# BUSINESS-DRIVEN INFORMATION TECHNOLOGIES

**Grado en Administración de Empresas / Bachelor in Business Administration BBA SEP-2023 BDITn-NBA.2.M.A**

Area Information Systems and Technology

Number of sessions: 25

Academic year: 23-24

Degree course: SECOND

Number of credits: 5.0

Semester:  1º

Category: COMPULSORY

Language: English

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## MARTA DOMINGUEZ BLAZQUEZ

**Corporate and business experience**

Marta Domínguez is a strategy consultant, startup expert, innovation thinker and innovation educator. She helps firms build more innovative business models and products. She is advisor of nimble tech start-ups and large companies that want to grow digital based markets. A former software engineer for Bell Labs and an executive for Vodafone. She has worked in Belgium, UK, The Netherlands and Spain. Her focus is on Internet, mobile and new/disrupting digital technologies. She is also a self-taught artist and sculptress that has created more than 30 workarts.

Marta´s writings about innovation and technology trends have appeared in Harvard Deusto Business Review, Innovation Excellence and Innovation Management.

**Academic profile**

PHD researching on innovation, cognition and arts
Adjunt professor of innovation, IE Business School.
Professor of technology and e-commerce and internationalization of tech-based projects, UIMP-ICEX
Completed a course on creativity with Tina Seelig, Stanford Technology Online Venture Program
AMP, IE Business School
MSc in Telecom Engineering, Polytechnic University of Madrid

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## SUBJECT DESCRIPTION

??This course focuses on the critical personal and organizational issues of the information systems. The unifying theme is the type of computer-based hardware and software being used at different levels of an organization and how computer technology assists individuals to perform their jobs. The student is provided with content to evaluate the role of information systems used to create competitive firms, manage digital organizations and provide useful online products and services for customers. Topics include new technology-based business models in the Internet, mobile technologies, networking systems, the use of social networks for marketing, Cloud Computing, Big Data and advanced analytics and new trends like, IoT, Blockchain, Artificial Intelligence and even the Metaverse.

?The main aim of the course is to develop an overall understanding of the nature and efforts required to exploit the potential of the Information Technologies (IT) and Management Information Systems (MIS) in contemporary organizations, whether they are start-ups or large multinationals. This course does not study any particular technology, nor does it study in- depth technical processes for systems development such as design, programming or coding. Rather, this course provides a critical understanding of the outcomes of the information systems in an organization and provides students with innovative ideas focusing on entrepreneurship.

?The program is divided into three main blocks:

1. ?Foundations: main definitions and elements
2. The infrastructure and interconnectivity of digital business
3. ?Using the infrastructure

Business-driven information technology is synonymous with digital transformation, data-driven companies, and information systems (IS). The entire idea is built on using the advances of technology for business management. This is done in a number of ways: better operative processes, better decision making, innovative products and services, just to name a few. The spheres of digitalization in businesses are not limited to ecommerce: digital products, digital supply chains, digital customer journeys, information systems…

This is not a topic for technical-only – The "let the technical department do their own magic" tactic does not work. Outside of technology, business managers leadership is a way to stand out in a fierce competitive market. In digital transformation, it is a necessity.

What is required to build a data-driven company?

The concept of a data-driven company has been around for a decade, but emerging technologies in the arena of data (big data, Internet of Things - IoT, Artificial intelligence - AI, machine learning, blockchain, 5G) introduce new challenges in the conceptualization of business strategies, data culture and information literary. Some have been possible only in the last years enabled by a mix of other founding technologies.

The inherent principle of using data and technology to power business is there to ensure that businesses do not end up with useless technologies. But harnessing the digital future it is not only about making a commitment in the budget. Some important considerations and challenges:

- Data and technology as key enablers of digitalization
- Getting alignment between data, technology and business.
- Caring about data privacy
- Infrastructure like computing power and network as key enablers of data
- Digital transformation models

## LEARNING OBJECTIVES

??At the end of this course students should be able to:

- ?Discuss the process of Information Systems (IS) innovation as a socio-technical endeavor that comprises both technology and organizational change.
- ?Identify the main trends in the socio-economic context of organizations and IS. Critically discuss the relationship between IS and business processes.
- ?Discuss the strategic value of IS for organizations and methods used for IS planning.
- ?Critically discuss the options organizations have to acquire the technologies they need for their information systems.
- ?Critically discuss some of the most frequently used methods for the information systems development or implementation.
- ?Describe the tasks comprising the process of managing IS development and implementation projects. Analyze the situation of IT markets, its history and future trends.
- ?Design the IS infrastructure a digital business model requires to support a successful implementation.

??Through this course, students will learn concepts whose practical implementation can have a major impact on sustainability issues such as:

- ?Climate adaptation
- ?Circular Economy
- ?Supply chain sustainability
- ?Green IT
- ?Carbon footprint
- ?Responsible AI
- ?Better ESG analytics
- ?Sustainability impact measurement

Real-world illustration of topics using the examples of digital-born companies such as Uber (Big data for operations), Kickstarter (IS platform), Lemonade (AI for business model innovation) and traditional long-established companies such as Walmart (smart supply chain management), Zara (IoT for retail management) and many others.

Digital transformation is a hard and long journey, especially for companies with legacy technologies. We will see specifically how digital is taking over in many industries.

Layers of BDIT:

- Network and computing power: infrastructure layer.
- Information system tools for management and data platforms: data layer.
- Going digital: applications layer.

This is what you will be doing:

- Final project: Dissect a real-world digital-born company, summarize technology and data that you´ve observed, conceptualize how their data-driven strategy explains their revolutionary business value.
- Short essay: Short research of big data adoption. Develop basic data literacy: hack the use of big data in different use cases, find unstructured and structured data sets, make a prediction on potential use cases for other industries.
- Practice basic data analyis for a business. Develop basic information literacy: create toy dashboard and business intelligence visualizations. It doesn´t have to be a formal concept,

experiments are great. Show which difficult decisions you can make based on data.

- Practice: Push the data privacy concept.

At the end of this course you should be able to:

- Discuss the use of technology in business and innovation as a socio-technical endeavor which involves organizational change.
- Identify and critically discuss the relationship between data, technology and business processes.
- Contribute in digital transformation projects at the intersection of technology and business.
- Predict the potential for tecnology use cases in a given organization.

## TEACHING METHODOLOGY

| Learning Activity | Weighting | Estimated time a student should dedicate to prepare for and participate in |
|---|---|---|
| Lectures | 20.0 % | 25.0 hours |
| Discussions | 4.0 % | 5.0 hours |
| Exercises in class, Asynchronous sessions, Field Work | 12.0 % | 15.0 hours |
| Group work | 12.0 % | 15.0 hours |
| Individual studying | 52.0 % | 65.0 hours |
| TOTAL | 100.0 % | 125.0 hours |

## PREREQUISITES

**How technical is this course?**

To participate in digital transformation projects is to work at the intersection of technology and business. Every business professional can gain an understanding of basic data and information skills and even contribute to strategic business decisions. We will leave Python, R, statistics and other programming languages to data scientists. Similarly, we will leave the more complex database design to data engineers.

**How is this course different from Technology trends?**

Some technologies are enabled by a mix of others. Knowing the link between them is a necessity to better predict business opportunities. Knowing the technology trends is not enough for understanding going digital for your organization. In the digital economy technologies such as cloud and big data are foundational. Not only they advance other technologies such as AI, IoT, 5G or the Metaverse. They make innovative and advanced products and services possible.

## PROGRAM

## SESSION 1 (LIVE IN-PERSON)

BUSINESS AND INFORMATION TECHNOLOGY

- Introduction to the course
- Information Technology evolution
- Digitization, digitalization and digital transformation

- 4th industrial revolution (4IR): transformative shifts and challenges

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Examples of how information technologies can help to meet sustainability goals: accurate measurements, performance and efficiency calculations in clean energy consumption, compliance with regulations and directives, the promotion of new services and changes in social habits characterized by wasteful use of resources.

*Book Chapters: Chapter 1, Bélanger et al (See Bibliography)*


## SESSION 2 (LIVE IN-PERSON)

HARDWARE, SOFTWARE & THE VALUE OF INFORMATION

- Main components of information systems
- Data – information- knowledge hierarchy model
- Types of information systems
- How IS support digital innovation in business

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Hardware approaches such as green computing and virtualization processes can be mentioned in this regard. On the other hand, software helps as a means to manage decisions on the sustainability goals.

*Book Chapters: Chapters 1 & 2, Bélanger et al (See Bibliography)*


## SESSIONS 3 - 4 (LIVE IN-PERSON)

ENTERPRISE INFORMATION SYSTEMS

- The flow of digital information
- Enterprise systems: business process integration, data integration
- ERP, CRM and SCM
- BPM: business process automation

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
The services developed and offered by companies to meetsustai nability goals rely on Information Systems: energy companies, recycling companies.....

*Book Chapters: Chapter 12, Bélanger et al (See Bibliography)*


## SESSION 5 (LIVE IN-PERSON)

STRATEGIC VALUE OF INFORMATION. BUSINESS INTELLIGENCE (BI)

- Data analytics vs business analysis
- Types of data analytics
- Components of BI systems
- BI visualization tools: dashboards for making decisions based on information
- Introduction to knowledge management systems

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Examples of Business Intelligence tools that help companies make decisions on energy savings, environmental compliance and sustainable strategies.

*Book Chapters: Chapters 4 & 14, Bélanger et al (See Bibliography)*

During this session the teams for the assignments (short essay and final project) will be closed. Students will be provided with a week to validate the topic of final project.

## SESSIONS 6 - 7 (LIVE IN-PERSON)

STORING AND ORGANIZING INFORMATION: DATA, DATABASES AND BIG DATA

- What is a database
- Data types: Structured vs unstructured data
- How relational databases work
- How big data changes IS and databases. Data types in Big Data
- Big Data: main characteristics and uses for exploiting information in organizations

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Examples of big data and advanced analytics tools to assess the impact of the measures implemented by companies in compliance with sustainability objectives.

*Book Chapters: Chapter 5, Bélanger et al (See Bibliography)*

Instructions for 1st assignment: Teams will write a paper on how companies use Big Data and advanced analytics. Students will follow the guidelines provided by the Professor and will have two weeks to submit it.


## SESSION 8 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES based on the past sessions

- Data analysis practice: Use real data from a store to create a dashboard. Using your new dashboard make suggestions on how the store performance can be improved. No coding required.

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Practical activities that include at least one approach to one of the sustainability topics: Environment, Governance, Social Challenge, Economic Development.

*Technical note & tutorials: Big Data (IST020061-U-ENG-HTM)*
*Practical Case: Business Intelligence (IST010050-U-ENG-HTM)*


## SESSIONS 9 - 10 (LIVE IN-PERSON)

INTERNET AND THE WEB: TRANSMITTING INFORMATION

- Internet history: web 1.0, web 2.0, IoT, web 3.0, Metaverse
- Networking architecture key terms
- Organizational networking: intranet, extranet, internet
- Client/server network architecture
- IoT in our world and in organizations

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
How the network concept provides more efficient interactions among its participants, thus contributing to more sustainable environments: Grid computing and Grid energy

*Book Chapters: Chapter 7, Bélanger et al (See Bibliography)*


## SESSIONS 11 - 12 (LIVE IN-PERSON)

CYBERSECURITY AND DATA PRIVACY

- Information security key terms
- Information security in organizations and risk strategy
- Main information security threats

- Techniques for protecting digital information

- Human role in data security: "you are a target"

- Data privacy key terms: Personal Identifiable Information (PII) and sensitive data

- Data privacy practice

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
The successful implementation of the SDG indicators relies on the wide-spread adoption of effective digital technologies.
Ensuring adequate cybersecurity is a crucial aspect of achieving the goals and each SDG stands to benefit from greater digital uptake and resilience.

*Book Chapters: Chapters 8 & 9, Bélanger et al (See Bibliography)*


## SESSION 13 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES based on the previous sessions

- Cybersecurity practice

- IoT. Technical note

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Practical activities that include at least one approach to one of the sustainability topics: Environment, Governance, Social Challenge, Economic Development.

*Technical note & tutorials: Internet of Things (IST020081-U-ENG-HTM)*


## SESSIONS 14 - 15 (LIVE IN-PERSON)

MOBILE, CLOUD AND ON-DEMAND PROVISIONING MODELS

- Mobile technology evolution and applications: 3G, 4G, 5G

- 5G use in cloud computing and IoT

- Cloud computing: definition and implications

- Inside a data center

- Cloud computing types: public, private, hybrid

- Cloud computing service types: IaaS, PaaS, SaaS

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
How large companies can reduce their carbon footprint per user by up to 30%, while small companies can reduce their carbon footprint by up to 90% by using Cloud Computing. Better infrastructure, higher utilization rate, hardware refresh speed, reduced electricity use, reduction in climate impact.

*Book Chapters: No chapter associated in the book*


## SESSION 16 (LIVE IN-PERSON)

INFORMATION, E-COMMERCE AND E-BUSINESS

- E-commerce and e-business: intro to digitalization

- 4 digital transformation types

- Customer interaction formats: social channel, multichannel, cross channel, omnichannel, metaverse

- New customer journeys supported by technology

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
The role of digital e-business in the promotion of sustainable development objectives and appropriate measures for their fulfillment.

*Book Chapters: Chapter 13, Bélanger et al (See Bibliography)*

## SESSION 17 (LIVE IN-PERSON)

DEVELOPING INFORMATION SYSTEMS AND DIGITAL PLATFORMS

- What is required to develop IS in organizations?
- Business requirements
- Tools to represent business requirements: data flow diagram and use case diagram
- Software development methodologies: Agile, Lean, Scrum
- Challenges in developing information systems: To buy or to build

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
How a well-developed information system can contribute greatly to meeting sustainability objectives in two ways: 1) By creating an effective and resource-efficient system 2) How it can be used to achieve these objectives.

*Book Chapters: Chapter 10, Bélanger et al (See Bibliography)*

## SESSION 18 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES based on the previous sessions

- Cloud computing: Practical case elondocs, what type of cloud? (will be provided by profesor in Blackboard)
- Moving to a digital business: Practical case
- Agility methodologies: interactive note

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Practical activities that include at least one approach to one of
the sustainability topics: Environment, Governance, Social
Challenge, Economic Development

*Technical note & tutorials: Knowledge Lab: Moving towards a digital model (ENT020232-U-ENG-HTM)*

*Technical note & tutorials: Agile Methodologies (ENT020084-U-ENG-HTM)*

## SESSIONS 19 - 20 (LIVE IN-PERSON)

LOOKING AHEAD (I & II): INFORMATION TECHNOLOGIES TRENDS

- Exponential technologies
- Blockchain beyond crypto coins: business use cases. Fintech industry
- AI capabilities: machine learning, deep learning, robotics
- Analysis on future trends: moving AI to the edge, privacy preserving apps,

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development):
Examples of web 3.0 and Artificial Intelligence applications in the field of sustainability

*Book Chapters: No chapter associated in the book.*

## SESSIONS 21 - 22 (LIVE IN-PERSON)

LOOKING AHEAD (III & IV): INFORMATION TECHNOLOGIES TRENDS

- AR, VR, MR and personal technology
- Quantum computing

- The metaverse

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development): Examples of the use of Mixed Reality applications in the field of sustainability.

*Book Chapters: No chapter associated in the book.*

## SESSION 23 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES based on the previous sessions

- Machine learning. Interactive technical note.

PRACTICAL ACTIVITIES

- The Meta-University. Students will enjoy an immersive experience in the Metaverse.

- Materials: Materials and guidance will be provided in advance by the University

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development): Practical activities that include at least one approach to one of the sustainability topics: Environment, Governance, Social Challenge, Economic Development.

*Technical note & tutorials: Machine Learning (IST020075-U-ENG-HTM)*

## SESSIONS 24 - 25 (LIVE IN-PERSON)

FINAL PROJECT PRESENTATIONS. Understanding the "Big picture"

Details for the Final Project will be provided at the start of the course.

During this double session the teams will present their projects live.

Sustainability Topic (Environment, Governance, Social Challenge, Economic Development): All the teams projects presented will contained an approach to sustainability through at least one of the 4 topics: Environment, Governance, Social Challenge, Economic Development.

Teams will present their projects in front of the class

## EVALUATION CRITERIA

(ORDINARY AND EXTRAORDINARY)

This course requires students to attend, at least, to the 70 % of the sessions. You will be asked to make written and verbal presentations and take an active role through different interactive class activities. The evaluation is based on the following criteria:

| criteria | percentage | Learning Objectives | Comments |
|---|---|---|---|
| Group Presentation | 40 % | | |
| Short essay | 20 % | | |
| Class Participation | 10 % | | individual |
| Intermediate Tests | 30 % | | individual |

## A. CLASS PARTICIPATION

Students must attend, at least, 70% of all classes and participate in class discussions. The rating of the class participation is based on two aspects, the presence and contributions to class discussions. Contributions on class discussions will focus on quality, not quantity of the contribution, so that students who participate often do not necessarily receive a better rating than those who participate less frequently. Therefore, students are encouraged to start contributing to the discussions since the beginning of the course.

For this course, consider the cases and the documentation just a starting point. Feel free to update, add additional data or analysis to the discussion, or ask questions in the light of recent news or the news the read.

## B. GROUP WRITE-UPS

For each write-up, there is an upper limit of three pages of text (assuming 11-point font size, Times New Roman, double spacing) plus no more than one page of exhibits.

A hard copy of the document must be delivered to the professor in class. You also have to upload a soft copy of the case write-up to the professor via Campus Online.

Make sure the case write-up is easy to read. Consider using bullets, headings, etc., to make the case write-up easy to follow.

The objective of this process it to give you practice writing concise executive summaries – something that would make the reader believe that you have done a thorough analysis supporting your recommendations. This is the type of briefing that must typically be prepared for upper management – before they provide the resources for a more detailed investigation.

## C. FINAL GROUP PRESENTATION AND REPORT

You are also expected to complete a final project with your group and present it in written form and in a presentation in class. The project will give you the opportunity to reflect on what you have learnt in class and apply it to some practical problems. More details of the project will be provided by the start of the course.

## D. INDIVIDUAL QUIZZES

They will focus on the topics explained throughout the course. Detailed instructions will be provided during the course.

## RE-SIT / RE-TAKE POLICY

Each student has four (4) chances to pass any given course distributed over two (2) consecutive academic years. Each academic year consists of two calls: one (1) ordinary call (during the semester when the course is taking place); and one (1) extraordinary call (or "re-sit") in June/July.

Students who do not comply with the 70% attendance requirement in each subject during the semester will automatically fail both calls (ordinary and extraordinary) for that Academic Year and have to re-take the course (i.e., re-enroll) during the next Academic Year.

The Extraordinary Call Evaluation criteria will be subject to the following rules:

Students failing the course in the ordinary call (during the semester) will have to re-sit evaluation for the course in June / July (except those students who do not comply with the attendance rule, and therefore will not have that opportunity, since they will fail both calls and must directly re- enroll in the course during the next Academic Year).

It is not permitted to change the format nor the date of the extraordinary call exams or deadlines under any circumstance. All extraordinary call evaluation dates will be announced in advance and must be taken into consideration before planning the summer (e.g. internships, trips, holidays, etc.)

The June/July re-sit will consist of a comprehensive evaluation of the course. Your final grade for the course will depend on the performance in this exam or evaluation only. I.e., continuous evaluation over the semester (e.g. participation, quizzes, projects and/or other grade components over the semester) will not be taken into consideration on the extraordinary call. Students will have to achieve the minimum passing grade of 5 and the maximum grade will be capped at 8.0 (out of 10.0) – i.e., "notable" in the extraordinary call.

Re-takers: Students who failed the subject on a previous Academic Year and are now re-enrolled as re-takers in a course will need to check the syllabus of the assigned professor, as well as contact the professor individually, regarding the specific evaluation criteria for them as re-takers in the course during that semester (ordinary call of that Academic Year). The maximum grade that may be obtained as a retaker during the ordinary call (i.e., the 3 rd call) is 10.0 (out of 10.0).

After exams and other assessments are graded by the professor (on either the ordinary or extraordinary call), students will have a possibility to attend a review session (whether it be a final exam, a final project, or the final overall grade in a given course). Please be available to attend the session in order to clarify any concerns you might have regarding your grade. Your professor will inform you about the time and place of the review session.

! Students failing more than 18 ECTS credits after the June/July re-sits will be asked to leave the Program. Please, make sure to prepare yourself well for the exams in order to pass your failed subjects.

! In case you decide to skip the opportunity to re-sit for an exam or evaluation during the June/July extraordinary call, you will need to enroll in that course again for the next Academic Year as a re-taker, and pay the corresponding tuition fees. As you know, students have a total of four (4) allowed calls to pass a given subject or course, in order to remain in the program.

## BIBLIOGRAPHY

### Compulsory

- France Bélanger, Craig Van Slyke, Robert E. Crossler. (2022). *Information Systems for Business. An Experiential Approach..* 4th edition. Prospect Press.. ISBN 9781943153886 (Digital)

This book is available in an online version only and can be acquired via:

https://www.redshelf.com/app/ecom/book/1828292/information-systems-for-business-1828292-9781943153879-france-belanger-craig-van-slyke-robert-e-crossler

### Recommended

- Gabriele Picoli, Federico Pigni.. (2022). *Information Systems for Managers in the Digital Age.* 5th. Prospect press. ISBN 9781943153831 (Digital)
- Kenneth C. Laudon, Jane P. Laudon. (2022). *Management Information Systems: Managing the Digital Firm..* 17th. Pearson. ISBN 9780136971542 (Digital)

## BEHAVIOR RULES

Please, check the University's Code of Conduct [here](). The Program Director may provide further indications.

**ATTENDANCE POLICY**

Please, check the University's Attendance Policy here. The Program Director may provide further indications.

**ETHICAL POLICY**

Please, check the University's Ethics Code here. The Program Director may provide further indications.