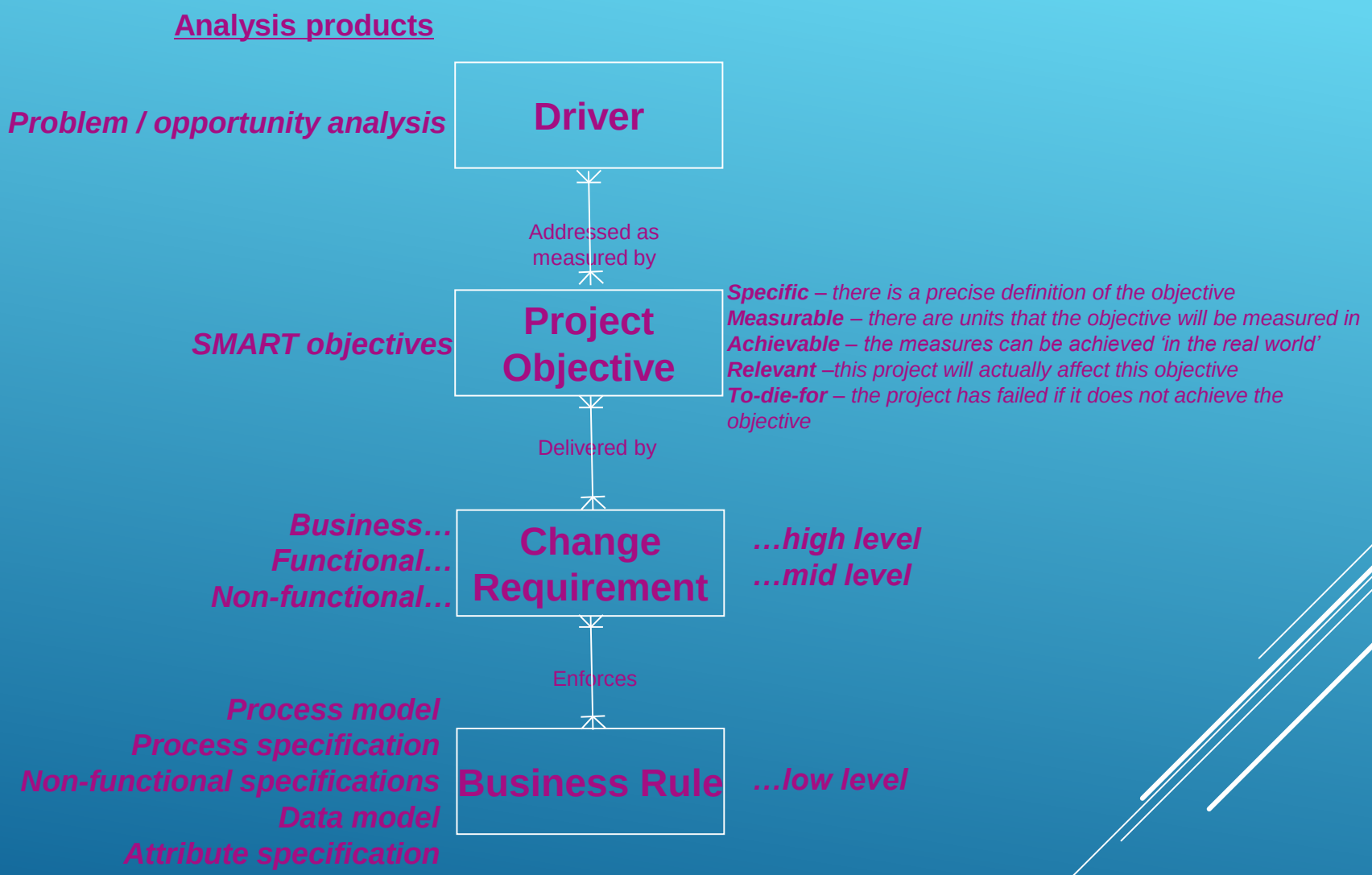
Change Requirement

Enforces

What rules must be implemented by the changes specified in the requirements

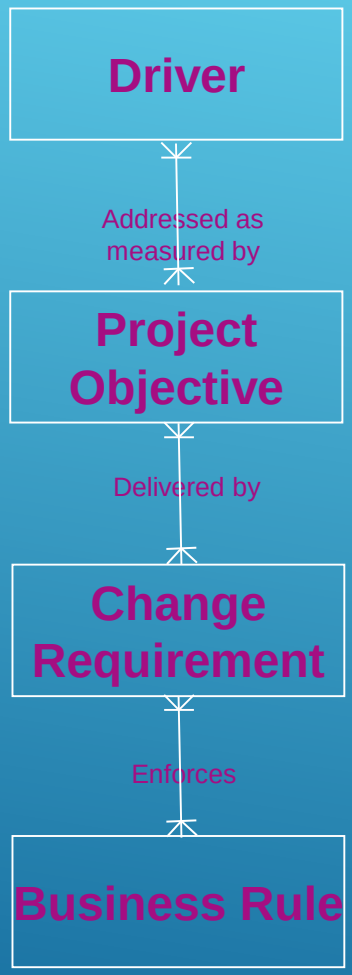
Business Rule

HOW TO FORGE LINKS IN THE CHAIN OF REASONING



ALL METHODS AND ALL APPROACHES HAVE TO COVER ALL LINKS IN THE CHAIN OF REASONING

AKA…



Problems
Opportunities
Threats
Constraints

Vision
Benefit
Target

Agile “product backlog”
7 types of ISEB requirements
6 types if IIBA requirements

Agile “product backlog”
More process and data modelling than you can shake a stick at

EXAMPLE WAY OF DOCUMENTING…

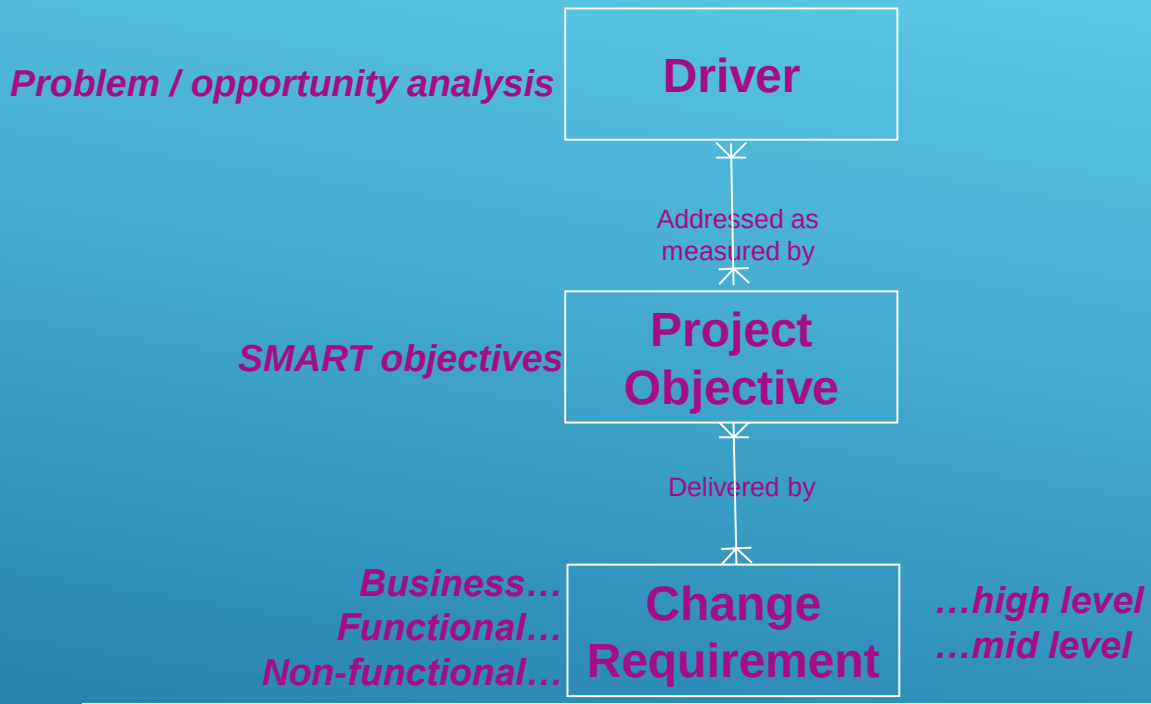
Problem / opportunity analysis **Driver**

No	Given the desire to…	…it follows that…	…the reasons this isn't happening now are…	…resulting in the business problems of
1.	FOR EXAMPLE Train the existing teams in Business Analysis essentials required by their role	i. The scope of the existing team role is defined ii. Training must as a minimum cover the scope of the role that is pertinent to Business Analysis	- There are many Business Analysis roles within {this company} -The BA team role has not been formally defined	- The BA team do not feel they are able to fulfil their role - The full benefits of a Business Analysis function are not being realised - There are expectation misses between what {this company} business expects and what the BAs are able to perform.

EXAMPLE way of documenting…

No	EXAMPLE Objectives	Target Value
1.	Reduction number of analysis errors found after the design phase	By 50%
2.	Reduction in transition cost of analysis to {this company}	By 30% on analysis team time
3.	Adoption by Business Analysts of the new ways of working	100%
4.	Improved quality of Business Analysis products	95% of projects exit analysis phase successfully on their first attempt as measured against exit criteria and all entry criteria have been met
5.	Quality of products handed over to all customers inc. Operations by Business Analysts	Exit criteria met 100%

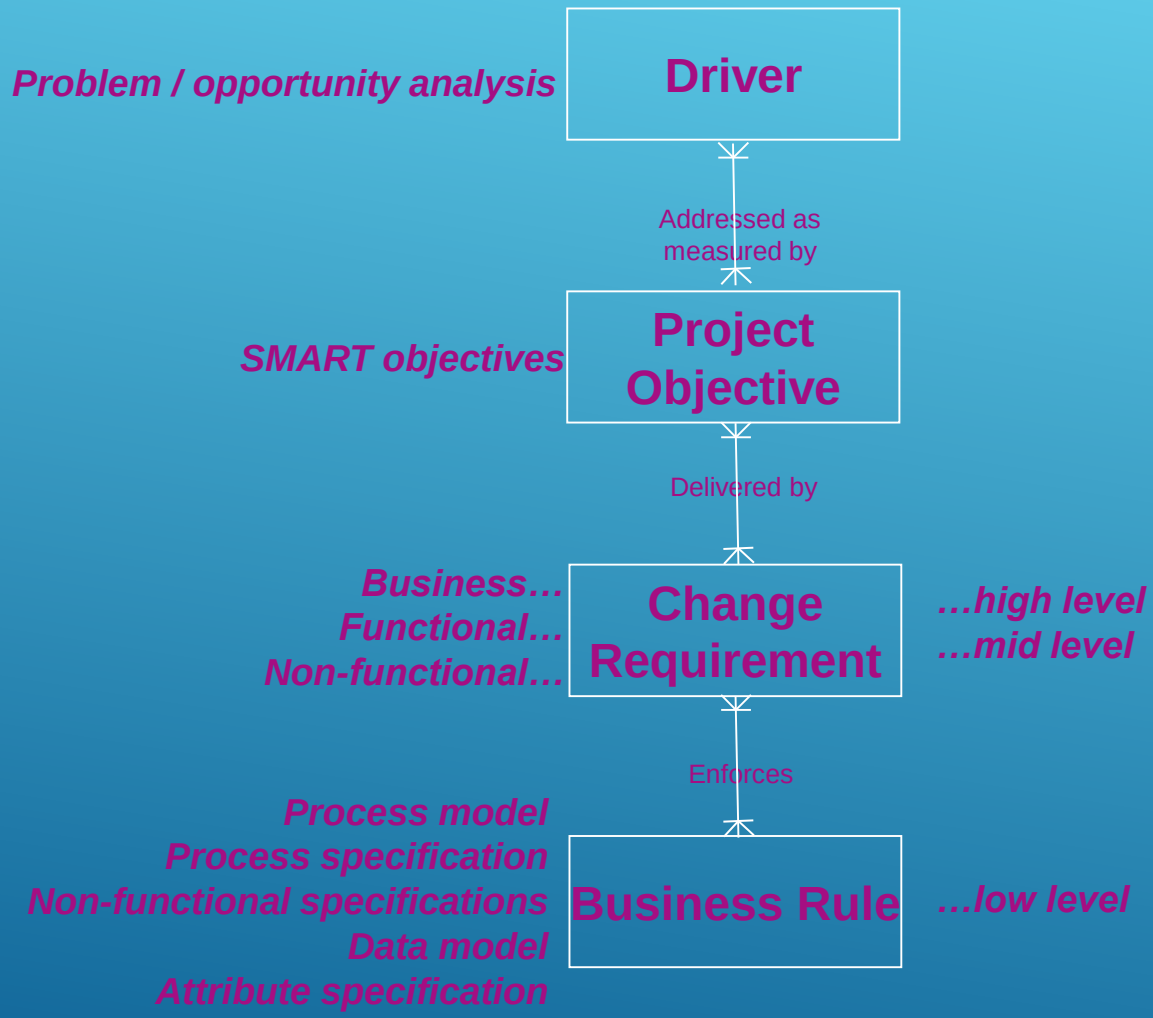
EXAMPLE way of documenting…



No	EXAMPLE High Level Functional Requirement	Maps to objective
1	Be able to train BAs in Business Analysis tools, methods and techniques	1,2,3,4,5
2	Be able to support trained BAs as they put training into practice	1,2,4,5
3	Be able to monitor the effectiveness of the Business Analysis	1,4,5

No	EXAMPLE High Level Non Functional Requirement	Maps to objective
1	Training will accommodate 40 delegates over 5 training sessions	1,2,3,4,5
2	Training support will be able to process up to 5 queries at any one time	1,2,4,5

EXAMPLE way of documenting…



EXAMPLE PROCESS RULES

Process execution rules

A BA can request one of 4 types of support:

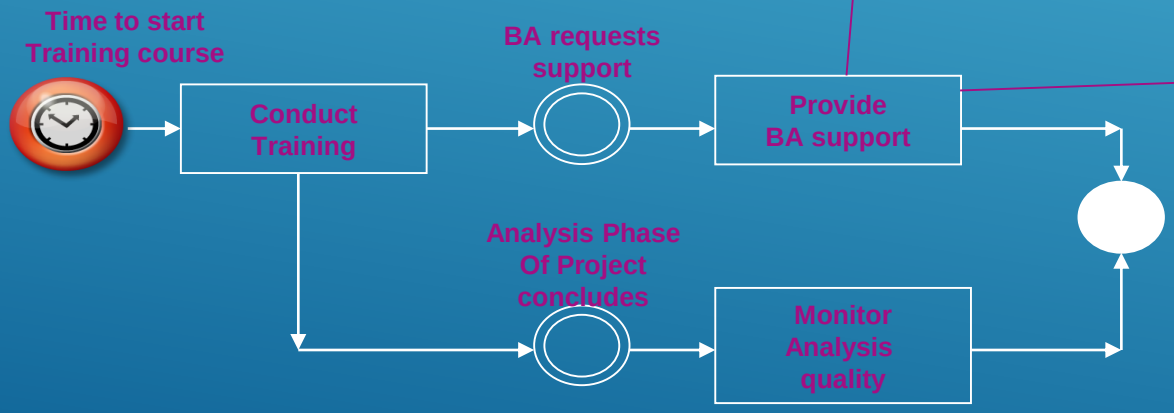
1. Phone or email based query about a specific point
2. Informal review of a project deliverable
3. Formal review of full set of project deliverables
4. Facilitated workshop of how to apply analysis to a specific project

1. In the case of phone or email query about a specific point
   the BA poses the question and the training provider will provide guidance for how the technicalities of Business Analysis apply to the problem

Informal reviews of project deliverables will be done by email and will only discuss the technicalities of Business Analysis in relation to the document

Formal reviews will involve the BA sending the full set of Analysis deliverables to the training provider who will critique them from a technical perspective and then deliver the feedback in a one-to-one structured feedback session on the client site

Facilitated workshops will be initiated by the BA - the training provider will supply workshop agenda and prerequisites which the BA will use to organise the workshop. The training provider will then facilitate the workshop for the project.



Process dependency rules

1. Who is interacts with process
2. Where they are
3. Availability of process
4. Volumetrics
5. Performance of process
6. Security & Authorisation levels

Non-functional Rules

EXAMPLE DATA RULES

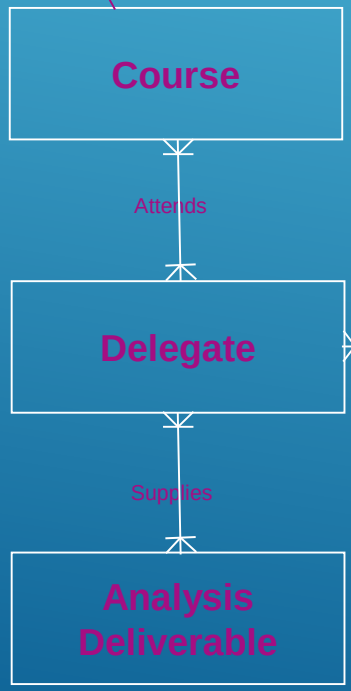
Non-Functional Rules

1. Who is allowed access to the data?
2. How long must this data be kept?
3. How many instances of it must be supported?

Data content rules

Course.Start Date
Definition: the date/time the course is scheduled to start
Data type: Numeric
Size: 12
Domain: Datetime
Data rules:

- Format is DD/MM/YYYY HH:MM
- When created must be in the future
- Cannot be a Saturday or Sunday or Bank Holiday



Attributes

1. **Name**
2. **Start Date**
3. **Course duration**

Attributes

1. **Name**
2. **Contact details**

receives

Support Type

Attributes

1. **Name**
2. **Description**

Attributes

1. **Name**
2. **Content**
3. **Review feedback**

Data relationship rules

SUMMARY

- Explained BI, Analytics, Data Marts and Big Data.
- Defined the characteristics of data for good decision making.
- Described data mining in detail.
- Explained and gave examples of market basket and cluster analysis.

- **References**

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