

Session 1: Levels of Corporate Decision

Taking decisions in a context of uncertainty
supported by evidence

Anàlisi de Dades i Explotació de la Informació

Grau d'Enginyeria Informàtica.
Information System track

Prof. Mónica Bécue & Lúdia Montero

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Let us introducing ourselves

- **Mónica Bécue Bertaut**

Multidimensional methods and their applications to:

- Survey data
- Textual data
- Sensometrics: statistics applied to sensorial data

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Despatx C5-209.

Consultations: Thursday 12h-14h. Advertise your visit, please

A meeting is possible at another moment, but ask for an appointment

- **Lidia Montero**

- Generalized/ General linear models
- Transport research
- Transportation planning and demand analysis

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Despatx C5-217

and introducing yourselves

- And you?

Let us introducing ourselves

- What are you expecting from this subject?

Levels of corporate decision

A company is a business organization aiming at creating value

Level	Decisions
Operational level	<p>The invoice is not accurate</p> <p>Restock inventory to be able to meet demand</p> <p>The mean daily production varies at random</p> <p>Most of the answers to the web queries are expelling potential costumers..How to avoid this problem?</p> <p>Offer credit to costumers according to the rules</p>
Middle management	<p>To launch advertising campaigns with high probability of success</p> <p>To develop a departmental budget taking into account an uncertain future</p> <p>Rengineering the manufacturing process to ensure better quality</p> <p>Design a new attractive corporate web</p>
Senior management	<p>Approve capital budget. Enter in a new (or exit) market.</p> <p>Decide long term goals in uncertain context</p>

Decision taking in a firm: All levels of management need taking decisions

Major Business Areas

FUNCTIONAL BUSINESS AREA	PURPOSE
Sales and Marketing	Selling the organization's products and services
Manufacturing, production and delivering	Producing and delivering products and services
Finance and accounting	Managing the organization's financial assets and maintaining the organization's financial records
Human resources	Attracting, developing and maintaining the organization's labor force, maintaining employee records

Decision taking in a firm: All levels of management need taking decisions

Context of uncertainty

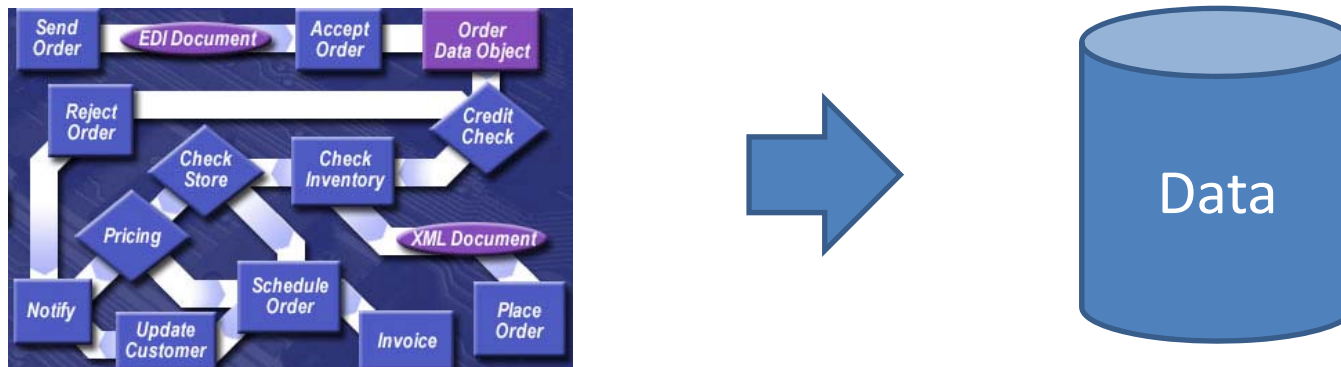
- All levels of management need taking decisions
- Many times in a “context of uncertainty”

Decision Support Systems

Level	decision	Data form	Tools and statistical level
Operational level	Structured. Short term	Files, BBDD	Data coming from files and data bases Control charts Routinely hypothesis tests
Middle Management		BBDD, DW (OLAP)	Decision Support Systems: To monitor business processes. Excel spreadsheet (weekly, monthly and yearly reports) Sophisticated Data Science tools: profiling, association of events, clustering, classification, prediction, forecasting, Web Mining, Text mining To discover niches in the market. To better customize the product or service. To avoid attrition. Business Intelligence systems
Senior Management	Unstructured. Long term	BBDD, DW (OLAP), external	Executive Information Systems Balanced scoreboard: Joint monitoring of Financial, Processes, Costumers and Human capital. Internal and external info. Tangible and intangible key indicators.

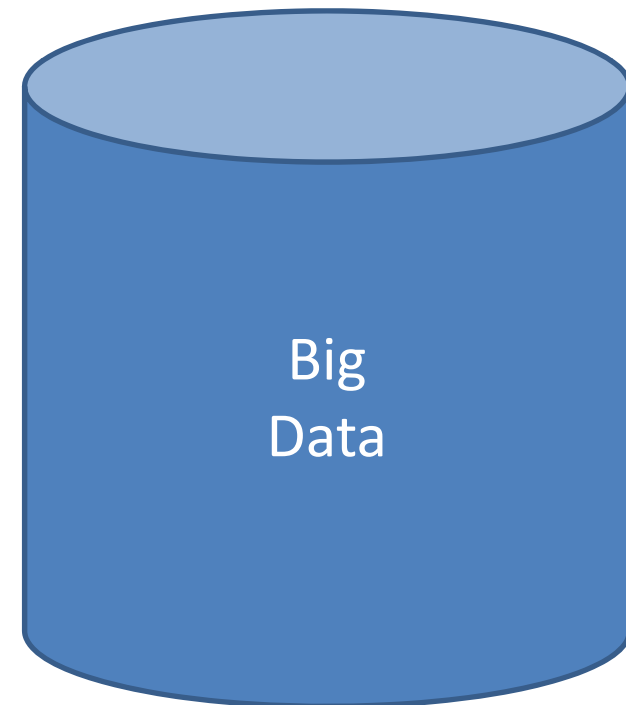
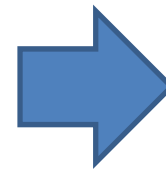
From Business Process to Data

Business processes are concrete workflows of material, information and knowledge – sets of activities. Each business process generates its own application (or part of it). The output of the application is stored in DDBB (or files).



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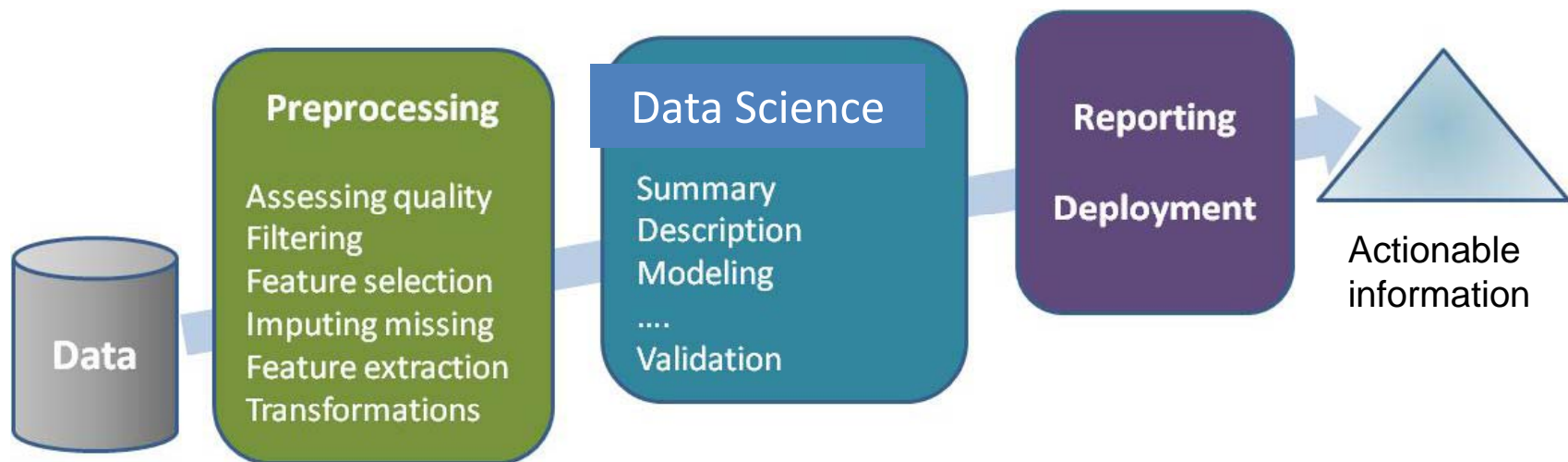
Taking decision with the assistance of data

- All levels of management need taking decisions
- Many times in a “context of uncertainty”
- “Experimental data” bring their support

La política de los grandes números

The value of Data

Paradigm of the information era:
Data is the new driving force of businesses and governments.
Data is a key value for organizations



Program

Block		Weeks
1	Taking decision supported by data	1
2	Quality of data.	1
3	Multidimensional Analysis: Profiling , Principal component analysis, Correspondence analysis, Multiple correspondence analysis, Clustering	6
4	Statistical Modeling. Prediction	5
5	Quality Control	2

		Tuesday-18 to 20h	Friday 18 to 20h
Week		Theory - A5105	Lab - C6S308
1	Levels of Corporate Decision	09-sep	12-sep
2	Data Quality	16-sep	19-sep
3	Oct Profiling	23-sep	26-sep
4	Multivariate Analysis	30-sep	03-oct
5	Multivariate Analysis	07-oct	10-oct
6	Multivariate Analysis	14-oct	17-oct
7	Multivariate Analysis	21-oct	24-oct
8	Multivariate Analysis	28-oct QUIZ - 1st Del	31-oct
9	Statistical Modeling	04-nov	07-nov
10	Statistical Modeling	11-nov	14-nov
11	Statistical Modeling	18-nov	21-nov
12	Statistical Modeling	25-nov	28-nov
13	Statistical Modeling	02-dic	05-dic
14	Quality Control	09-dic	12-dic
15	Quality Control	16-dic	19-dic QUIZ ?
		Final Exam	

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5	Multivariate Analysis Clustering	07-oct	10-oct
6	Multivariate Analysis AC/ ACM	14-oct	17-oct
7	Multivariate Analysis ACM/ Clustering	21-oct	24-oct
8	Multivariate Analysis	28-oct	31-oct
		QUIZ - 1st Del	

ADEI course. Bachelor in Informatics
Engineering. Session 1. Teaching: To...
Aluja & Lidia M

Case study

The passengers' satisfaction case:

We have data corresponding to a satisfaction survey

The goal will be to perform a check out on the quality of the data. To describe the profile of the .
Finding the main factors satisfaction ,

Deliverables:

Practical works	Deadline
1 st . :on Multidimensional Analysis Report on Data description and Data Quality -	October 28th
2 nd . Report Statistical Modeling- -	

Groups of two students

Final exam: **oral presentation** , with an executive summary and/or conclusions presented in English.

Evaluation

The evaluation of the course integrates the three phases of learning process: knowledge, skills and competencies.

- **The knowledge is assessed by two quizzes**, *in the middle and last week of the course. If you fail this exam, students may have a final resit. (score T).*
- **The skills assessed from the delivery of 2 practices relating to the course.** *Each of the blocks 2-3 and 4 involve a practice that students will perform by groups of 2 (Score L)*
- **The case study will be evaluated based on the oral presentation (score P).** *In the presentation of case study that generic skills will be assessed. In any case, the presentation of the case study is compulsory.*

The final grade will obtained weighing the three scores: Final Mark = $0.4P + 0.3L + 0.3T$.

Generic skills will be assessed on the scale: Fail, Pass, Good and Very good (D,C,B and A).

Generic competences

- English
 - Evaluated from the
 - Presentation of the executive summary (5 min.)
 - Slides of presentation
- Reasoning
 - Evaluated from the answers to the questions raised by the oral presentation of the Case Study.

To assess the competence on English, it will be required to have written in English the report on the Case Study, moreover at the beginning of the presentation, the student must do an outline of the work in English as well. Regarding the reasoning competence, it will be assessed from the answers given to the presentation of the Case Study.

Software

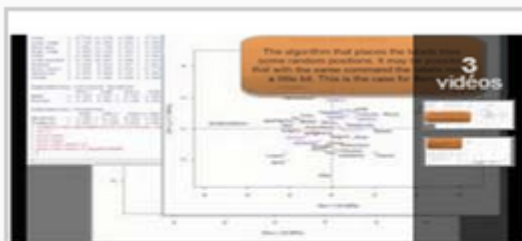
The software to be used during the course will be R.
Each block will use its specific packages and functions.
cran.r-project.org/

Moreover, for presentations purposes, *Excel* will be used

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FACTOMINER

> News bulletin



Exploratory multivariate analysis with R and FactoMineR

Videos on the use of FactoMineR (for PCA, multiple factor analysis, clustering, etc.)

The version 1.24 of FactoMineR has a new graphical module that place the labels in an "optimal" way, that allows to select some elements to draw, etc.

Four reviews on the book [Exploratory Multivariate Analysis by Example using R](#) are available in this [site](#). To see the complete review done by Gary Evans ([for Journal of Statistical Software](#))

A new [user group](#) to ask questions on FactoMineR and on Exploratory Multivariate Data Analysis has been created. Join this group to have news about FactoMineR and to ask questions

[missMDA](#): a new package to handle missing values in PCA, MCA or MFA with FactoMineR

[English Version](#)[Version française](#)

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> Useful Links

[Agrocampus Rennes Applied Maths Department](#)[R Project](#)[CRAN](#)

Recommended books

John, Peter W.M. , Statistical Methods in Engineering and Quality Assurance , Wiley-Interscience , 1990 , ISBN:0471829862. http://ebookee.org/Statistical-Methods-in-Engineering-and-Quality-Assurance_225786.html

Maindonald, J and Braun, John , Data Analysis and Graphics Using R , Cambridge University Press , 2007 , ISBN:9780521861168. <http://cran.r-project.org/doc/contrib/usingR.pdf>

Aluja Banet, Tomas y Morineau, Alain , ***Aprender de los Datos: El Análisis de Componentes Principales*** , EUB , 1999 , ISBN:84-8312-022-4.

Middleton, Michael R. , Data Analysis Using Microsoft Excel , Duxbury , 2009 , ISBN:0-534-22122-X.

François Husson, Sébastien Lê, and Jérôme Pagès ***Exploratory Multivariate Analysis by Example Using R*** Chapman & Hall/CRC 2011

Cornillon P.A., Guvader A., Husson F. , Jegou ,N., Josse,, J., Kloareg M., Matzner-Lober , E-, Rouvière, L. ***R for Statistics*** . Chapman & Hall/CRC 2012

<http://factominer.free.fr/>