



# Innovation and Entrepreneurship in eHealth



eHealth Eurocampus





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# Innovation and Entrepreneurship in eHealth

## Chapter 1. Introduction



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### National and European Issues of Innovation and Entrepreneurship

- Innovation is a main driver of enterprise's competitiveness and economic growth.
- Western countries showing the highest rate of economic development are those in which enterprise birth rate is also the higher.
- In westerns countries, there is a strong correlation between job growth and the creation of new businesses, that is with new entrepreneurs.
- The most innovative and brilliant ideas come from young people: most of greatest business successes are those of students who had in mind to ensure their independence after being graduated.
- Young IT engineers, as future actors of economic growth, have a social responsibility: creating sustainable jobs and businesses.

### Why a Teaching Module on Innovation and Entrepreneurship in eHealth ?

- In France, the rate of young people aged between 18 and 25 years who express the desire for creating an enterprise has been growing for more a decade.<sup>[1]</sup>
- Their ability to adapt to the new digital economy and to comply with a certain professional nomadism make these students key actors to prepare the jobs of tomorrow, which 50 % of them will be invented in the next 10 years.<sup>[1]</sup>
- Digital transformation of the society is central to that issue.
- The economic and social future of our countries is largely linked to their ability to integrate these new dynamics by valuing and supporting these new entrepreneurs
- eHealth as been recognized as a strategic domain by EU.

[1] From Conference of the French University Presidents. Practical Guide: University and Student Entrepreneurship (July 2016).  
Guide CPU – Université et entrepreneuriat étudiant. [www.cpu.fr/wp-content/uploads/2016/08/guide-CPU-entrepreneuriat-web1.pdf](http://www.cpu.fr/wp-content/uploads/2016/08/guide-CPU-entrepreneuriat-web1.pdf) 1. 6

# Chapter 1. Introduction



## World has become digital

“There is no digital strategy, just strategy in the digital world”



Acknowledgement: Valérie Sauterey and Pierre Dubié (Altran Lab). Impact of digitalisation on service and consultancy firms. Seminary on Digital Transformation. Graduate School of Engineering ISIS, Castres (France), February 9, 2018.

1. 7

The digital transformation of our society is progressing daily. In a higher education and research framework, no one could ignore the phenomena. The intensity of the change in our way of life is obvious. This digital dimension concerns designing services and products. Therefore, it is our responsibility to share knowledge on such a transformation, by teaching this reality to our students, as well as defining differently our research topics with the idea to better understand what it is and how to manage it.

### What is Digital Transformation ?

*"Digital transformation is the change associated with the application of digital technology in all aspects of human society. The transformation stage means that digital usages inherently enables new types of innovation and creativity in a particular domain, rather than simply enhance and support traditional methods.*

*In a narrower sense, "digital transformation" may refer to the concept of "going paperless", which affects both individual businesses and whole segments of society, such as government, mass communications, art, medicine, and science". (source: Wikipedia)*



1. 8

Should you make a request on Wikipedia on keyword 'digital transformation', you will have access to the content mentioned in this slide.

There are some connections between innovation capacities/abilities on one side, and digital transformation on the other. Regarding a project life cycle, understanding digital transformation could influence a project ideation at a time when creativity is needed. But the digital use is so important for acceptability purposes that during the whole life cycle, the evaluation of innovation will be performed by interaction with the end users. Agility is not a buzzword in such a context.

One interesting issue in this content is the example of **medicine as an area deeply affected by digital transformation**. eHealth is concerned by the phenomena as we know, and it is not just about having paperless business processes, it goes far beyond this.



## Levers for Innovation

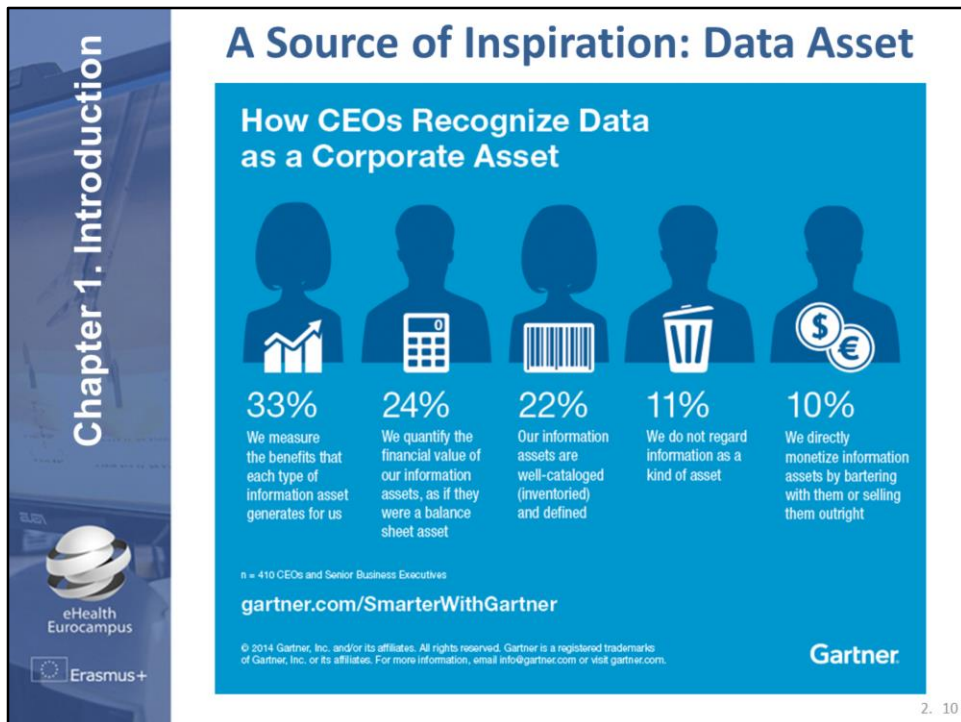
		Nature of Innovation					Example
		Technological	Social / Organizational	Commercial	Product / Service	Business Model	
Examples of Innovation Levers	Knowledge management	X	X		X		AnwerHub
	Mobile terminals	X	X	X			Smartphone
	Big Data	X		X		X	Looker
	Geo-tracking	X		X	X		Sigfox Technology
	Artificial intelligence	X			X		Natural Language Processing
	Advanced automation	X			X		Robotic Process Automation
	Internet of things	X			X	X	IBM Watson IoT
	Cloud computing	X	X		X		Google Cloud Platform
	Blockchain	X	X			X	Bitcoin
	Crowdfunding			X		X	Chaordix
	Social networks		X			X	Tweeter
Collaborative work		X	X			Diligent	

1. 9

Let's refer to the categories defined by the French Public Bank for Innovation (BPI France) to measure the impacts of innovations trends.

In this table, the rows described new IT known as being factors of change at the root of digital transformation of our society. Each row points out an added value service, able to better and continuously monitor systems, or to share knowledge and optimize diagnoses on the state of such systems, or to build new collaboration spaces with the least effort, or to meet easily new partners having great potential, or to have access to data with ubiquity, ....

But when the analysis of the effect of each innovative service with respect to the BPI categories is achieved (crosses in the matrix), all the dimensions of digital transformation arise. Technologies are at the front end of progress, but their use modify organisation and human behaviours. Facing with such complexity is important and an exciting challenge.



What are the raw materials that feed digital transformation processes ? The answer is simple. Data are the first subject of concerns. But how does my own organisation consider its data ? What is our maturity when we consider the potential of those data ? Is it really considered as an asset in the organisation ? Is it translated financially in our balance sheet ? The questions are asked by consultancy agencies to their customers. But it could also be asked more largely to any kind of institutions, including public ones.

Let's take an example. Clinical research has a true perception about data values. But in the health ecosystem, with trends to develop personalised medicine, data on citizens are no more limited to their health state and the consequences of a prescribed treatment, social aspects, will be more and more valued for example to understand the effects of the clinical practices. It is a proof, if necessary, of the dynamics linked to the question of data asset. The big data wave is one concrete consequence of how much data (as a raw material) processing improvements will be able to boost innovation.

## Levers for Digital Transformation

### Futuristic dimensions of digital transformation: impact on lifestyle

**Connecting everything to address the digital world of tomorrow.** Internet of things (IoT) makes it possible to connect users, processes and goods both inside and outside firms, hospitals, living spaces, institutions, and transportation networks.



**Deploying analysis capabilities aiming to automation, understanding or backup.** By using and analysing huge amount of data available to your company, you obtain valuable information.



**Introducing new business models.** For instance, 'Freemium' model and upon request business models (Uber) are more and more attractive.



**Shifting toward a unique and single platform is the goal of digital transformation.** Either on site or in the cloud, this platform aims to take over communication and collaboration services for the whole company.

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End users perceive digital transformation in their daily way of life and in their consumption habits. We could classify the impacts of digital innovation in 4 categories.

The first one deals with the internet of things, that is data collection coming from fields using connected objects and wireless communication networks. Most products are now providing facilities for data communication to the surrounding environment. Once stored in a database, those data could be exchanged taking care to people privacy and integrity.

Data analysis is referred to in the second category. The aim is knowledge production in order to make decision and to use services that will be adapted to the context and increase performance. Artificial intelligence is included in this field.

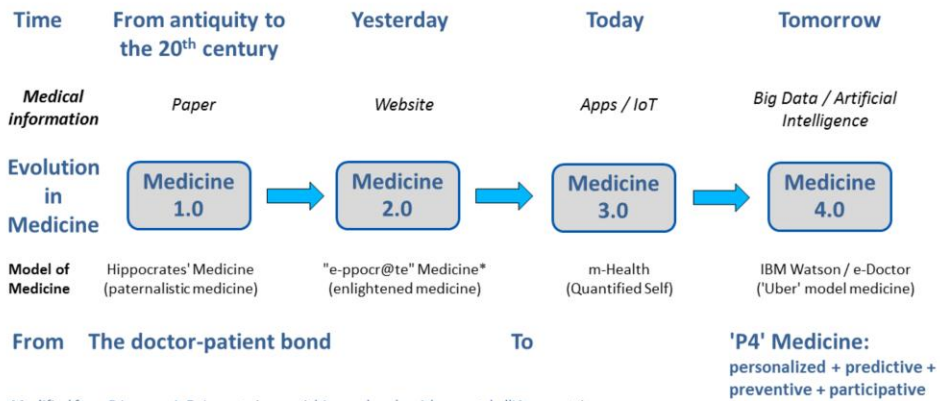
Business models are considered in the third category. While people consumption profiles are becoming increasingly precise with data collected and analysed, business is changing and companies have the opportunities to create new proposal to sell their goods and services. The challenge is to access very quickly to the consumer and to capture his/her needs by having a first response partially adapted. Then, a dialog could be installed between parties and the consumer could become the best way to promote the company on social nets, as well as being a provider for new functionalities that will be included in future product release with confidence.

The last category is explicit. Access to services using data stored in the cloud has to be managed such that user can easily use them without having to browse on many resources. In the health ecosystem, for instance, accessing to his/her own health records is of prime interest for a patient. Most of the time, data are spread in many databases depending on the information systems of practitioners that the patient has met during his/her pathway. A full access is a guarantee for healthcare quality and risk mitigation.

# Chapter 1. Introduction



## Digital Transformation in Health: From Hippocrates' Medicine Towards 'Uber' Model Medicine ?



Modified from Béranger, J. Enjeux et risques éthiques des algorithmes et de l'IA en santé. Workshop on Ethics and IT in Health, ISIS Engineering School, Castres (France), February 23, 2018

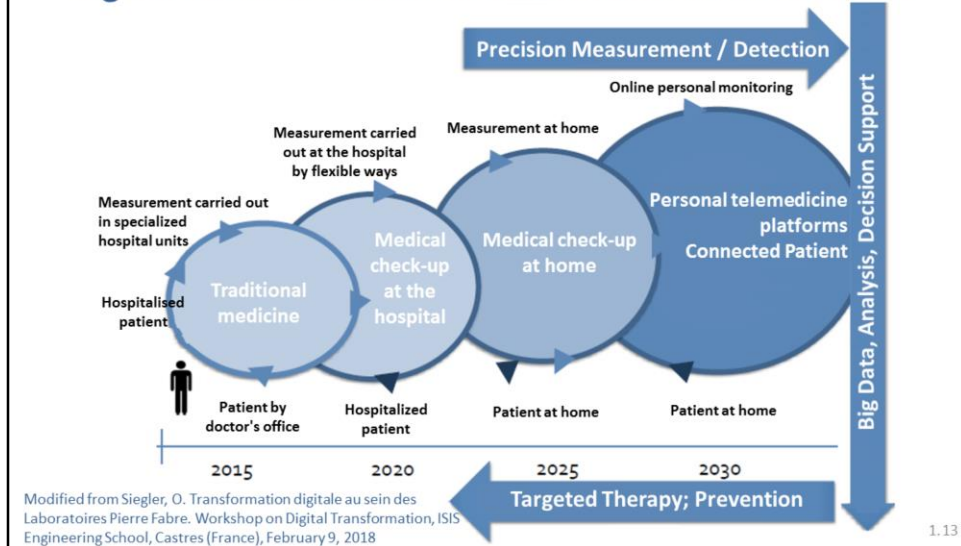
\* Béranger, J. Big Data and Ethics. The Medical Datasphere. ISTE Press: London (UK)

1.12

According to the French National Consultative Ethics Committee, the use of artificial intelligence in health raises questions on the evolution of medical practices, from the doctor-to-patient meeting to a so-called 'P4' medicine.

Hippocrate's medicine, most often practiced up to now, is a physician-centred medicine organized in specialities, characterised by action episodes isolated from each other, which applies generic care protocols for curative purposes.

## Digital Transformation Pervades Health in All Its Forms



'P4' medicine is based on the use of massive amount of data, including patient's medical, environmental and health history data acquired through apps, sensors, IoTs, "smart" goods and from medical databases, aiming to a more personalized, predictive, preventive and participative medicine. The neologism '*ubimedicine*' has been proposed (\*) to qualify this new form of medicine based on the reception and analysis of data collected on the initiative of the patient at multiple times and places. By using IT, this new approach of medicine brings individuals, likely well before even being patients, in connection to computerized medical decision support.

(\*) Postel-Vinay, N. Auto-soins et raisonnement collectif (*Self-care and collective reasoning*). Seminar on Risk Prevention in Medicine. Collège de France, Paris (France), January 13, 2012.

## Learning Topics for IT Engineers Aiming to Work in eHealth



### Computing Science & Information System

- Information system: modelling, databases
- Object oriented design and programming
- Human-machine interfaces
- Service-oriented architecture and interoperability: XML technology, web services, ...
- Distributed and competing systems
- System security and robustness

### Healthcare System Organization & Organizational Management

- Health system: organization, healthcare businesses, legislation, economy, sociology, finance, ethics
- Communication in a professional context
- Communication and innovation
- Organizational management
- Health economic and sociologic issues
- Project management



### Health Information System

- Health information system engineering and organization
- Health business intelligence
- Data and system security
- Health distributed computing and interoperability, cloud computing
- Care flow management

### Health Engineering

- Statistical methods and epidemiology
- Measurement on living matter
- Wireless sensor network
- Communicating goods and IoT for health
- Medical imaging
- Biomedical engineering



The profile of a young IT engineer trained to the health domain is composed by four skill categories, each one having something in common with the categories introduced in the previous slide. Their employability is enhanced by the digital transformation wave, and as a young person, he/she will be motivated by this perspective. For instance, the scientific and cultural features of ISIS students perfectly mix for doing so.

# Chapter 1. Introduction



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## Learning Outcomes IT Engineers Must Own to Be Efficient in Health

Professional Activity	Related Skills Owned at the End of the Training Process
<b>Information system (IS) development</b>	Implementing the recommendations and standards of computing sciences in health. Complying with standards and certifications. Ensuring the interoperability of applications. Implementing the recommendations and standards of computing sciences in health. Complying with the standards and certifications. Ensuring the interoperability of applications.
<b>Software and IS design</b>	Designing information system for health while practicing the domain vocabulary. Analysing data flows encountered in health organisations. Modelling business processes.
<b>Team &amp; communication management</b>	Integrating into a health organisation and acting as the link between the different health businesses. Knowing well the legal environment of health. Interacting and communicating with the different IT professionals of health domains.
<b>Project management</b>	Integrating quality standards into in health scenarios (i.e. related to drugs, medical devices, ...). Developing research projects and operating innovation.
<b>Technical consultancy</b>	Implementing technical interoperability standards and certifications in the health domain. Integrating applications within the software layers of health information system. Carrying out a survey of business software packages for health.
<b>Functional consultancy</b>	Knowing the businesses of health professionals and their functional and organisational constrains. Being able to communicate with health professionals by using their vocabulary and knowing the standards and certifications specific to the health domain. Converting business issues into technical constrains (i.e. medical processes). Understanding the health information systems and their specific software layers. Carrying out a survey of applications used in health information system.
<b>IT park management</b>	Integrating medical devices and medical imaging systems into the IT park. Communicating with biomedical engineers. Carrying out authentication processes. Installing business software.
<b>Data base management</b>	Knowing and integrating regulation standards for health data management and hosting.
<b>IS security and safety</b>	Carrying out security and safety standards of health information system. Ensuring the availability, integrity, confidentiality and traceability of health data. Integrating the technical standards for health data hosting.
<b>Processing IS data</b>	Knowing coding standards for medical acts. Mastering the tools used to analyse medico-economics activities. Carrying out statistical methods to analyse clinical and epidemiological data. Interpreting and to exploiting data in the frame of distributed complex systems to decision support. Modelling health datamart.

Generic learning outcomes that any IT engineer must own are not shown here

1.15

This slide presents the certified skills that any IT engineer must own to be efficient in the health domain when graduated. A good knowledge of uses, practices, constrains and vocabulary of health professional is a scope of prime importance.

Skills related to eHealth technology including the use of IoT and Big Data in health must also be included in this scope.



# Chapter 1. Introduction



## Expected Student Entrepreneur's Generic Skills (1/2)

Skills	Knowledge, Know-How and Soft Skills Examples
<b>Spirit of initiative</b>	Inquiring, getting information and key resource persons. Building up a network of contacts with a variety of actors. Deepening his/her network by making new contacts, with new partners. Establishing long-term collaborations with individuals and organizations.
<b>Leadership</b>	Convincing and mobilizing teams and partners. Leading a team. Maintaining a partnership. Promoting involvement to a project. Imparting values. Retaining the team members. Thanking and encouraging.
<b>Capacity to experiment</b>	Using trial-and-error approaches to bring about the need to persevere. Learning from their own mistakes and experiences.
<b>Capacity to listen and to reality checking</b>	Getting the most of the ecosystem into which the business project must be developed, facing problems/constraints, identifying solutions/resources. Accepting others with all their differences. Considering individual differences as wealth. Taking into consideration the ideas of the others and rephrasing them.
<b>Intellectual agility</b>	Having an open-minded spirit to switch from creativity, imagination, curiosity to searching within the realm of the possible and for what is concrete and actually feasible. Switching from divergence to convergence. Stepping back to better understand debates, conflicts, ...
<b>Collectively producing coherent and professional documents</b>	Writing in a style adapted to readers and to document's aims (report, display production, etc.), using good grammar and selected vocabulary. Being able to produce collectively a document. Ensuring reporting.

From Farenc, P. and Marengo, N. *Entreprendre : outil de capitalisation des expériences et des compétences (Entrepreneurship: capitalisation of experiences and competences tool)*. IMT-Mines Albi-Carmaux & INU Champollion (2016)

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## Expected Student Entrepreneur's Generic Skills (2/2)

Skills	Knowledge, Know-How and Soft Skills Examples
<b>Mastering communication</b>	Identifying and promoting the organization's values. Presenting his/her ideas. Speaking in public. Presenting a project and its outcome in clear and practical terms to a variety of actors, including in the context of critical deadline. Communicating about a project by stressing its values. Facilitating a meeting. Being understood by cultural or social group other than his or her own.
<b>Showing curiosity. Being a source of initiatives</b>	Embracing change, new situations and problems. Adjusting his/her own behaviour accordingly to unexpected situations. Being attentive to his/her surrounding. Anticipating. Taking advantage of any opportunities.
<b>Ability to plan, transpose and adapt</b>	Identifying unmet needs. Accomplishing a lot with limited resources. Knowing highlighting problems and proposing alternatives. Working in an intercultural and international context (team members, project stakeholders, users or customers).
<b>Being creative, inventive and curious</b>	Inventing new solutions in terms of organisation, activity or partnership. Adapting good practices that have worked elsewhere. Being curious about what is carried out elsewhere. Being open to what is outside the norm, knowing how to dare, undertaking initiatives, putting forward proposals.
<b>Autonomous Know-How</b>	Being able organizing oneself. Not being depending on others to get ahead. Knowing how to identify her/his own development potential. Taking initiatives. Being able to arbitrate between different views. Learning by doing. Practicing peer-learning and self-learning tools.
<b>Getting informed</b>	Knowing how to search and identify information sources, how to analyse and manage information, how to call in others to get relevant information.

From Farenc, P. and Marengo, N. *Entreprendre : outil de capitalisation des expériences et des compétences (Entrepreneurship: capitalisation of experiences and competences tool)*. IMT-Mines Albi-Carmaux & INU Champollion (2016)



## Expected Student Entrepreneur's Managerial Skills (1/3)

Skills	Knowledge, Know-How and Soft Skills Examples
<b>Creativity</b>	Knowing about creativity methods and how to implement them.
<b>Structuring a project</b>	Elaborating a diagnosis and putting a project in a socio-economic context including the institutional environment. Inventing a scenario, evaluating different scenarios, assessing the idea and coherence of a project.
<b>Analysing a market</b>	Knowing survey tools. Knowing the concept of market segment. Defining a strategic opportunity, integrating the societal and environmental context.
<b>Building a business model</b>	Integrating a financial approach over time (cost price, break-even point, profit and loss account, balance sheet, financing table, cash flows, working capital needs, return on investment, ...)
<b>Financing a project</b>	Convincing one other on the interest of partnership. Building a partnership and maintaining relationship with different partners including private and public organisations. Knowing to find the right arguments to present the issues of a project and justify resource requirements. Obtaining public funds and justifying their use (filling a grant application, submitting a assessment of action). Obtaining funds from private partners (loan, agreement, sponsoring, ...). Knowing to give account of partner's means to preserve a relationship of trust.

From Farenc, P. and Marengo, N. *Entreprendre : outil de capitalisation des expériences et des compétences (Entrepreneurship: capitalisation of experiences and competences tool)*. IMT-Mines Albi-Carmaux & INU Champollion (2016)

1.18

## Expected Student Entrepreneur's Managerial Skills (2/3)

Skills	Knowledge, Know-How and Soft Skills Examples
<b>Identifying and organizing required means</b>	<p>Building a consensus. Knowing how to form and/or complement a staff by identifying the right people. Welcoming and integrating new team members. Putting to work together different individuals including those having a different status. Allocating tasks according to the competencies and interests of staff members, making them autonomous. Supporting all the staff members to achieve the objectives.</p> <p>Defining by means of dialogue the rules of living and acting together within a project. Imposing the non-negotiable rules and enforce them. Identifying training needs and proposing answers. Recognising staff's skills and acknowledging them.</p> <p>Knowing how to delegate while helping staff members to take on more responsibility. Developing shared and collective solutions. Sharing information. Stimulating and managing discussions. Pooling energies. Playing the role of interface.</p> <p>Creating a user-friendly climate of work. Identifying, preventing and managing conflicts by anticipation, listening and mediation.</p>
<b>Protecting a project</b>	<p>Knowing how to choose the legal status of his/her organisation. Registering a trademark. Knowing how to use a patent database.</p>

From Farenc, P. and Marengo, N. *Entreprendre : outil de capitalisation des expériences et des compétences (Entrepreneurship: capitalisation of experiences and competences tool)*. IMT-Mines Albi-Carmaux & INU Champollion (2016)

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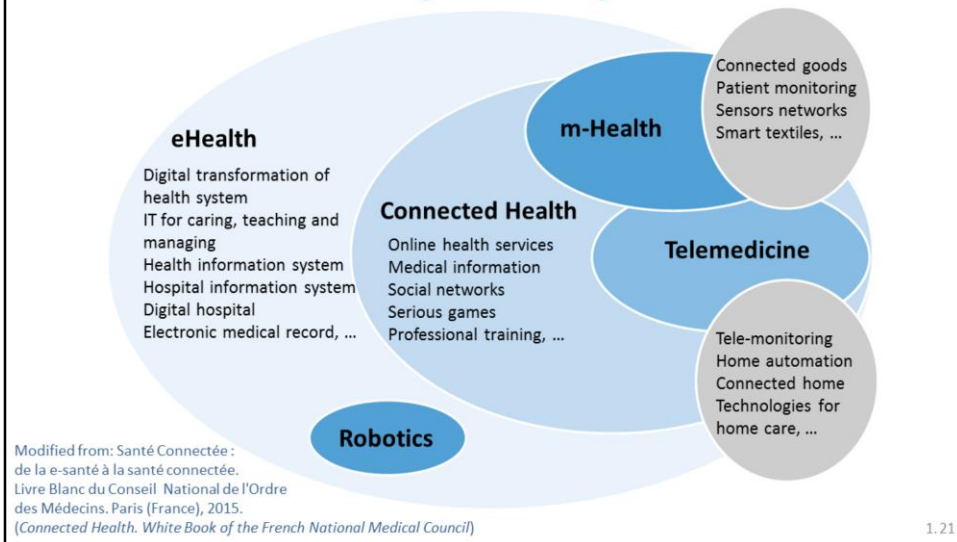
## Expected Student Entrepreneur's Managerial Skills (3/3)

Skills	Knowledge, Know-How and Soft Skills Examples
<b>Developing a strategic vision for a project</b>	Setting priorities. Planning. Developing a project and keeping it alive. Involving project stakeholders over time. Understanding the project issues, embracing its values and challenges. Following a project along its different steps (definition, design, implementation, follow-up). Developing his/her action in a mid-term and long-term perspective.
<b>Defending a project, getting involved in its success.</b>	Knowing how to communicate with decisionmakers.
<b>Providing an entrepreneurial expertise</b>	Defining and arguing a multi-year action plan. Proposing new projects. Bringing forward a project, adapting it according to its development. Being accountable for what has being said and done. Propose strategic decisions.

From Farenc, P. and Marengo, N. *Entreprendre : outil de capitalisation des expériences et des compétences (Entrepreneurship: capitalisation of experiences and competences tool)*. Mines Albi-Carmaux & INU Champollion (2016)

1.20

## eHealth: a Melting Pot to Forge Innovations



While providing IT students a sound knowledge of health businesses, a curriculum such as the one that leads to the skills presented in the previous slide allows them to work easily in the health domain, whether in hospital environment or in companies which develop IT projects for healthcare. But, to be efficient, let's mention that IT students also need to have a good overview of eHealth technologies and practices, including connected health, mobile health (m-Health), telemedicine and robotics in healthcare, as depicted in the slide.

**eHealth illustrates the emergence of a new market at the confluence of a triple evolution: sociological change** (patient's empowerment), **technological revolution** (worldwide explosion of innovations, including smartphones, IoT, connected goods, ...) **and political-economic evolution** (requirements for enhancing the efficiency of national/regional health systems). Owing to a broad range of stakeholders and to cutting-edge technologies requiring meaning in terms of use and liable to change deeply health care organization, eHealth can be considered as a complex domain.

**The creation of innovative and economically sustainable eHealth solutions is not just a technological issue. It requires a broad sphere of knowledge and competences covering the following issues:**

- **legal:** complying with medical, digital and commercial standards;
- **clinical:** understanding the functioning and issues of patient's care pathway and healthcare professionals' businesses;
- **economical:** getting to grips with value creation process and monetizing eHealth products and services;
- **sociological:** mobilizing project team and defining, early in the project life, a clear strategy for diffusing innovation.

This module aims to provide students with most of these competences.

## Module's Contents (1/3)

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### Chapter 2. Innovation in eHealth

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Chapter 2.5 - Open innovation in eHealth	Slides 2.216 - 2.192
Chapter 2.6 - Innovation workshops on open innovation in eHealth	Slides 2.193 - 2.300
Appendix 2	

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After Chapter I, that introduces the module's structure and contents and presents the expected skills, Chapter II provides a wide overview on innovation in eHealth in four chapters. Chapter 2.1 addresses European social and health challenges trends at medium and long term. Chapter 2.2 is dedicated to strategic digital and technological trends in eHealth, when chapter 2.3 discusses the dynamics of innovation in eHealth and the obstacles it has to face. Some examples of health innovation models and of products and services are presented in chapter 2.4.

Although innovation in eHealth includes services, it also concerns digital solutions that are often developed by start-ups, that is environments which integrate digital transformation in their 'genetic code'. Digital transformation, which is developed through uses and by agile processes cannot find its full potential within a strict framework. As a matter of fact, 'closed' innovation methods, that refer to experimental pilots (such as for clinical research), are characterized by time delay incompatible with digital innovation processes. In this context, IT engineers must be introduced to the optimization of innovation management processes including open innovation approaches.

This is the aim of the last two chapters of Chapter II, which are dedicated to open innovation in eHealth. Chapter 2.5 provides an introduction to management processes, focusing on open innovation in eHealth and presenting Living Lab approaches and some examples of such platforms dedicated to eHealth. Chapter 4.6 proposes two multidisciplinary educational approaches aiming to help IT students understanding patient's healthcare pathway and the ways health professionals work. This chapter is supplemented by an appendix that provides teaching material.

### Ethical Issues in eHealth

- The development of eHealth technology and of new economical models underlying eHealth and based on personal data collection, processing and valorization lead to huge changes where threats to social solidarity and integration and to individual's supervision and dependence pose ethical questions.
- Ethical issues must be taken into account at all levels of the development of an innovation, from design to social impacts.

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Ethical issues must be taken into account at all levels of the development of innovation, from its design to the social impacts it can have. As an example, for start-ups, that form the bulk of eHealth innovating companies, the need for staying a step ahead of the competition is absolute, but at the risk of offering products that could not provide enough security guaranties.

Therefore, ethical issues are of prime importance in eHealth.



## Module's Contents (2/3)

### Chapter 3. Ethical Issues in eHealth

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Chapter III is organized into three chapters.

Chapter 3.1 highlights the importance of considering ethical and legal issues in the design and development of eHealth solutions. Ethics is of course fundamental to health care, and can be traced back to the ancient Greeks. The Hippocratic oath, which is widely known throughout Western society, is an excellent example of our recognition of ethics in health. So, why should eHealth be any different? We need to make sure that we can work ethically as IT practitioners if we are working in health care, just as clinicians do in their practice. Individuals are responsible for their own actions, which they can examine and control through rigorous self-discipline.

Owing to the ethical issues relating to interactions of robots used in healthcare with individuals, chapter 3.1 is supplemented by a chapter (3.2) dedicated to robotics in healthcare, that also includes discussions on the integration of a degree of 'emotional intelligence' in robots or eHealth goods.

Chapter 3.3 ends this section by the presentation of teamwork activity, including teaching material for three activities.



## Module's Contents (3/3)

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1.25

**Entrepreneurship spirit is not innate nor given. It is built. It combines forming a picture of oneself, attitudes and skills.** Chapter IV aims to inspire IT students to the issues of entrepreneurship and to awake entrepreneurship spirit.

Starting with an introduction to the entrepreneurship process (chapter 4.1), Chapter IV covers the key points to consider when developing an entrepreneurship project, from the project idea to product or service launching, including:

- building the founding team and the way its member must be maintained in an ongoing effort (chapter 4.2);
- the way of validating a business idea by the designing a business model (chapter 4.3), including Canvas model (chapter 4.4) and creativity techniques (chapter 4.5);
- methods to understand business model and developing strategy (chapter 4.6);
- business planning and story telling techniques (chapter 4.7);
- the key points of business model validation (chapter 4.8);
- the issues entrepreneur has to balance to be successful in marketing (chapter 4.9);
- financial statements (chapter 4.10);
- the ways to raise money for starting and growing business (chapter 4.11)

Chapter 4.12 is dedicated to four case studies for teamwork intended to implement brainstorming techniques.

**Chapter 4.13**, which is not course material, **is dedicated to teachers**. It presents approaches to encourage students to create their own business in order to fulfil themselves professionally and to create economic and social wealth and new employment. These approaches include the establishment of a national network, the creation of a national status of student entrepreneurs, the definition of a training frame, encouraging universities to create student entrepreneur diplomas, and providing financial support to the setting-up of innovative businesses. Approaches within the eHealth Eurocampus partnership are also shown.

## Contribution

- Prof. Bernard Rigaud (INU Champollion, ISIS Graduated Engineering School until 31 March 2018; retired since 1<sup>st</sup> April 2018)
- Prof. Hervé Pingaud (INU Champollion, ISIS Graduated Engineering School)
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