Creativity and Innovation in Education. Case-study.

Author: Miriam Monsonís Canós

Tutor: Francesc Xavier Molina Morales

DEGREE IN BUSINESS ADMINISTRATION

AE-1049 - Degree Final Project

Academic year 2018-2019

"If you think adventure is dangerous, try routine; it is lethal"
- Paulo Coelho.

TABLE OF CONTENTS

INTRODUCTION……**5**

Chapter 1. THEORETICAL FRAMEWORK

1.1. Creativity

1.1.1. Concept of creativity……..……..……7

1.1.2. Factors that influence in creativity……..……..…..9

1.2. Innovation

1.2.1. Innovation concept and tipologies……..……...……..12

1.2.2. A model of organizational innovation: INNOVARCHY ……..……..……14

1.3. Creativity and Innovation relationship

1.3.1. Innovation processes……..……..……18

1.3.2. Creative economy……..……..22

Chapter 2. EMPIRICAL WORK

2.1. Methodology

2.1.1. Description of the case-study: CIDET.....24

2.1.2. Sources of information and data……..……..……..24

2.2. Industrial environment

2.2.1. Education in Spain……..……..25

2.2.2. Innovation in education……..……..……..28

Chapter 3. CASE STUDY

3.1. CIDET

3.1.1. Location: ESPAITEC……..……29

3.1.2. Origins, business model, and philosophy of CIDET……..……..……30

3.1.3.. CIDET Services ……..……..……..31

3.2. Description of the research……..……..33

3.4. Results of the research ……..……..34

Chapter 4. CONCLUSIONS

4.1. Limitations of the study……47
4.2. Final conclusions and recommendations……47

BIBLIOGRAPHIC REFERENCES……50

APPENDICES
Annex 1. Interview employees……53
Annex 2. Questionnaires……55

TABLE OF FIGURES

Figure 1. Components of creativity……8
Figure 2. Qualities of Problem Solvers that Promote Creativity…… 10
Figure 3. Qualities of Problem Solvers That Inhibit Creativity……10
Figure 4. Technology Boost Model……19
Figure 5. Market Pull Model……19
Figure 6. Departamental Stages Model……20
Figure 7. Closed Innovation as compared to Open Innovation……21

TABLE OF IMAGES

Image 1. Student numbers according to their educational level……27
Image 2. Students by type of school……28
Image 3. CIDET LinkedIn……32
Image 4. CIDET Services……34
Image 5. Kanban……47

TABLE OF TABLES

Table 1. Qualities of environments that influence in creativity……11
Table 2. Organizational Learning Capability……16
Table 3. Creative industries……22
Table 4. Educational levels in Spain……26
Table 5. Description of Case-study……34
Table 6. Questionnaire on motivation……35

Table 7. Skills and abilities of the employees……..……..37
Table 8. Questionnaire regarding working environment……..……..40

1. INTRODUCTION

We live in a world that is globalized and full of persistent change, in which innovation in most aspects of our lives is of constant importance. These changes affect all of society in general, both businesses and the people of which they are composed, and this means that they must face up to new challenges which will often determine whether or not a business will survive in the market. For this purpose it is necessary to adopt organizational measures, attitudes, and aptitudes that allow them to adapt to the uncertain environment in which they operate.

Meanwhile, technology and science are constantly evolving, albeit unpredictably, which increases still further the probability that processes of change will appear requiring competent and flexible persons who can adapt to the said changes. This is why both businesses and the market are seeking ever-more persons who have specific personal skills that go beyond merely professional skills. Faced with this scenario, we must think about and bestow the necessary importance on creativity and business innovation as a source competitive advantage for survival, the attainment of objectives, and differentiation in any industry or sector.

Innovation is currently present in the vast majority of industrial sectors. The education and training sector, which is what we will be focussing on in this project, has not been immune to this fact and has experienced changes, although currently there are many impediments to the innovation it requires. As such, we consider that it would be a matter of interest to extend and to encourage creativity and innovation at all levels of training and that these should be considered as being essential skills in the training of professionals in all areas of knowledge. In general, educational innovation processes are associated with information and communication technologies, which offer enormous possibilities for teaching processes and for the introduction of changes into traditional classrooms and the creation of virtual training environments, inter alia.

This project is based, first of all, on the development and understanding of both of the aforementioned concepts with a theoretical approach, as well as those factors that influence them, their various different types, and the relationship between creativity and innovation. Secondly, we have decided to focus on a real case study within this industry and for this purpose

we have chosen the company named CIDET, located at the Jaume I University in Castellon. The aim is to examine the creativity and innovation process of a business operating within the education and training sector. First we introduce the business, its location, and the environment within which it performs its activity, and then we carry out the CIDET case study. This will include performing the research objectives and setting out the results that have been obtained. On the basis of the said results we will then form the conclusions to be extracted from the research, the limitations of the research, and some proposals for improvement.

Chapter 1. THEORETICAL FRAMEWORK

1.1. Creativity

How can we as humans reach new thoughts? How is creativity defined? Is creativity simply a new idea, or does it go further than that? Examining the concept of creativity will be the first step in this study, and that is why we are going to focus on some of the theories in which this concept is described. It then shows the factors that influence people's creativity, which will be both personal in nature and in the working environment.

1.1. Concept of creativity

Definition of creativity

As is the case with many concepts, we can find a broad range of definitions and research into the concept of "creativity". Firstly, the term derives from the Latin word *creare* and is defined by the Spanish Royal Academy as "the faculty of creating" or "the capacity of creation" (RAE, 2018). From this definition we may deduce that creativity is a mental aptitude of human beings to produce. In contrast, the author Margaret A. Boden describes creativity as "a mystery, not to say a paradox. A new idea may be creative, while another is simply new" (Boden, 2004, p.16).

If there is something that characterizes creativity it is its complexity and dynamism, given that it may appear within any context of knowledge. In general creativity is related to aspects such as problem-solving, decision-making, or the creation of new products, inter alia, wherein the necessary faculty of originality and utility are always found. As is stated by Domenech and Lazzeretti (2012, p.182) "Creativity is the ability to generate something new, to combine data, perceptions, and materials in order to produce new and useful things".

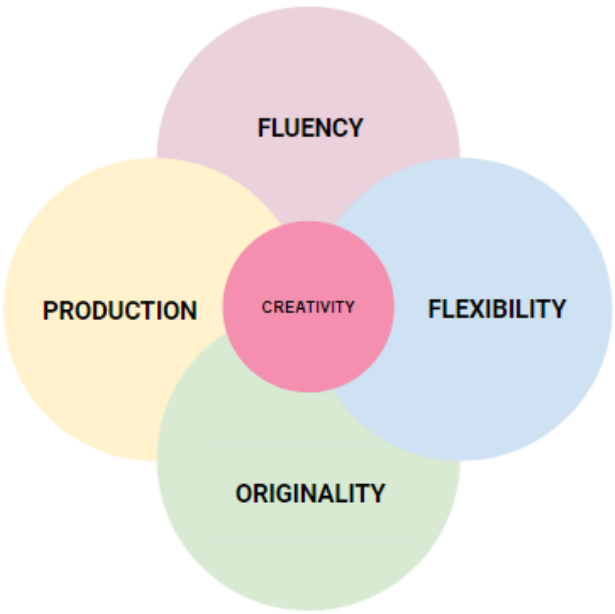
The breadth of the concept of creativity and the multiple dimensions of human development that it covers is evidence of the existence of many ways of understanding creativity. The author Margaret A. Boden proposes distinguishing between "H-creativity", which is understood to mean "creativity at a social and cultural level", and "P-creativity", which is "creativity at a personal and psychological level". The difference derives from the moment when the ideas arise, given that an idea may be "P-creative" even when it has previously manifested itself in the minds of other

people, whereas an idea can only be “H-creative” when “no one else, in all of human history, has had it before” (Boden, 1994).

Measurement of creativity

It would be logical to assume that the task of measuring or assessing people’s creativity or the creative process of organizations is not simple, but quite the reverse, partly due to the lack of “reliable and valid” methods (Escobedo et al., 2009). One of the best-known tests is the TTCT (“Torrance Test of Creative Thinking) created by Torrance (1974) with the aim of revealing the essential elements that make up creativity in people. The following illustration shows what they are, according to this method, and what the main characteristics of creativity may be considered to be.

Figure 1. Components of creativity



Source: Adapted from Torrance (1974) cited in Escobedo (2009, p.3)

The Torrance Test is based on words, images, or sounds, and from these a series of ideas need to be presented, and in addition, four categories are assessed from the answers which correspond to the main characteristics of creativity. In this way, flexibility is measured in accordance with the “variety of ideas presented”, fluency refers to the “number of ideas”,

production refers to the verbal capacity to explain the new ideas, and originality is measured by having an aptitude for presenting ideas which are not obvious (Escobedo, 2009).

1.1.2. Factors that influence in creativity

Developing creativity will allow people to reach new ideas that may lead to innovation. Under this heading we are going to study what factors or circumstances assist or prevent organizations from being creative. On this subject there are many studies that have identified multiple factors that promote or impede individuals from being creative. Personal relations between staff or between groups of staff have been examined, along with the workplace itself, the business culture, or the personality of each individual and how this affects his/her creative capacity.

The study carried out by Theresa Amabile in 1988 entitled *A model of creativity and innovation in organizations* and which we are going to focus on distinguishes between two kinds of factors that facilitate problem-solving, the appearance of new ideas, and ultimately, creativity at organizations, which are personal qualities (problem-solvers), i.e. all personality traits that influence creativity, and work-environment factors. Meanwhile, it also establishes a classification for those factors, whether personal or affecting the environment, that inhibit or reduce creativity. According to Amabile (1988, p.127)

> *"Qualities of environments" are any factors outside of the problem-solvers themselves (including other people) that influence creativity positively or negatively. "Qualities of problem-solvers" are any factors of ability, personality, mood, etc. within the problem-solvers themselves that influence creativity constantly or negatively.*

There follows below the classification resulting from the research carried out by Amabile (1988) involving 120 scientists and employees regarding the personal factors that either promote or inhibit creativity. The percentages shown in the image reflect the frequency with which the factors of the problem-solvers have been mentioned by the survey group at least once during the study.

Figure 2. Qualities of Problem Solvers that Promote Creativity

Source: Adapted from Amabile (1988, p.128)

Figure 3. Qualities of Problem Solvers That Inhibit Creativity

Source: Adapted from Amabile (1988, p.128)

As we have said, the study revealed a series of factors that are external to the individuals that influence their creative capacity, these being the environment factors, within an organizational and economic context, and workplace-environment characteristics. Amabile (1988) states that the persons who participated in the said study found a higher number of these factors, i.e. there was a larger consensus regarding the importance of social factors. The table below sets out the classification of the said factors together with the percentages that each one represents.

Table 1. Qualities of environments that influence in creativity

Qualities of Environments that Promote Creativity	***Qualities of Environments that Inhibit Creativity***
1. ***Freedom:*** Autonomy, delegation and decison power. *(74%)*	**1.** ***Various organizational characteristics:*** little regard for innovation. *(62%)*
2. ***Good Project Management:*** servant leadership. *(65%)*	**2.** ***Constraint: lack of freedom*** *(48%)*
3. ***Sufficient Resources.*** *(52%)*	**3.** ***Organizational Disinterest:*** lack of support. *(39%)*
4. ***Encouragement:*** create an atmosphere that facilitate new ideas. *(47%)*	**4.** ***Poor Project Management.*** *(37%)*
5. ***Various Organizational Characteristics:*** where innovation is prized and fail is allowed. *(42%)*	**5.** ***Inequitable Evaluation*** *(33%)*
6. ***Recognition.*** *(35%)*	**6.** ***Insufficient Resources*** *(33%)*
7. ***Sufficient Time.*** *(33%)*	**7.** ***Time Pressure:*** insufficient time to think about the problem. *(33%)*
8. ***A Sense of Challenge.*** *(22%)*	**8.** ***Overemphasis on the Status Quo.*** *(26%)*
9. ***Pressure.*** A sense of urgency to accomplish something important. *(12%)*	**9.** ***Competition:*** fostering a self-defensive attitude. *(14%)*

Source: Adapted from Amabile (1988, p. 146)

1.2. Innovation

In a world that is increasingly globalized, businesses must innovate to survive. After studying the concepts of creativity we move on, in this chapter, to talk about innovation. The concept is described from different perspectives first, then a classification of innovation according to its typology and finally proposes an ideal organizational model for creativity and innovation.

1.2.1. Innovation concept and tipologies

When we talk of innovation, we refer to the process that ranges from the creation of new ideas to the realization of these ideas. In effect, unless the new idea is implemented/introduced into the market, it does not really count as an innovation. This line of thought is expressed by authors such as Escorsa and Valls (2003), who recommend that the first step in the definition of innovation is to differentiate between “innovation” and “invention”.

As such, an invention represents a new idea, new knowledge, or even new products, and innovation is related to the commercial exploitation of that idea, knowledge, or product. Likewise, Urabe (1988) describes innovation as the representation of the creation of a new idea and its implementation in a product, process, or service. From these definitions we may deduce that invention is part of innovation.

We can find many definitions that seek to describe the concept of innovation, all of which on a similar basis and with the aim of providing an exclusive definition. The OECD (Organization for Economic Co-operation and Development) recognizes the definitions contained in the Frascati and Oslo manuals. The latter represents the reference framework with regard to the features and trends of innovation. In particular, Frascati (OECD, 2002) argues that innovation is, to a great extent, of a technological nature and covers the introduction onto the market of new or significantly-improved products and processes through organizational, financial, technological, or scientific innovation activities. Meanwhile, the Oslo Manual (OECD, 2005) offers a broader view of the concept of innovation. As such, innovation may have different origins, but they all have the quality of being “new” or “significantly-improved”, and it is not essential for an innovation to qualify as such for the whole world, but rather it need only be an innovation for the organization that is implementing it.

In accordance with the definition of innovation contained in the Oslo Manual (OECD, 2005), we can distinguish four different kinds of innovation, and the classifying principle used in the manual is the origin of the said innovation.

Product Innovation. This arises where a product (good or service) that is new or significantly-improved compared to the previous one is introduced onto the market. The condition of "significantly-improved" may be understood to mean that there is an improvement in the performance of the product, in its "functional characteristics", in its "technical specifications", "components", or "materials".

Process Innovation. This refers to the "implementation of a new or significantly-improved production or delivery method". These new techniques include improvements to "unit costs", "production", or "delivery" of goods.

Marketing or Commercial Innovation. In the same line of definitions, an innovation of this kind is understood to be the application of a new "marketing method" at the business, which implies, amongst other factors, changes to the "design" of the product, to its "packaging", or the use of new distribution channels. The main aspect of this kind of innovation is the search for "customer satisfaction."

Organizational Innovation. This last kind of innovation explained in the Oslo Manual describes Organizational Innovation as the "implementation of a new organizational method in organizational practices, in the organization of the workplace, or in external relations".

Following on from the definitions of innovation within an organizational context, we highlight the authors Escorsa and Valls (2003), who argue that not all innovations should be considered to be the same, i.e. it should not be taken as granted that all innovations have the same "significance", and they distinguish innovations in accordance with their "importance". As such, we can distinguish between "principal or radical" innovations and "incremental innovations".

With regard to ***radical innovations***, these represent a breakthrough and lead to "spectacular improvements in outcome", which is related to the implementation or discovery of something totally new.

Meanwhile, ***incremental innovations*** refer to “improvements to products and processes that are already known”, which generally focuses on “reducing costs”. Radical innovations need a more sophisticated technology to perform their activities, whereas incremental innovations are focussed on continuous improvements that originate from market demand (Escorsa y Valls, 2003).

Finally, it is worth noting that Lundvall (1994) understands innovation as an “interactive process” in which different users and producers participate and establish relationships to achieve competitiveness and innovation. For this reason he coined the term “National Innovation System” in order to promote an innovation policy that encompasses everything related to innovation within a national space. That is, all the people, institutions, programs, strategies and factors that influence in technological innovation in a country. Specifically, the main elements that make up a National Innovation System are companies and stakeholders, public administrations, financial, educational, scientific and technological institutions that create and disseminate technology and information for innovation (UJI, 2018).

1.2.2. A model of organizational innovation: INNOVARCHY

Innovation cannot be attained without creativity, and neither is possible without certain personal and social qualities. Furthermore, the structure, culture, and working method of an organization, amongst other factors, have a clear influence on the individuals who work there, and vice versa. In an article published in *Harvard Deusto Business Review*, (Chiva, et al., 2017), an organizational model is proposed that focusses on innovation, which seeks to replace the conservative and antiquated models based on hierarchy. According to the authors, “innovarchy is the most innovative organizational model, but it is also the most aware and the most human, given that it considers the human being to be an essential element of innovation” (Chiva, et al., 2017 p.30).

This model is aimed at start-ups, new technology-based businesses with a large “innovation potential”, although it may be extrapolated to larger companies that wish to innovate given that, as the authors state, “the majority of businesses, once they have reached a certain size, opt for traditional organizational models based on control” (Chiva, et al., 2017 p.30). In other words, most start-ups lose their innovation potential as they grow because they adopt “hierarchical and functional” organizational structures in which work effectiveness and efficiency dominate.

The “innovarchy” organizational model has certain defining characteristics which are aimed at ensuring that innovation can continue at those organizations that implement it.[1]:

- **MINDFULNESS** (as opposed to *Mindlessness*)**:** The authors argue that in order for creativity to be possible, all obstacles generated by the “mind” and by our own “knowledge” must be eliminated. As such, “knowledge is good for more repetitive tasks” and is useful when we do things “automatically”.

  Therefore, in order to face up to new challenges and be creative, we need our “full attention” on the present moment, and this means being in a state of “mindfulness”. Mindfulness also requires people to “know themselves and their very essence”. Innumerable benefits appear when organizations with organizational models that promote habits and lifestyles among their employees to reach a state of “mindfulness”, both for the business and for the individual, and one of them is to obtain the second characteristic of “innovarchy”, authenticity.

- **AUTHENTICITY** (as opposed to *Professionalism*): The key to authenticity is to “let oneself be guided by intuition and spontaneity”. Mindfulness allows people to be “authentic”, i.e. to know themselves and also to show themselves at all times and in all situations as they really are. Thie means “expressing positive and negative emotions, doubting, not being sure about what needs to be done, and being able to acknowledge one’s own vulnerability”. It contrasts with professionalism, which focuses on behaviour that is “rational, perfect, individualist, and competitive”.

- **TRUST** (as opposed to *Fear*): Innovarchies seek to bestow confidence on their employees, given that they have the highest value. By having confidence, employees are more creative and have greater freedom to “try out new things” without being afraid of failure. As is stated by the authors, “there are two ways to approach life: with fear and with confidence”. When we act with confidence, there is no need for control conditioning the decisions made by individuals and inhibiting their creativity.

[1] Classification extracted from the Innovarchy article (Chiva, Ballesteros, and Martínez, 2017)

- **ORGANIZATIONAL LEARNING CULTURE** (as opposed to *Culture on efficacy and efficiency*): Creating a culture that encourages organizational learning, i.e. where organizations and their personnel "learn and develop new ways of seeing things", requires a culture that encourages a series of practices.

Table 2. Organizational Learning Capability

Experimentation	Trying new things, new challenges, or new ways of doing things.
Accepting risks or mistakes	Tolerance in the face of ambiguity or uncertainty. Not punishing mistakes.
Interaction with external environment	The business is open and evolves with its surroundings.
Participative decision making	Involving all members of the organization in decision-making. Empowering employees.
Dialogue	In contrast to argument, dialogue implies doubts, respect, and reaching a situation where everyone wins.
Systemic Thinking	This involves solving problems by seeking out their causes instead of the symptoms. The organization as a whole and the relationship between all of its aspects should be understood. Long-term vision.

Source: Adapted from Chiva, et al., (2017, p. 33)

- **HUMAN MANAGEMENT** (as opposed to *Human resources management*): At innovarchies, persons are not viewed as being instruments to be used to attain

objectives, but rather they are the most essential part of the organization, and the aim is to "extol" them. With regard to personnel-management practices, selection processes are carried out by members of the organization, in which the aim is to find "innovative" and "dynamic" people. Once an individual finds him/herself within an organization with these characteristics, he/she receives training based on "sharing experiences" among the members. Promotion, in its traditional form, does not exist at innovarchies, the organization is flat and as such there is no hierarchy, instead persons assume different "roles" and there is a "redistribution" agreed by the members. Each person is appraised by way of "individual or group self-assessment" in order to promote a spirit of co-operation. Finally, pay is characterized by its lack of individual incentives (given that it has been shown that these reduce motivation and co-operation between people). They are replaced by "incentives for the organization".

- **SELF-MANAGED TEAMS** (as opposed to *Hierarchies*): "Innovarchies are organizations composed of self-managing teams". Teams contain people with different "training and experience", and as such they are referred to as "multifunctional teams", which have decision-making powers over their "responsibilities", "leadership", "innovations", etc. This means that at innovarchies there are no functional or traditional departments, and that people within a team interact on a "peer-to-peer" basis, i.e. there is no hierarchy, but equality.

- **PURPOSE** (as opposed to *Objectives and strategies*): It is common among traditional hierarchical businesses to focus on "what and how", i.e. they prioritize their aims and strategies. Innovarchies propose that the first question should be "why", given that this is the essence of any organization, and that they should be clear as to what their "purpose" is, their "main *raison d'être*" which determines all other steps that the organization is going to take.

1.3. Creativity and innovation

To conclude the theoretical section of this project and ensure a better understanding of the concepts that have been examined, we are going to analyse the relationship between creativity and innovation.

Firstly, it is important to point out that creativity is a tool for innovation, given that without new ideas, many innovations would not have been possible. We can state that innovation is a combination of creativity and the ability to quantify the creative and economic value of ideas. However, creativity is not an unconditional factor within innovation, given that a business can innovate on the basis of ideas deriving from outside sources (Escorsa and Valls, 2003). What is beyond doubt is that although creativity does not necessarily follow on from innovation, it does facilitate it. Innovation is more likely to arise where there is creativity.

As humans, we tend to think of creativity as something that is strictly intellectual, associating it with creative minds and the creation of new ideas, while also linking innovation to everyday practice, which can in fact include products, services, practices at organizations, or marketing methods, among others. There is no doubt about the relationship that exists between creativity and innovation, but it is also necessary to point out that both are associated to learning processes. The continuous changes occurring in modern society make flexibility, adaptability, and the exchange of knowledge necessary. Thanks to the human capacity to learn, create, and innovate, it acquires major social significance (Fernández et al., 2012).

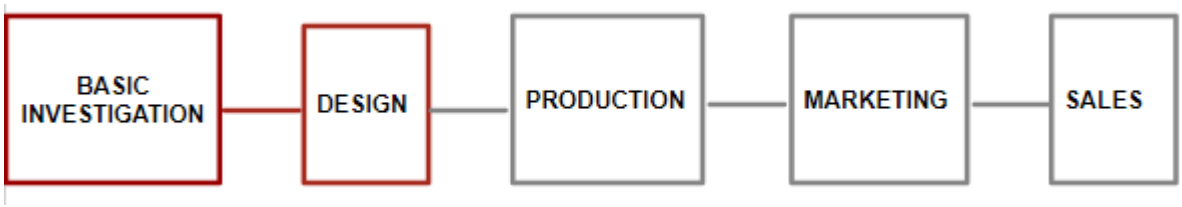
1.3.1 Innovation processes

It is important to highlight the importance of understanding innovation as a process, which is attained through a series of steps, which start with an idea and end with the innovation. So far, we can state that there is no universal model that explains the path to be followed from when an invention arises to when it reaches the market; all studies undertaken contain flaws (Balmaseda et al, 2007). However, we consider that it is important to illustrate some of the most significant studies in this area which have given rise to different proposals regarding models for the innovation process.

1. Linear models

- **Technology boost.** This model represents a linear innovation process, in which innovation is attained by following a series of steps. These models are a long way from what the innovation process involves in reality.

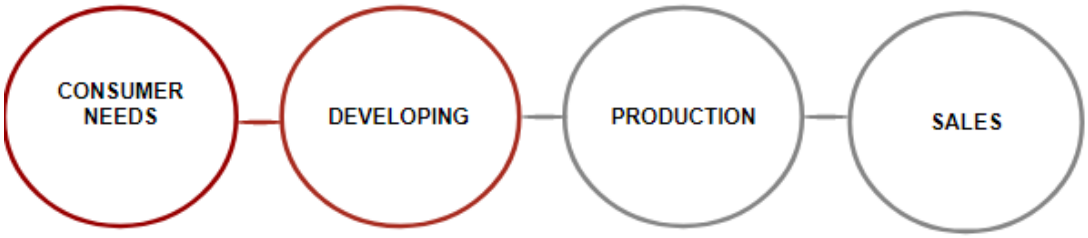
Figure 4. Technology Boost Model



Source: Adapted from Rothwell (1994)

- **Market Pull Model.** This model seeks to represent the significant role played by demand in the innovation process, and as such "the needs of consumers become the main source of ideas".

Figure 5. Market Pull Model



Source: Adapted from Rothwell (1994)

2. Models in stages

- **Departamental Stages Model.** This includes both market-pull and technology-drive elements.

Figure 6. Departamental Stages Model

Source: Adapted from Saren (1984) cited in Balmaseda (2007)

The interactive models we set forth below were created in order to correct the deficiencies of the above models, such as for example "considering the innovation process as a linear process, considering each activity or department as being individual or isolated from the rest" (Balmaseda, 2007 p.6).

3. Interactive or mixed models

Interactive models replace the linear nature of the previous models with "on the one hand, interaction between technological capacities, and on the other hand, market needs, as well as considering the importance of retroactive processes".

- **Kline Model.** This is the best-known model within the group of interactive models, and it proposes an innovation process which follows five paths (Kline and Rosenberg, 1986):

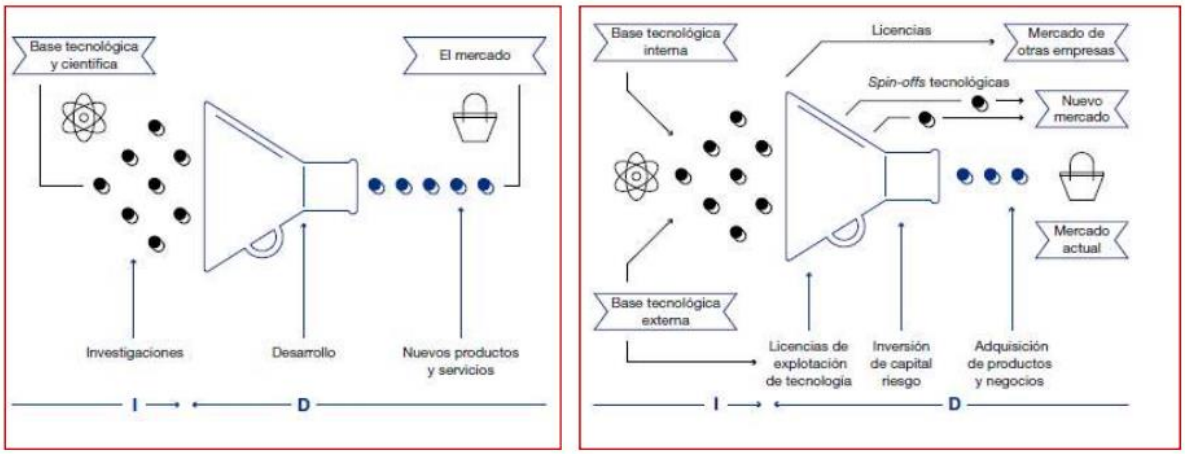
1. The first path is known as "the central chain of innovation" and corresponds to the new idea manifested by a real consumer need.
2. The second path corresponds to feedback links generated by the market through validations of the idea or invention itself. The areas in which these validations take place are "market potential, invention or design, testing, production, distribution, and sale".
3. The third part relates "knowledge and research with the central chain of innovation" (first path). This path has been formulated with the aim of resolving any problems that may arise within the activities of the first path, with the possibility of resorting to knowledge or research where necessary.

4. At the fourth path we find “the connection between research and invention”, which will determine the nature of the innovation (e.g. radical innovation or incremental innovation).
5. Finally, the last path corresponds to “the connections between the market and research”.

4. Open innovation model

For many years, businesses have carried out their innovation processes in an individual manner, i.e. performing all of the activities, from research through to marketing, for themselves. Chesbrough (2015) proposes an open innovation model which arises out of the obsolescence of the closed innovation models, and is based on “the use of internal and external knowledge flows to accelerate internal innovation and broaden its markets for external use”, which allows businesses to take advantage of knowledge from both inside and outside the organization thanks to co-operation between the two. The main activities of this open innovation model have the aim of both developing innovation projects in co-operation with organizations, and exploiting current projects by external agents.

Figure 7. Closed Innovation as compared to Open Innovation



Source: Adapted from (Chesbrough, 2003)

Businesses can carry out open innovation processes to take advantage of external knowledge in different ways, by acquiring licence agreements or simply by buying. The best-known open-innovation practices are referred to below (UJI, 2018):

- Joint venture: The main aim of this agreement between businesses is the transfer of knowledge that cannot easily be transferred in the form of licences. These are long-term projects.
- Innovation marketplaces: These are meeting points for organizations seeking a specific solution and organizations with the capacity to resolve certain problems. They ultimately perform the role of intermediaries.
- Crowdsourcing: This consists of the externalization of certain tasks to a large number of people (e.g. customers) in order to co-operate in the performance of a specific project.

1.3.2. Creative economy

Creativity may appear in many different aspects of life or of knowledge, and for many years it has been related to culture, with the result that it has become just “one more economic activity”. Meanwhile, many traditional industries seek to survive in a market that is ever-more changing, ambiguous, and competitive by incorporating creativity into their products or processes. This has led to “the creation of the concept of the creative economy in order to demonstrate the influence that creativity has in the development of knowledge” (Navarrete et al., 2012).

The importance of the “creative economy” rests on the fact that creativity is the origin of innovation, i.e. it is the principal source for innovation to be possible, which means greater competitiveness, development, and the continuous improvement of industry (Domenech and Lazzeretti, 2012). The study of the so-called “creative economy” has given rise to the appearance of the concept of the “creative industries”, which are defined, according to the DCMS (2001, p.5), as “industries that have their origins in creativity, skills, and individual talent, and which have potential for the creation of wealth and jobs through the generation and exploitation of intellectual property”.

The complexity of the concept of creativity means that it is very difficult to define the characteristics that a particular industry ought to have in order to be considered creative, although it is essential that the main activities within the said industries should have a creative and inventive basis. The authors Domenech and Lazzeretti propose a list of creative industries which includes the UNCTAD (2008 and 2010) and Howkins (2007) classification, which is set forth in the following table:

Table 3. Creative industries

Advertising and related services	Architecture and Engineering	Art and Antiques trade
Artisans	Specialist design services	Fashion
Cinema and Video industries	Music and Musical studios	Performing arts
Photography	Graphic arts	Publishing
Radio and Television	Software y Video games	Interactive media
Painting and Sculpture	Copyright agencies	Cultural tourism and related services
Jewellery	Musical instruments	Creative research and development

Source: Adapted from Domenech y Lazzeretti (2012, p.188)

Chapter 2. EMPIRICAL WORK

2.1. Methodology

2.1.1. Description of the case-study: CIDET

Having analyzed the theoretical framework regarding creativity and innovation in organizations, we will present the chosen case study. It is important to highlight the choice of the case study as a research method the value of which resides in the possibility of obtaining future hypotheses aimed towards the taking of business decisions (Gómez, 2012).

The company chose for the performance of our case study is CIDET (Centro para la Innovación y desarrollo de la Educación) founded in 2014 and with its registered office at the Science and Technology Business Park (ESPAITEC) at Jaume I University has as its main mission "ensuring that education and technologies are used effectively for personal and social benefit". The aim of this project will be attained by way of performing an analysis of the creativity and innovation process of this organization, and it shall be carried out by way of personal interviews made up of questions extracted from the theoretical framework of this project.

The reason CIDET is the chosen business is, first of all, its innovative potential in a sector such as education, in addition to the important task they perform given that they ensure that people can increase their knowledge, their capacity, their skills, their value, and their attitudes. Given that this business forms part of the education and training sector, we are first going to set out an overview of the Spanish education system and provide some interesting facts such as the types of education that exist in Spain, educational levels, or the volume of people who study in the country, as well as innovation in education. We consider that it is relevant to then describe the environment of the company, i.e. its location (at ESPAITEC) and then provide a brief description of the history of this technology park. Finally we will provide a description of the chosen business, CIDET, and the services it offers and its business model.

2.1.2. Sources of information and data

In order to carry out the CIDET case study, we have used primary and secondary sources of information:

- With regard to secondary sources of information, data and information have been collected thanks to visiting the official CIDET website, news, its social media (Facebook and LinkedIn), as well as the official ESPAITEC and EDUECA websites.

- Secondly, in order to obtain more detailed information, we have carried out interviews with CIDET employees. These are interviews conducted individually, face-to-face, in structured manner, given that the same interview has been conducted for all individuals at the organization, with the aim of facilitating the comparison of the results obtained. (See interview at Annex 1). Subsequently, a series of questionnaires were prepared in order to obtain specific information on aspects relating to the working atmosphere and the people (See questionnaires at Annex 2).

2.2. Industrial environment

2.2.1. Education in Spain

Having introduced the company over which we are going to perform the analysis of the creative and innovative process, it is important to provide a framework for the context in which the company operates. There follows below a description of the Spanish education system and of the different levels of which it is composed. The Spanish education system is currently formed of different educational levels which are distinguished by being of a compulsory or non-compulsory nature. These are as follows:

Table 4. Educational levels in Spain

Infant School	★ From 0-6 years ★ Not compulsory ★ Two cycles
Primary Education	★ From 6-12 years ★ Compulsory ★ Six courses
Compulsory Secondary Education (ESO)	★ Between 12-16 years ★ Four courses
Post-compulsory Secondary Education	Options: ★ Sixth-form education (two years) ★ Vocational training ★ Plastic arts and design education ★ Sports education
Higher Education	Options: ★ University education ★ Artistic education ★ Vocational training ★ Plastic arts and design ★ Sports education ★ Languages ★ Artistic education

Source: adapted from (BOE, 2006)

The Spanish education system has seen major changes since the Spanish Constitution came into force in 1978 and has become a sector for the "masses", increasing access to non-compulsory education levels thanks to the state system, which represents a very important part of the sector, which the private segment has remained in the minority, dominated by "Catholic education". The author furthermore highlights the existence of a parallel education system known as concertado, which is not funded with taxpayer funds and which "is required to comply with the legislation establishing that education should be free of charge and that access conditions for students should be equal to those existing at state schools" (Calero, 2006, p.20).

The latest figures published by the Spanish Statistical Institute (INE) in relation to education in Spain refer to the 2016-2017 academic year. In the following images we can see the number of students enrolled in education under the general system, which comes to a total of 8,127,832, broken down into the various study levels, as well as the total number of students enrolled on university courses, which stands at 1,558,685.

Image 1. Student numbers according to their educational level

	Número de alumnos	Variación interanual %
Total[1]	**8.127.832**	0,2
Educación Infantil[2]	1.775.264	-1,8
Educación Primaria	2.940.226	0,5
E.S.O.	1.884.223	0,8
Bachillerato	686.933	-1,2
Formación Profesional	793.499	3,7

	Nº de estudiantes	% Mujeres	Variación interanual % Número de estudiantes
	1.558.685	**54,5**	
Total grado y 1º y 2º ciclo	**1.307.461**	**54,7**	-1,1
Ciencias Sociales y Jurídicas	608.986	59,6	-0,9
Ingeniería y Arquitectura	242.088	25,1	-5,6
Artes y Humanidades	132.463	61,3	1,2
Ciencias de la Salud	242.012	69,6	1,1
Ciencias	81.912	50,8	2,1
Máster	**184.745**	**54,1**	8,0
Doctorado	**66.479**	**49,7**	19,5

Source: (INE, 2018 p.13)

If we investigate adult education in Spain, which is what CIDET engages in, we find that according to the Ministry of Education, during the 2017-2018 academic year 495,034 students enrolled across both public and private schools, the latter being in the minority. We may highlight the balance between those who pursued education of a formal nature (238,136 students), with Secondary Education for Adults being the most popular, and those who pursued non-formal courses (256,898 students).

With regard to the private sector, we find that this represents a small fraction of the Spanish education system, although comparatively larger than other countries in the European Union (Calero, 2006). The following image shows data reflecting the three educational sectors present in Spain during the 2011-2012 academic year.

Image 2. Students by type of school

Alumnado	Públicos%	Concertados%	Privados%
TOTAL 7.914.243	68,2	25,4	6,5
E.I. 1.912.380	65,1	24,1	10,9
1º ci 443.279	51,7	16,5	31,8
2º ci 1.469.101	69,1	26,3	4,6
PRIM 2.795.941	67,6	28,4	4,0
EE 31.987	56,8	42,9	0,3
ESO 1.791.968	65,9	30,6	3,5
PCPI 82.939	77,9	22,0	0,2
BACH 685.100	76,0	9,5	14,5
FP 613.928	77,7	17,6	4,6

Source: (Agudo and Lacruz, 2012, p.112)

2.2.2. Innovation in education

Many studies have documented the huge creative and innovative capacity that children have when in their infancy, and yet it has been established that this ability decreases as they advance through the educational system. This is why the importance of helping people, and students in particular, to develop creative thinking, whatever educational level they are at, is of such relevance (Steinbeck, 2011). In a study carried out by Land and Jarman (1993), it is shown how the current educational system creates people with very low levels of creativity, which reflects the alarming need to redesign new learning environments which allow people to have the "knowledge and the tools necessary in order to attain new ideas and come up with innovative solutions to complex problems" which currently arise frequently (Steinbeck, 2011, p.28).

The appearance of innovations at all educational levels has become ever-more important over recent years, according to Fullan and Stiegelbauer (1991) cited in (Salinas et al., 2008 p.20) improvements in training and teaching processes entail changes relating to "the inclusion of new materials, new teaching behaviours and practices, the introduction of new technologies or new syllabus approaches". But the true challenge according to these authors lies in teachers' willingness and ability to pass on new skills and introduce new methodologies into teaching.

There can be no doubt that in practice, any educational innovation process must also be accompanied by the use of "information and communication technologies". Where these

technologies are incorporated into the educational sector we must conclude that this constitutes an innovation process in education, given that it will lead to changes and alterations to elements of the didactic process. It is commonplace to associate the introduction of new technologies in education to their application in remote learning using “virtual training environments”. As such, new learning methods have appeared which, while they are not going to replace traditional teaching based on face-to-face models, they will complement it and “diversify the educational offer” (Salinas et al., 2008).

New ways of educating have emerged thanks to the use of new information and communication technologies, both in public and in private spheres. One of these is the so-called Web 2.0, which arises in order to replace the traditional web and offer a new style of pedagogy through the “more personal, participatory, and collaborative” use of the internet. This has been possible, inter alia, thanks to E-learning platforms or “virtual training environments” where innovation can be found in the new forms of collaborative learning (Salinas et al., 2008).

Chapter 3. CASE STUDY

3.1. CIDET

3.1.1. Location: ESPAITEC

The Science and Technology Business Park of the Jaume I University of Castellon – a unique place made up of businesses, start-ups, and even spin-offs – is an innovation, collaboration, and competitiveness ecosystem, which is distinct from other business environments in Castellon because of a series of unique characteristics. Since 2007, which was when this park was created, it has had the aim of improving the socio-economic development of the province. At ESPAITEC they undertake to facilitate business creation and consolidation as from the start of any business or project given that they offer infrastructure, business services, virtual installations, security, maintenance, and even internationalization services.

The collection of businesses that make up ESPAITEC facilitates the creation of business synergies, thanks to active collaboration between the businesses or with other institutions of Jaume I University. Given the existence of these synergies, the business has access to a network of high-value contacts, as well as the opportunity to participate in all projects that are carried out. Ultimately, belonging to ESPAITEC guarantees a Brand image associated with innovation and a higher visibility and dissemination of the Brand names.

The services offered by the park are very diverse, and they are all focussed on supporting and developing entrepreneurial initiatives. These range from general services such as premises, a registered office and tax address, or the ability to access other University installations, to more specialist services focussing on the special needs of each company. ESPAITEC provides numerous benefits to businesses, all of which are oriented towards innovation, and this is why the vast majority of businesses that we find at the park have a technological basis and significant innovative potential.

3.1.2. Origins, business model, and philosophy of CIDET

The young company CIDET was founded by Roger Esteller, an IT engineer, and Pilar Escuder, a pedagogue, with the aim of meeting some of the needs of the University itself. The idea came about from the UJI University for Pensioners, where the two founders worked and where they detected a series of needs which were not being fulfilled. This gave rise to the creation of CIDET, with the aim, originally, of offering technological solutions for people of retirement age.

Therefore, to start with the Company was dedicated to offering training courses, particularly those focussing on the use of new technologies, in order to help make life easier and to train older people. Thanks to this training, they learn to enjoy the technology and to take advantage of all the benefits that they offer, e.g. smartphones, tablets, or even creating new digital content through inclusion in the digital society.

Naturally, the business has evolved and so has its business model. Currently, the company has 4 employees and its value proposal is focussed, mainly, on increasing people's skills and abilities by way of an "E-learning Platform" under the commercial name of "Edueca". Therefore, we consider that the company has a social mission or ethos. As is stated by Roger, "we operate in a highly-competitive sector, and yet without E-learning proposal we can position ourselves on the market however we want given that, although there are many platforms like ours, none of them matches the characteristics that ours has". We can state that the business aims to distinguish itself from the competition by offering a unique, simple, and accessible E-learning platform to everyone. Currently, many of these platforms on the market contain a series of obstacles and difficulties to being used by users who are not technology experts. The CIDET proposal seeks to attract those people, mostly adults, and to provide them with a digital learning environment without complications.

Therefore they have the aim, mainly, of ensuring that education and technology are supplied, used, and exploited not just for personal benefit, but also for that of organizations and society. For this purpose they use information and communication technologies with the aim of increasing individual know-how, skills, and abilities in certain areas of knowledge and competences. In this way they seek to ensure that people use technology in as human, useful, and friendly a way as possible. We may conclude, therefore, that the business aims to become the benchmark company in "technopedagogy".

Finally, we would highlight that the company has a multidisciplinary team composed of:

- ❖ Roger Esteller as manager and co-founder.
- ❖ Pilar Escuder as co-founder.
- ❖ Andrea Gallardo as translator, co-ordinator of European projects, and head of marketing.
- ❖ Hector Saiz, program analyst and IT, robotics, and design trainer.
- ❖ Samuel, web programmer.

Image 3. CIDET LinkedIn

Source: https://www.linkedin.com/company/cidet/

3.1.3. CIDET Services

The company offers various services aimed at educational development and the knowledge of its customers through training activities which boost knowledge thanks to the use of technologies. We have classified these according to the time established for each one, and as such we find the following:

- Short-term services. The company calls this section the “Learning Lab”. As we have already said, it offers training courses for adults and for older people focussing on improving the use of technologies. But there are also courses aimed at trainers and pedagogues that teach new methods for collaborative and creative teaching, all of which is always accompanied by technology. Finally, the company offers other kinds of courses aimed at promoting socio-cultural activities, such as excursions or robotics classes for

children. As is stated by CIDET employees, all of these classes are taught with a methodology that encourages the creativity and autonomy of the students.

- Medium-term services. In this section, also known as "educational technovation" the company collaborates in European projects funded by the European Union, such as Erasmus programmes for students or education programmes in certain skills, the organization of meetings and scientific conferences, as well as the publication of materials and digital manuals.

- Long-term services. As we have stated above, the company is currently focussing all of its efforts on developing and perfecting the "Edueca" online platform, a "business to business" service aimed at training institutions or self-employed trainers which/who wish to offer their training on the platform with the aim that it should be the meeting point for education. This is attained by the creation of virtual learning spaces through which knowledge can be shared.

Image 4. Servicios CIDET

Source: http://www.cidet.es/servicios/

3.2. Description of the research

In this section we are going to carry out the case study for our chosen business, CIDET, through which we are going to introduce the concepts seen in the theoretical part of the study in order to be able to identify and analyse both the creativity and the innovation that the business has. For this purpose we need to show the main objective that we are pursuing in this research,

which is to analyse the creativity and the innovation that exists at CIDET. In order to extract the results obtained in the interviews that have been conducted, we have differentiated four parts: Ideas, People, Business and Environment, and Services. Therefore, the specific goals of our research will be as follows.

Table 5. Description of Case Study

IDEAS
Q1+Q2. The origin of ideas and the process for creating them.
EMPLOYEES
Q3. The motivation of CIDET employees **Q4. The creativity of CIDET employees**
BUSINESS AND ENVIRONMENT
Q5. The Business Culture, Leadership, and level of Formalization at CIDET **Q6. The working environment at CIDET** **Q7. The benefits of belonging to the ESPAITEC** **Q8. The characteristics of a Learning Organization applied to CIDET**
SERVICES
Q9. The methodology of CIDET courses **Q10. The differentiation of CIDET services**
INNOVATION
Q11. Types of CIDET innovations **Q12. Organizational Innovations applied at CIDET**

Source: Own elaboration

3.3. Results of the research

RESULTS REGARDING IDEAS

Q1+Q2. The origin of ideas and the process for creating them

At CIDET, inspiration derives from different sources. In some cases, ideas are born of necessity, that is to say new ideas are needed when, for example, the company is overseeing a project and so the team feels “compelled” to create together. Thus the team meets to oversee the project that requires new and creative ideas. However when it is a more formal process, the best ideas – i.e. the most creative – do not arise in these situations. As has been stated by the interviewees, the best ideas arise in more informal situations, but underline the importance of these meetings.

Another of the sources used by the company are periodical gatherings which, through networking both between employees and between other companies within the park, allow new ideas to arise. As is stated by the employees in the interview, “many ideas that come out of these informal meetings are crazy ideas, which initially seem impossible to realize, but gradually they are improved”. From this information we may conclude that the company follows an informal process for the creation of ideas, based on periodical and sometimes spontaneous gatherings at which ideas arise, for the most part, thanks to interaction between and co-operation by the employees.

With regard to the origin of the ideas, the manager Roger considers himself to be the “creative one” at the company, and he is the one who creates the majority of the new ideas. For him, creativity is a very important aspect of life and that is why he seeks to increase it day by day. This explains why his main inspiration comes for the most part thanks to travelling, reading, the conferences he attends on innovation, education, and business, and the projects in which he participates. Furthermore, he states that all ideas that he attempts to realize are always in response to a real need that consumers have, this is the example from the E-learning platform that he has created and that arose, initially, from the need to train older people.

RESULTS REGARDING EMPLOYEES

Q3. The motivation of CIDET employees

The factor that most motivates CIDET employees is the diversity of the tasks they perform, as it is a small business, no employee has a certain set of tasks assigned, but instead, at CIDET, every day is different. In addition, they consider themselves to be a creative business in terms of the services they offer, and naturally, in terms of the working atmosphere. The employees state that “we have managed to create an informal working environment, where each person can be him/herself all the time and no one is judged on the basis of his/her behaviour or ideas”. Finally, we may highlight the flexible hours worked by all of the employees and the manager, which allows them to have a relaxed life and to achieve a balance between their personal lives and work.

There follows below a questionnaire given to the interviewees in order to ascertain aspects relating to their personality. A questionnaire was given to each interviewers, and the table shows the average score obtained by the employees (0 = wholly dissatisfied, 5 = wholly satisfied).

Table 6. Questionnaire on motivation

I have a lot of experience in the area in which I work	3,5
I consider myself to be a sociable person	3,5
Co-operation between employees/teamwork is primordial at the company	4,5
I am highly motivated when I work	4
I consider myself to be a creative person	4
I feel truly valued at this company	5

Source: own elaboration

As may be seen, the maximum score was for the statement “the employees feel truly valued at the company”, which boosts their motivation. In addition, we can see that no employee has given a score lower than 3, which shows that motivation among CIDET employees is present.

Q4. The creativity of CIDET employees

The majority of the interviewees had thought for the most part of their lives that they were not creative people, generally because they were critical and sincere with themselves and because they would like to have more and better ideas. However, belonging to CIDET has allowed them to understand that it is necessary to be a creative person in order to be able to train other trainers who are accustomed to working in an educational system that inhibits the creativity of the students.

Thus the importance of creativity in the training activity is primordial for the CIDET team. As they themselves state, they have been developing systemic thinking for years, based on thinking of the organization as a whole and understanding the relationships between its parts (O’Connor and McDermott, 1998). this helps them to tackle problems from different perspectives, and above all, to be more creative in order to avoid blockages and student absenteeism.

There follows below a table summarizing the questionnaire provided to the employees in which they are asked to assess whether or not they consider that they have the following skills and abilities. The skills are taken from the section 1.1.2. of the theoretical framework “Factors that influence creativity”. As in the previous table, the average of the score obtained is given (0 = fully agree, 5 = strongly disagree).

Table 7. Skills and abilities of the employees

Creation of new ideas	4	Self-motivation	4
Creation of new ideas which may be of economic value	2	Problem-solving	5
Originality	3	Capacity to take risks	2
Flexibility	5	Expert in the field of work	4
Social skills	4	Empathy	5
Expert in various fields	2	Ambition	4

Source: Own Elaboration

As we can see, the two skills that interviewees most believe that they have are flexibility and problem-solving, two qualities that are very important for creativity. In contrast, the interviewees consider that they are least able to create ideas with economic value, or be experts in various fields, or take risks, factors which, while they do inhibit creativity to a certain extent, are not essential conditions for creativity.

RESULTS REGARDING ORGANIZATION AND ENVIRONMENT

Q5. The Business Culture, Leadership, and level of Formalization at CIDET

"Business Culture covers the range of opinions, rules, and values that apply within a business and which characterize the behaviour of managers and the staff as a whole." (Pümpin, 1988 p. 8).

The CIDET manager, Roger, argues that his team has a common series of values and beliefs, i.e. that they are shared by all individuals forming part of the company, which we have been able to confirm thanks to the rest of the interviews carried out with employees. Even though it is a young business, we may consider that they possess a strong organizational culture, based mainly (as is confirmed by CIDET employees) on "co-operation between staff members,

teamwork, helping colleagues, and the transfer of information and communication in all processes and activities." Employee Héctor states that everything he learns at the company he shares with his colleagues so that they can all co-operate and grow together, and that he believes that his colleagues do the same.

Meanwhile, with regard to leadership, we have observed that Roger, whose role is to act as leader and supervisor of the team, has a high level of involvement in all of the activities carried out at the company. Furthermore, all employees agree that the kind of leadership displayed is one of service, given that the main task of the leader is to serve, assist, and provide information to the employees. For Roger, one of the most important matters when it comes to leading the team is transparency, especially when imparting information to his team. As such, he states that "information is everything; an informed team is a team that co-operates, that works as a team and that helps itself". In addition, he likes to take his employees into account when making decisions, and as such we can state that the vast majority of decisions taken at this company are shared thanks to the leader delegating to his employees and he empowers them to participate in the said decisions.

"Formalization refers to the existence of rules, procedures, and policies which define what people holding employment positions ought to do" (UJI,2018). On the basis of this definition we have analysed that the company has a low level of formalization, on account of the existence of few formal written rules and procedures. The main characteristics that the company achieves and which the interviewees highlight are, amongst others, the informal working environment, that employees must perform a certain number of working hours but that these can be adjusted how they like, they all have full autonomy in their tasks, and there is no formalization of new ideas, i.e. they can be made and unmade easily if they do not work out.

Q6. The working environment at CIDET

In order to analyse the working environment at the business and identify whether or not this is favourable to creativity and innovation among employees, we have given the employees the following questionnaire so that they can assess different aspects of this matter. Interviewees were asked to score their conformity (5 points) or disconformity (0 points) with the following

elements relating to the theoretical part of this project. The table shows the average scores obtained from the interviewees' responses.

Table 8. Questionnaire regarding working environment

Participation by employees in decision-making	5
Communication and dialogue among employees	5
Acceptance of risk	3
Freedom at work	5
Motivation of the whole team	4
Experimentation with new working methods is common	4
The working atmosphere facilitates innovation	5
There is a culture that encourages creativity	5
The business has the ambition to grow every day	4
Changes at the company are commonplace	4
There are many internal rules at the company	1
We as employees are all clear about the aims of the business	4

Source: Own Elaboration

It should be pointed out first of all, as we already mentioned in the previous question, that there are very few internal rules at the company, i.e. a low level of formalization and bureaucracy, which in theory ought to favour innovation and creativity. Furthermore, aspects such as

participation in decision-making, dialogue, and experimentation have scored highly, which we will explain below.

Freedom at work has obtained an average of 4 points, which may be related to the low level of formalization at the company, which allows the employees greater freedom to plan, organize, and perform the tasks themselves. This may also be related to the existence of flexible working hours. More positive aspects of the working environment at this company are the ambition to grow every day and the regular changes which occur, which are related to experimentation with new working methods, and this has a positive influence on the creativity of the employees. In addition, we can observe that the vast majority of the employees are clear about what the future vision is or what the aims of the business are, i.e. why they do what they are doing. We may therefore deduce that the team has a shared vision of what the company wants to be and of the goals it is seeking to achieve.

The most negative aspect in this case is the scarce acceptance of risk, which may in some way inhibit experimentation with new challenges or projects, and therefore innovation, although it does not stop it completely. As we will see below, the company opts for testing the services prior to launching them on the market.

Q7. The benefits of belonging to the ESPAITEC

At section *3.1.1. Location: ESPAITEC*, we have focussed on the technology park where the business is based and we have listed a series of advantages that this location provides for the businesses based there. We considered it important to personally ask the interviewees about these advantages and they were asked to draw up a list of the main advantages and disadvantages provided by ESPAITEC, in their opinion.

Advantages

- Commercial visibility of the brand.
- Proximity to a larger objective audience.
- The availability of many activities to encourage innovation (meetings between companies, informal gatherings: “INNO-BAR”, which is held every so often in which all

businesses at the park are invited to participate and where they create links, synergies, projects, new ideas, or collaborations).

- Major installations, either in the park or through access to the University's numerous installations.

Disadvantages

- Little success in attempts at innovations. Roger states that "the gatherings are not usually very successful, i.e. they do not have a large audience, which means that they have not given rise to many ideas".
- It is not easy to form clusters at ESPAITEC.
- ESPAITEC does not provide funding, but rather helps to find it.
- Products that represent highly-disruptive innovations are sought (this is not easy to do).

Q8. The characteristics of a Learning Organization applied to CIDET

Experimentation: At CIDET experiments with new working methods are carried out practically every day, especially in the training courses where new methodologies are tested or existing ones are modified with the aim of making these courses more innovative. For example, the latest thing the company has tried has been to provide robotics and programming courses for children and also for older people.

Taking risks: Experimentation means taking risks, and as such it is inevitable that the business will take risks when it changes its way of doing things: for example, it may incur in absences from its courses or complaints from students. Furthermore, the manager Roger states that the biggest risks they take are monetary risks in European projects. However, many of the services currently offered by the company have been tested in advance, i.e. before creating the materials necessary for a course, it is verified that they are going to be accepted. The company allows its most loyal customers to try the services that it hopes to launch.

Interaction with the external atmosphere: The location of the company makes it easy to interact with the outside, and the interviewees emphasize the business synergies that are created with their neighbouring companies, although business relations are scarce. Interaction

with its customers given that the company allows for the possibility that its customers can try its services before they are launched on the market, which provides reassurance as to the acceptance of its services. Finally, the relationship with the university, given that they take on many intern students and with research groups.

Dialogue: The CIDET team defines dialogue among employees as informal, open, and continuous.

Participation in decision-making: One of the characteristics that defines the company is the autonomy of its employees to work in the way they see fit, and this means that they have to take a series of decisions in order to define or alter their working method, and as such this is a team that actively participates in the day-to-day decisions of the business. The employees state that the manager calls the whole team together when decisions have to be taken about European projects, changes to the "Edueca" platform, or the transformation of the courses so as to be able to reach a joint decision. With regard to decisions of responsibility, the manager Roger states that he follows the company ethos and consults with all of his team, but that the ultimate decision rests with him.

RESULTS REGARDING SERVICES

Q9. The methodology of CIDET courses

Thanks to the study carried out at the company we can state that its activity is considered to be innovative, given that they themselves use the term "techno-pedagogy" to explain their aim of combining technology with education. We consider it essential to discover the methodology taught at CIDET given that this will condition the training of its customers and therefore their abilities and skills. Furthermore, it will truly show whether or not the company follows its principles of innovation and promotes methodologies that focus on this.

The results obtained indicate that various methodologies are used at CIDET, with different characteristics which adapt to the different customer profiles and to the different situations that arise. As is stated by the interviewees, the same methodology is not always used, even during the same session, given that this depends on many factors such as the willingness of the

students to co-operate, their abilities, and of course, the trainer's skill at introducing changes during a class. Thus we can state that the following methodologies are pursued at the company:

- **Instructional methodology.** The manager at CIDET himself states that it is necessary to use this methodology in certain situations, especially with older people, given that they are much more accustomed to receiving training and require more planning and control as part of their training. In order to use the said methodology, the CIDET team carries out tasks such as planning the activity that is going to be carried out, which entails setting the goals that one wants to achieve for each session or course, the audience it is aimed at, the resources required, and an appraisal of the training. An example of the procedure that is carried out in the situations where the said methodology is used would be the IT classes, given that, according to the employees, changing the way this subject is taught is very complicated. Therefore these are carried out, for the most part, by way of explanations given by the trainer in which he/she describes or interprets the tasks that need to be carried out and then it is the students who carry this out on an individual basis. We may consider that this methodology is not very participatory and that it encourages individualism among students.

- **Constructivist and connectivist methodology.** Secondly, we conclude, in accordance with the information obtained, that the business combines the instructional methodology with the constructivist and connectivist methodology. We may furthermore state that using this methodology in all sessions is one of the current goals of the company. The manager Roger argues that this methodology is the starting point for training creative people. He himself defines the constructivist methodology as a way of "learning from experience and from one's mistakes", i.e. it is a way of providing students with autonomy given that they themselves have to resolve a series of problems. Meanwhile, he defines the connectivist methodology as "network learning, collaboration, and participation by everyone". Both methodologies are used jointly given that the employees consider that they must go hand in hand in order to work properly. Examples of these methodologies are teamwork, participatory classes, or role-playing games.

Q10. The differentiation of CIDET services

After carrying out the interviews with the CIDET team, we can state that the company has a significant differentiating potential, not just because of the design and the way it delivers its services, but also because of the technology they use in them and its pro-active vision, given that it is always seeking new ideas and new ways in which to surprise its customers, something which gives the business added value.

The interviewees state that the differentiation of their offer lies in the technology, and that this is the basis for the innovations. Firstly, we highlight the use of “techno-pedagogy” with the aim of differentiating itself thanks to the use of technology as the basis for learning. Sinay and Yashkina (2012), cited in Salvat and Fructuoso (2015), state that technology will improve learning when it is used from a constructivist perspective on the basis of experiences based on “social interaction, active participation, and complex surroundings”. The company seeks to distinguish itself from the competition mainly through the “Edueca” platform. Employee Hector Saiz states that complete differentiation is difficult given that highly-sophisticated Artificial Intelligence (AI) is required which the company currently does not have the capacity to acquire. However, since the platform was launched, it has undergone numerous reworkings (the state in which it currently finds itself) in order to be able to offer a platform that is accessible to everyone. And therefore this is where the differentiation of CIDET’s offer lies, in offering E-learning for everyone.

There are numerous E-learning platforms on the market, with different features and characteristics, from open-source or free-source platforms aimed at and used by Universities or public bodies, to pay platforms in the private sector. “Edueca” is notable for its efficiency, accessibility, and simplicity, and offers the ideal characteristics to adapt to trainers or students of any profile.

RESULTS REGARDING INNOVATION

Q11. Types of CIDET innovations

With regard to the type of innovations seen in the theoretical section of this project, it should be pointed out, first of all, that there has been agreement among all interviewees that the majority of the services offered by CIDET are innovative. As the employees themselves explain, the company offers innovative services in comparison with other teaching institutions, and the main reason is that other institutions, such as secondary schools, universities, or private centres, do not use technology in all teaching processes, but rather it is only significant where the training is highly oriented towards technology.

As is described at section *1.2.1. Innovation concept and types,* radical innovations entail major changes in connection with the discovery of something new, while incremental innovations are based on the continual improvement of elements that already exist (Escorsa and Valls, 2003). Following these definitions, the interviewees have concluded that the innovations carried out by the company are **incremental**. The interviewees refer to the E-learning Platform developed by the company as an example of incremental innovation, and yet they do not consider incremental innovation with the aim of reducing costs, but rather to improve performance. As is stated by the manager Roger, “E-learning has been around for years, and so that is not where the innovation lies, but rather it is in the simplicity of the platform. E-learning is never aimed at the older population”.

Furthermore, the manager adds that the innovations carried out at CIDET have a technological basis, which leads us to introduce the concept of “technological innovation”, which is defined as “the vital ingredient in order to maintain and for the prosperity of a nation and a business”, i.e. it is perceived as a way to achieve a competitive advantage thanks to the appearance of innovations which are possible through an investment in research and development (R&D) (González and Pérez, 1989). A clear example is the “Edueca” platform, which has software that offers many uses, but furthermore, the manager Roger highlights the recent acquisition of a 3D printer and drones, which has allowed them to diversify their activities, e.g. by holding events on bank holidays with children and older people and introducing these materials.

Q12. Organizational innovations applied at CIDET

Organizational Innovation or Business Innovation is defined, as we introduced at section *1.2.1. Innovation concept and types,* as the "implementation of a new organizational method or one that is significantly better than the previous one into organizational practices, the organization of the workplace, or external relations" (O.E.C.D., 2005 p. 51).

From the definition taken from the Oslo Manual on Organizational Innovation, we may conclude that the business has not implemented any organizational method that is completely new for itself. Innovation in this case lies in the continual improvement of the organizational models and business practices. The manager Roger emphasizes the introduction of shared working spaces, which has entailed a change in the organization of the work and of tasks. Specifically, a working space that was divided up, and in which individual work dominated, has been transformed into an open, shared space, which promotes co-operation, communication, and co-ordination of the whole team. To all this the company has added a special meetings room, which is used both for work and formal meetings, and for spending an enjoyable time with work colleagues, having a coffee, strengthening personal relations between employees, and naturally, encouraging the creation of new ideas.

In parallel, the company has adopted a new way of working, known as the Kanban methodology, an organizational method for tasks originally from Japan which is becoming more widespread at businesses and organizations as way of "administering the work in a fluid way" (Anónimo, 2019). The entire CIDET team agrees that this way of working has helped to plan and organize and administer the tasks to be performed in a more efficient way. This methodology is carried out by way of a Kanban panel showing the tasks to be done (to do), actions which are underway (doing), and completed tasks (done). Tasks are represented by cards on the panel which are moved through the various stages until they are finished.

The interviewees agree that the implementation of this methodology at work has brought them numerous benefits, such as being clearer about what work is outstanding and what has been completed, as well as knowing the status of the tasks, challenges, or projects underway at any given moment. Being able to follow each task (represented by a card) more efficiently, which allows problems to be detected and increase performance. Finally, the organization of the tasks and employee participation in the said tasks have increased.

Image 5. Kanban

Source: https://kanbantool.com/es/metodologia-kanban

Chapter 4. CONCLUSIONS

4.1. Summary results

To end this study, we are going to provide a brief summary of the results obtained in the different stages of the case study at the company CIDET, together with the main ideas and y conclusions reached.

New ideas

Through the analysis of the chosen company, we have found that the origin of new ideas are different sources of inspiration, which may arise out of necessity, in day-to-day situations, or at periodical gatherings and meetings of the whole team. Furthermore, ideas may arise thanks to the interaction of the whole team or simply doing so individually and then being shared with all the employees. All ideas arising at the company are assessed, and they are modified if necessary.

Employees

CIDET is a young, dynamic, and innovative company, and this is reflected in its employees, and in the study we have carried out we have found them to be motivated in their work thanks to certain factors such as the diversity of the tasks, the flexible hours, or the fluid communications between team members. Motivation favours creativity, and in effect we can state that each member of CIDET considers him/herself to be creative, and they all have specific know-how and skills that contribute to the formation of a multi-disciplinary team.

Work Environment

With regard to the internal atmosphere at the company, we may conclude that there is a working environment at CIDET that encourages innovation. With a strong organizational culture that is focussed on innovation, co-operation, and teamwork, together with a service-oriented leadership, based on assisting its employees, participation in decision-making, and the sharing of information. Finally, a low level of formalization at the company makes it difficult for highly-defined hierarchies to appear, and this facilitates the freedom and creativity of the employees. The company connects education with technology and innovation, and in conjunction with its flat organizational structure and its multi-funcional team, there are the essential ingredients to facilitate the appearance of innovations at the company.

Innovations

Meanwhile, we may consider CIDET's service to be innovative. The most notable innovations are the E-learning platform EDUECA, a virtual learning space with a simple design that is unique on the market, and the training courses with various levels, taught with a connectivist and constructivist methodology. These innovations are based on continual improvement, i.e. they are incremental while at the same time always responding to the actual needs of the market. Therefore we can state that CIDET is clear about what its market is and what trends are present there.

4.2. Limitations and future research

As we approach the end of this project, it is important to emphasize certain limitations that it incurs in. Firstly, it is a case study for one single business, which makes it difficult to obtain general results that can be extrapolated to the sector as a whole. Therefore the information obtained in the study refers to the business that has been analysed. Furthermore, it is a young business with few employees, and so it is not possible to perform an exhaustive analysis of a creativity and innovation process.

In terms of possible future research, with the aim of broadening the scope and improving the results of the suty, it would be interesting to analyze the following issues:

- Carry out a study aimed at university students to find out their assessment of the Spanish education system.
- Study how to improve education in Spain in terms of school dropouts and how companies can help to reduce it.
- Analyse whether there is another company in the education sector that can be considered innovative in its services and in organisational terms.
- Carry out a project that fosters emotional education.

4.3. Final conclusions and recommendations

At the start of this project there was a discussion about the importance of innovation nowadays. Innovation and creativity are concepts that are closely related, given that one follows the other,

and currently they are the basis that ensures the survival of many companies on the market. In this project, we have managed to understand many concepts relating to creativity and business innovation, both in a theoretical and in a practical sense. Then we have put these concepts into practice by analyzing the process of creativity and innovation of the company CIDET. I consider it important to propose a series of guidelines so that the company can improve its innovation process. It would be advisable for the company to bear in mind the following aspects:

- ➔ The low formalization of the processes and activities at the company may become prejudicial, given that many of the new ideas that arise may be lost along the way if the company does not carry out a formal process to appraise and verify them. Thus it is advisable to carry out the formalization of new ideas which may give rise to the emergence of a more formal process to join creativity and innovation together.
- ➔ Belonging to a network of innovative businesses such as ESPAITEC offers numerous advantages and tools for innovation which the business ought to take advantage of more efficiently. As such, it would be advisable to create more external relations with neighbouring businesses, share experiences with other entrepreneurs, generate synergies in areas of technology, and favour the appearance of new ideas.
- ➔ Provide incentives for creativity as another way of encouraging it.
- ➔ We have barely mentioned the marketing activities that the company carries out, and the fact is that these are scarce. Therefore I recommend that the company should strengthen this aspect and carry out more activities to make its services and its innovations known on the market.

Finally, I recommend that the company should continue its research into innovation and the improvement of its services. The education sector in Spain needs innovation and it is essential that business should focus on their customers – students in this case – be flexible, pro-active, and capable of facing all kinds of changes.

BIBLIOGRAPHIC REFERENCES

- Amabile, T.M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behaviour, 10, 123-167.*

- Agudo, J.L.B. & Lacruz, J.L. (2012). La privatización de la educación pública. Una tendencia en España un camino encubierto hacia la desigualdad. *Profesorado. Revista de Currículum y Formación de Profesorado, 16(3), 103-131.*

- Balmaseda, E.M.V., Elguezabal, I.Z., & Clemente, G.I. (2007). Evolución de los modelos sobre el proceso de innovación: desde el modelo lineal hasta los sistemas de innovación. *Decisiones basadas en el conocimiento y en el papel social de la empresa: XX Congreso anual de AEDEM.*

- Boden, M.A. (2004). *The creative mind: Myths and mechanisms.* London and New York: Routledge

- Boden, M. A. (1994) *Dimensions of Creativity*. London: MIT Press

- Calero, J. (2006). *La equidad en educación: Informe analítico del sistema educativo español.* Madrid: Secretaría General Técnica.

- Chesbrough, H. (2014). Innovación abierta. Innovar con éxito en el siglo XXI. En BBVA Openmind. *Reinventar la empresa en la era digital* (pp. 395-410). Madrid: BBVA.

- Chiva, R., Ballesteros, M., & Martínez, A. (2017). Innovarquía: el modelo organizativo para las 'startups'.. *Harvard Deusto Business Review,* (277), 30-40.

- de Navarrete, F.C.F., Pomeda, J.R y Sánchez, F. (2012). Los nuevos modelos de negocio en la economía creativa: Emociones y redes sociales. *Universia Business Review,* (33), 48-69.

- Department of Culture, Media and Sport (2001): *Creative Industries Mapping Document.* London: DCMS

- Domenech, R.B. & Lazzaretti, L. (2012). Las industrias creativas en España: una panorámica. *Investigaciones regionales: Journal of Regional Research,* (22), 181-206.

- Escobedo, P.A.S., Mendoza, A.G., & Cuervo, A.A.V. (2009). Validez y confiabilidad de un instrumento para medir la creatividad en adolescentes. *Revista iberoamericana de Educación,* 50 (6), 1-12.

- Escorsa i Castells, P., & Valls Pasola, J.V. (2003). *Tecnología e innovación en la empresa.* Barcelona: Edicions UPC.

- Fernández, I.F., Sagardia, A.E., Loroño, M.A., de Gauna Bahillo, P.R., & Ramos, A.E. (2012). Creatividad e innovación: claves para intervenir en contextos de aprendizaje. *REICE: Revista Electrónica Iberoamericana sobre Calidad, Eficacia y Cambio en Educación,* 10(2), 23-40.

- González, M. R., & Pérez, E.M. (1989). *La innovación tecnológica y su gestión.* Barcelona: Marcombo.

- Gómez, P. (2012). La elección del estudio de caso en investigación educativa. *Gazeta de Antropología,* 28(1)

- Howkins, J. (2007). *The Creative Economy: How People Make Money from Ideas.* London: The Penguin Press.

- INE (2018). *España en cifras 2018.* Madrid: INE

- Kanbantool. (2019). *Metodología Kanban.* Recuperado de: https://kanbantool.com/es/metodologia-kanban

- Kline, S. y Rosenberg, N. (1986) *An overview of innovation.* Washington D.C.: National Academy Press.

- Ley Orgánica 2/2006, de 3 de mayo, de Educación. Boletín Oficial del Estado. 106, de 4 de mayo de 2006.

- Lundvall, B.A., & Johnson, B. (1994). Sistemas nacionales de innovación y aprendizaje institucional. *Comercio exterior, 44 (8), 695-704.*

- Ministerio de Educación. (2006). *La equidad en educación: Informe analítico del sistema educativo español.*

- Ministerio de Educación. (2019). *Estadística de las enseñanzas no universitarias.* Recuperado de: http://www.educacionyfp.gob.es/dms/mecd/servicios-al-ciudadano-mecd/estadisticas/educacion/no-universitaria/alumnado/matriculado/2017-2018/NotRes1718.pdf

- O'Connor, J. & McDermott, I. (1998). Introducción al pensamiento sistémico. *Barcelona: Editorial Urano.*

- OECD. (2002) *Frascati manual 2002: Proposed standard practice for surveys on research and experimental development.* OECD.

- OECD. (2005) *Manual de OSLO. Guía para la recogida e interpretación de datos sobre Innovación.* Comunidad Europea.

- OpenMind. (2019). *Innovación abierta. Innovar con éxito en el siglo xxi.* Recuperado de: https://www.bbvaopenmind.com/articulos/articuloinnovacion-abierta-innovar-con-exito-en-el-siglo-xxi

- Pümpin, C. (1988). Cultura empresarial. *Conferencias y trabajos de investigación. 144.*

- Real Academia Española de la Lengua (2018). *Creatividad*. Recuperado de: https://dle.rae.es/?id=BD3eZdM

- Rothwell, R. (1994). Towards the fifth-generation innovation process. *International Marketing Review,* (11), 7-31.

- Salinas, J., Castillo, P., Benito, B., Cebreiro, B., Castaño, C., Cabrero, J., & Martínez, F. (2008). *Innovación educativa y uso de las TIC.* Sevilla: Universidad Internacional de Andalucía.

- Salvat, B.G., & Fructuoso, I.N. (2015). Mirando el futuro: Evolución de las tendencias tecnopedagógicas en Educación Superior. *Campus Virtuales,* 2(2), 130-140.

- Steinbeck, R. (2011). El "design thinking" como estrategia de creatividad en la distancia. *Comunicar: Revista científica iberoamericana de comunicación y educación,* (37), 27-35.

- Torrance, E.P. (1974). T*he Torrance test of creative thinking: Norms-technical manual.* Bensenville, IL: Scholastic Testing Service.

- Universidad Jaume I (2019). *Taller Tema 2: Innovación abierta (apuntes de la asignatura AE1041).* Material no publicado.

- Universidad Jaume I (2019). *Tema 3: Análisis del entorno e innovación (apuntes de la asignatura AE1041).* Material no publicado.

- Urabe, K. (1988). *Innovation and the Japanese management system.* Innovation and management International comparasions. Berlín: Walter de Gruyter.

WEBGRAPHY

http://espaitec.uji.es/
http://www.cidet.es/
https://www.ine.es/
https://kanbantool.com/es/metodologia-kanban
https://www.linkedin.com/company/cidet/
https://www.facebook.com/cidet.es/posts/745336832342297

APPENDICES

ANNEX 1. INTERVIEW EMPLOYEES

GENERAL QUESTIONS

DESCRIPTIONS

- Who is the founder of CIDET?
- Why and when was it created, how did the idea come about?
- How many workers make up CIDET?
- What kind of services do you offer?
- Who is your target audience?
- How did you get to work in CIDET?
- Describes the tasks you carry out, how many departments there are in the company and aspects such as communication between workers, the working environment, among others.

OPINION

- How would you define the company in relation to its business model and value proposal?
- How would you describe the sector in which the company operates? Do you think it is competitive?
- Describe the company's philosophy.

INNOVATION AND CREATIVITY

QUESTIONS ABOUT WORK

- What are the tasks that you develop in the company?
- Do you have training in this area?
- What is the methodology you use in your courses?
- Do the courses you give have a participatory or rather than formal character?
- Do you consider that the methodology fosters the creativity of your students?
- How do you use the technology to teach your clients?
- Where do CIDET workers fins motivation?

- Do you think it is important to be creative when you teaching?

QUESTIONS ABOUT IDEAS

- How are new ideas generated/where do they come from in the company?
- Can you define the process of creating new ideas in the company? This is a formal process? For example: when a worker has a new idea, what is the next step?
- Do you think that this process is innovative?
- Are CIDET workers considered creative people?

QUESTIONS ABOUT COMPANY AND ENVIRONMENT

- How would you define CIDET's business culture?
- How would you define CIDET's leadership?
- Do you think there is a culture and leadership that encourages creativity and innovation?
- Compared to other teaching institutions, do you consider your company to be creative?
- Are there rules and procedures, i.e. formalization in the company?
- Do you consider that CIDET has a purpose, a reason to be?
- Do you think that the localization of the company (ESPAITEC) favors innovation? What are the benefits of this localization?
- Does CIDET have a multidisciplinary team?
- In the theoretical section, the 5 characteristics of an Organizational Learning Capacity have been developed. Which of these do you think his company is doing?
    - *Experimentation*
    - *Assumption of risk*
    - *Interaction with external environment*
    - *Dialogue*
    - *Participative decision-making*

QUESTIONS ABOUT INNOVATION

- What are the company's innovation?
- Do you think your services are innovative?

- Do the innovations carried out are radical, that is, something totally new or incremental (based on continuous improvement?
- Do the innovations in the company have a technological base or rather than a meaning?
- Do you think that innovation is important in education?
- Is the company innovative in organizational terms, i.e. has it applied any innovation in its organizational practices?

ANNEX 2. QUESTIONNAIRES

CIDET WORKERS INDIVIDUAL QUESTIONNAIRE

Assesses the following aspects of the company and its internal environment:
(0 = wholly dissatisfied, 5 = wholly satisfied).

Employee participation in decision-making	
Communication and dialogue between workers	
Acceptance of risk	
Freedom at work	
Motivation of the whole team	
It is common to experiment with new forms of work	
Work environment facilitates innovation	
There is an organizational culture that encourages creativity	
The company has ambition to grow every day	
Changes in the company are common	

There are many internal rules within the company	
It is clear to all the employees what the purpose of the company is	

Assess your conformity or non-conformity with the following statements regarding your person. *(0 totally dissatisfied - 5 totally satisfied)*

I have a lot of experience in the area I work in	
I consider myself a sociable person	
Cooperation between workers/ teamwork is paramount in the company	
I have a lot of motivation when it comes to doing my job	
I consider myself a creative person	
I feel really valued in this company	

Score from 0 to 5 the following skills and competencies according to your personality.

Creating new ideas		Self-motivation	
Creation of new ideas that can have economic valor		Troubleshooting	
Originality		Ability to take risks	
Flexibility		Expert in the area of work	
Social skills		Empathy	

Experti in various fields		Ambition	