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Adapting Higher Education through Skills to the Professional Needs

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Abstract

This article aims to show the importance of studying on the part of universities to acquire the skills they need workers in companies today that these are innovative, are constantly changing and constantly adapt to the environment. Universities have a key role in the training of future employees and recycling of these. Therefore must know what capabilities should train their students to these meet the needs of today's business environment. Universities should be continuously updated and adapted to the needs of their customers, companies. At this time the universities must be aware of the business needs to innovate and therefore should pay special attention to train entrepreneurs and intrapreneurs. Therefore, in any grade must have skills that make their estuddiantes to be innovators, entrepreneurs and intrapreneurs.

Key Words: *Higher Education, Innovation, Entrepreneurs, Intrapreneurs, Innovation, Competences and Skills.*

Introduction

Innovation is the result of the development of an idea and bringing that idea into the market. This process is carried by individuals, who manage information and decision making, individuals who develop ideas and bring them to a new market, resulting in innovation. Based on the studies that analyzed characteristics of the entrepreneur and the common characteristics found in this study, we conclude that both are characteristics that are also competencies that can be developed. According to Bunk (1994), professional competence is developed by the knowledge, expertise and aptitudes needed in particular professions. In addition, professional competence means that individuals who possess it are autonomous and flexible and are able to contribute to the workplace and their profession.

Innovation and entrepreneurship are interlinked because innovation is the specific tool of entrepreneurs, the means by which they exploit changes as an opportunity for a different business or service. Szerb (2003) describes an entrepreneur as someone who is profit and growth oriented, can bear calculated risk, and who has innovative vein. Cunningham and Lischeron (Verhees and Meulenberg, 2004) argue that an entrepreneur is someone "who creates, manages, and assumes the risk of a new venture embraces the total innovative process". More general, entrepreneurship can be seen as "a process of creating new and valuable things" (Hisrich and Peters, 1989, cited in Szerb, 2003). By creating new and valuable things, the entrepreneur can be seen as a "key figure of economic growth in the sense of Schumpeter" (Szerb, 2003, p. 86).

While the connection between entrepreneurship and innovation is explained throughout the literature, measuring it becomes complex. In future, entrepreneurial research should include organizational variables in the individual level analysis in order to better explain performance differentials among new ventures (Canina et al., 2012). Van Praag and Versloot (2007), argue that innovation can be seen as a broad concept, and that there are multiple indicators for measuring innovation. Among the reasons for this complexity are the impact of innovation across countries and institutional contexts; the conditions under which entrepreneurs innovate; the policies and institutional environments that determine innovative behavior; the global environment and its challenges (Szirmai et al., 2010).

Entrepreneurs contribute in important ways to economic development (Nissan et al., 2011). One way they do this is through innovation, which involves the development of new products, new processes, new sources of supply, but also the exploitation of new markets and the development of new ways to organize business.

The main objective of the Bologna Process is to create a European space for higher education that allows for comparability, compatibility, and coherence between the existing systems of higher education across Europe. This objective is commonly known as the European Higher Education Area (EHEA). The creation of the EHEA is a new and specific challenge for higher education in Europe, one that depends upon improved facultydevelopment and training across Europe. The integration of Spain and other European countries into European higher education more generally entails these challenges. In order for necessary changes in faculty development and training to take place, university managers and policy makers must account for designing training plans, as well the knowledge, attitudes and needs of faculty members.

The new structures of study plans, curriculum changes made based upon teaching skills and the professional profiles derived from the studies, require methodological adaptations in order to change the manner in which the faculty teach (Rué 2009; Calvo-Bernardino and Mingorance-Arnáiz2009).

Universities play an important role for shaping the future of the world society in terms of sustainable development by generating new knowledge as well as contributing to the development of appropriate competencies and raising sustainability awareness However, it can be asked which key competencies are most relevant for sustainable development and hence should be developed in future-oriented higher education. Different approaches for the selection of sustainability key competencies have been developed, but it can be stated that in the international debate does not exist an agreement about the most important key competencies.

Consequently, absolutely essential is a new learning culture which does not confirm academic tradition but examines its potential for a sustainable future, in an open-minded and participative process. On the other hand, it is about the future of higher education itself, because it raises the question of how higher education should look like in the future in order to be able to take part in sustainable development of the (world) society.

Societal change, the progress of technology and globalisation are accompanied by new challenges which have to be mastered: increasing individualisation and growing societal diversity, accompanied in parallel by expanding economic and cultural uniformity, the availability of a rapidly growing amount of information as well as the necessity to cope with increasing complexity and uncertainties (Rychen, 2001; O'Hara 2007). These conditions require creative and selforganised action, because the complexity of the actors, the action situation and the course of action do not allow for problem-solving processes which go strictly according to plan.

Competencies describe the dispositions which individuals need in this environment for acting and self-organisation in various complex contexts and situations. However, no agreement exists about what (key) competencies actually are and which are of importance.

Within any higher education for the needs and demands of the work environment survey, universities should teach students skills for entrepreneurs and innovators. Only if the company, regardless of your industry, is made up of people with these skills she will be entrepreneurial and innovative.

In this paper presents three separate investigations but are interrelated. Showing the importance in the field of Education to train students in the competences and skills demanded and needed by businesses.

1. First research: the competences that employees must have so that companies can generate innovationin Spain and Brazil

To identify good practices arising from ideas and knowledge management covered in the organizational structure and in the information systems of the company, we use a qualitative methodology: grounded theory. This methodology is appropriate in this case since the subjects themselves are part of the object of study and because both variables and results have to do with the behavior and the human relationship. Grounded theory generates a conceptual inductive model; that is, from the observation of the real world, some hypotheses are developed to construct the theory. Thus, the researcher reaches general conclusions from a particular environment, from the experience of the studied subjects (Glaser, 2002).

Following this methodology, individual results are compared to each other and see if there are matches that allow the generalization of results to all individuals. Then, some categories or patterns can be established, in our case, they can be considered as good practices emerging from organizational structure, ideas and knowledge management, and ICT, leading to innovation. This exploratory study can be stated in three steps: 1) data collection; 2) sample selection; 3) data processing.

To collect data we designed a semi-structured interview based in the literature revision, consisting of five parts comprising three objectives: 1) to determine the organizational structure to identify what type of structure is used; 2) to know if innovation is developed in the company, what type and how to determine if any innovation process exists; 3) to know how information, ideas and knowledge are managed and if a model exists. The interview was conducted with the CEOs of 14 innovative companies from different industries located in the region of Rio de Janeiro (Brazil) and 15 innovative companies in the region of Gandia (Spain). In this sense, and according to Bierly and Daly (2007), the inclusion of companies from different industries provides a global view, which is very convenient since this is an exploratory research.

A feature of grounded theory is that the sample is not known at the beginning of the analysis (Marín-García et al., 2009). This is because the constant comparative method implies that as the interviews are conducted, and data are processed, in our case, by using Atlas.ti software. The process finishes when information is saturated, that is, when new data add no additional value. In the case of 29 interviews in total were conducted. In the experiment, interviews took two hours on average. They were recorded and transcribed into a text file, used in Atlas.ti software as a primary document. Then, codes are individually generated by searching for patterns that emerge from the study data. Atlas.ti groups those repeated codes, matching the ones common to the sample. The codes are categories or patterns, where theory is generated from, establishing possible relationships between them.

Thus, we have identified common good practices to these innovative companies. Spanish results show 10 good practices related to the organizational structure, ideas and knowledge management, and ICT, being all of the areas potential sources of innovation, as show in Figure 1. Results from Spain.

In Canós and Santandreu (2010) a theoretical framework which justifies the relationship of the organizational structure of companies and the circuit through which information flows is presented. In our case, the event or phenomenon we want to analyze can be described as the circuit that follows the information in the company according to its organizational structure and the management of ideas, the ones evaluated through the ideas management system in order to reach innovation.

It is also demonstrated in another study by Santandreu-Mascarell et al. (2011), that the specific characteristics of innovative companies are the competences that employees must have so that companies can generate innovation. Therefore, employees must have them in advance or acquire them afterwords.

The competences wanted by companies for their staff, are:

- ✓ *Shared vision*: degree of staff identification with corporate culture, level of socialization and entrepreneurial orientation (Zortea-Johnson et al., 2012).
- ✓ *Rotation*: understood as the change between jobs or tasks in the company. Rotation allows employees to know the company from multiple perspectives and develop not only one routine, but creative work. Rotation allows duplication, that is, the deliberate overlapping of information, operational and management responsibilities, to create knowledge (Nonaka et al., 2000; Ortt and Smits, 2006; Tajeddini and Mueller, 2012). ·
- ✓ *Free access to information*: business knowledge becomes more fluid and easy to implement through transparency in reporting. ·
- ✓ *Teamwork*: teamwork techniques, roles, cooperation, status, coordination, etc (Chiesa et al., 1996; Rothwell, 1992; Souitaris, 2002; Quinn et al., 1996). ·
- ✓ *Project teams*: it is based in the interpretation of top managers' ideals. Teams play a key role because they provide a shared context where people can interact and establish an ongoing dialogue that enables effective reflection. Through dialogue and discussion, team members create different views that are integrated into a collective perspective (Nonaka et al., 2000; Quinn et al., 1996). ·
- ✓ *Communication channels*: this issue is clearly related to information, assertiveness and information systems (Rogers and Shoemaker, 1971). ·
- ✓ *Experience*: we consider this competence if University offers the possibility of doing business practices or internship to students.
- ✓ *Company vision*: it has its origin in managers, with responsibilities related with multidisciplinarity, considering different views, openness, etc. (Choi and Lee, 2003).
- ✓ *Corporative strategy (innovation):* it is considered if training about manage innovation is offered (Quinn et al., 1996). ·
- ✓ *Involvement of managers*: degree of management commitment in the implementation of strategies.

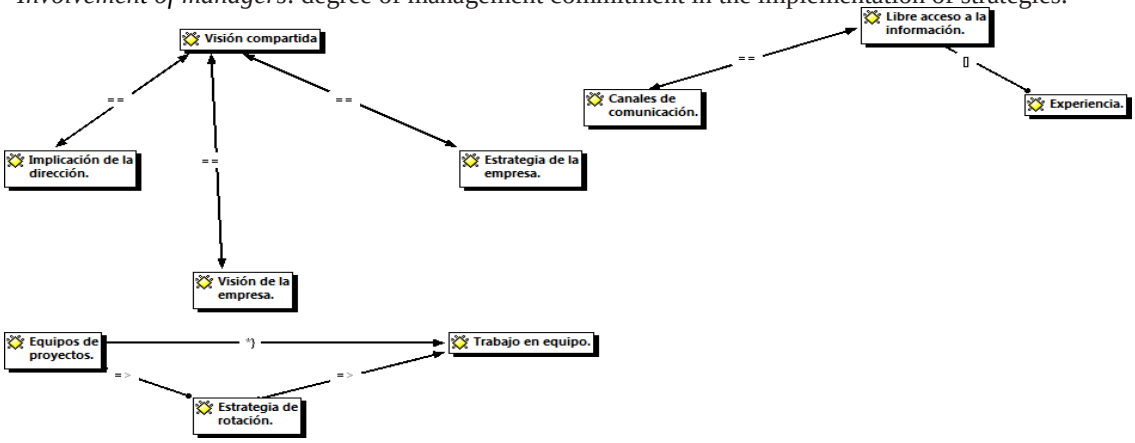

Figure 1.Results from Spain. From authors. Program ATLAS.TI.

Brazilian results show 34 good practices related to the organizational structure, ideas and knowledge management, and ICT, being all of the areas potential sources of innovation. Categories, patterns or good practices are 34 in total that can be seen graphically in Figure 2. Results from Brazil: constant search of information, external partners, organizing committee, share knowledge, share information, competitiveness, communication, confidence, creativity, quality, culture, clear definition of objectives, strategy, experience, administrative flexibility, training, intranet, investment and development, continuous improvement, mission, motivation, multidisciplinary, patents, workers profile, publication, HR recognition, social networking, regular meetings, information systems, innovation systems, sustainability, differentiated work, group work, project work, technology transfer and vision. As we can see, all are related with the organizational structure, ideas and knowledge management and/or ICT. The results obtained in Spain are included in the results obtained in Brazil.

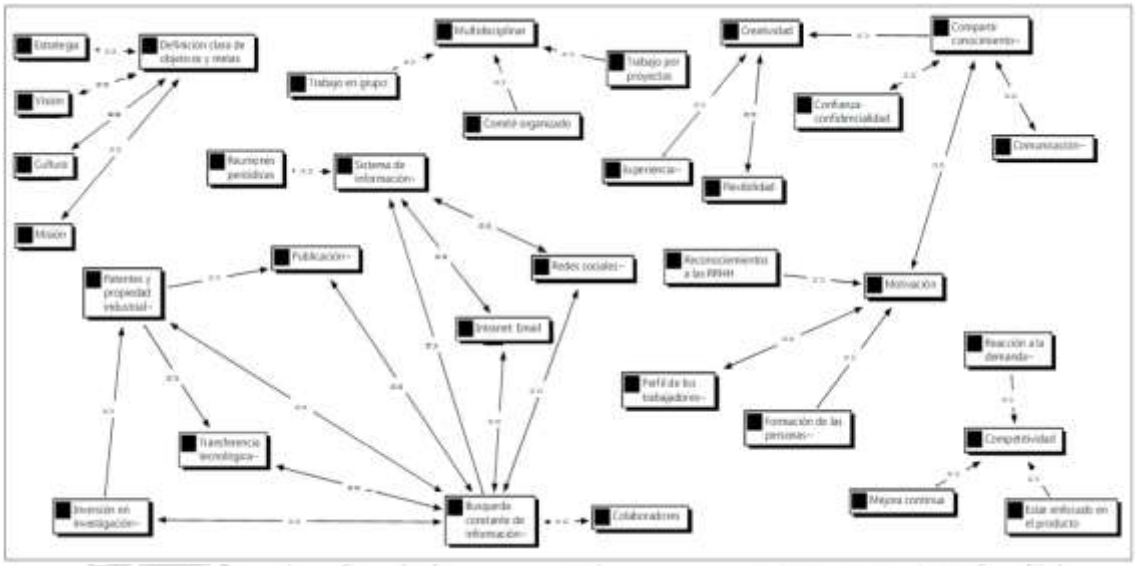

Figure 2. Results from Brazil. From authors. Program ATLAS.TI.

Second Research: Entrepreneurial and innovative competences

The study of personal entrepreneurial competences of each member of the company and analysis of the complementarity of their profiles is important in order to assign roles and responsibilities and therefore optimize the capabilities of each of them (Nielsen and Lassen, 2012).

A previous paper (Garzon, 2010; Santandreu et al., 2013) analyzed personal entrepreneurial competences (PECs), which appear to characterize the behavior of successful entrepreneurs based on McClelland's (1961, 1965) research. McClelland (1961, 1962, 1965) and McClelland and Winter (1969), stated that there are a number of key personal entrepreneurial competences that distinguish successful people from those that do not achieve success easily (Bergh et al., 2011). The results of these studies identified, among others, the following hypotheses:

(1) There are 30 common competences among the entrepreneurs included in the survey that are crucial for their success.
(2) These 30 competences can be grouped into ten PECs:
- Opportunity seeking and initiative.
- Risk taking.
- Demand for efficiency and quality.

- Persistence.
- Commitment to the work contract.
- Information seeking.
- Goal setting.
- Systematic planning and monitoring.
- Persuasion and networking.
- Independence and self-confidence.

PECs are decisive when starting up a business venture. These competences can be developed through specific techniques.

These competences (and their corresponding behaviors) are clustered into three main groups in accordance with Table 1: Achievement cluster, planning cluster and power cluster.

Table 1.Achievement cluster, planning cluster and power cluster. From "Entrepreneurial and innovative competences, are they the same?, by Santandreu-Mascarell, C., Garzon, D. & Knorr, H. (2013). *Management Decision* 51 (5).

Achievementcluster	Planningcluster	Powercluster
Opportunity seeking and initiative Does things before asked or forced Tobyevents	Information seeking Personally seeks information fromclients, suppliersor Competitors	Persuasion and networking Uses deliberate strategies to influenceor persuade others
Acts to extend the business into new areas, products or services	Does personal research on how to provide a product or Service	Uses key people as agents to accomplish own objectives
Seizesunusualopportunitiesto start a new business, obtain financing, equipment, landwork spaceorassistance	Consultsexpertsforbusiness ortechnicaladvice	Acts to develop and maintain businesscontracts
Risktaking	Goalsetting	Independence and self confidence
Deliberatelycalculatesrisks and evaluatesalternatives	Sets goals and objectives that are personallymeaningful and challenging	Seeksautonomyfromthe rules or control of others
Takes action to reduce risks or control outcomes	Articulatesclear and specific longrangegoals	Sticks with own judgment in the face of opposition or early lack of success
Places Self in situations involving a challenge or moderate risk	Sets measurable short term Objectives	Expressesconfidence in own ability to complete a difficult task or meet a challenge
Demand for efficiency and quality	Systematicplanning and Monitoring	
Finds ways to do things better, faster, orcheaper	Plansbybreakinglarge tasksdowninto time constrained sub-tasks	

Acts to do things that meet or exceedstandards of excellence	Revises plans in light of feedbackon performance or changingcircumstances
Develops or uses procedures to ensure work is completed on time or that work meets agreed upon standards of quality	Keepsfinancial records and uses them to make business Decisions
Persistence	
Takes action in the face of a significantobstacle	
Takesrepeatedactionsor switches to an alternative strategy to meet a challenge or overcome Anobstacle	
Takes personal responsibilityfor the performance necessaryto achievegoals and objectives	
Commitment to the work contract	
Makes a personal sacrifice or expendsextraordinaryeffortto complete a job	
Pitches in with workers or in their place to get a job done	
Strives to keep customers satisfied and places long term good will over short termgain	

The competences can be analyzed one by one or studying the relations between them.

The theoretical relations between competences identified by McClelland in successful entrepreneurs are the following:

- "Goal setting" must have the highest value and, in particular, must be above "Persistence". · "Persistence" must have a similar value to "Opportunity seeking and initiative". ·
- "Independence and self-confidence" must have a similar value to "Commitment". ·
- The "Risk taking" competence is related to those of "Independence and self-confidence" and "Information seeking".

In her research, Garzon (2010), found that there exists a real evolution of the PCEs from the moment at which the entrepreneur conceives an idea to the time when they are a fully-fledged and experienced CEO.

The samples studied consisted of 1.163 innovative entrepreneurs and 27 CEOs from an association of innovative companies.

In Figure 3. PCEs (entrepreneurs and the frequency), we can appreciate the PCEs put into practice by entrepreneurs and the frequency they do so. In Figure 4. CEOs, we observe both again in the CEOs group. It is worth noting the evolution of PCEs observed.

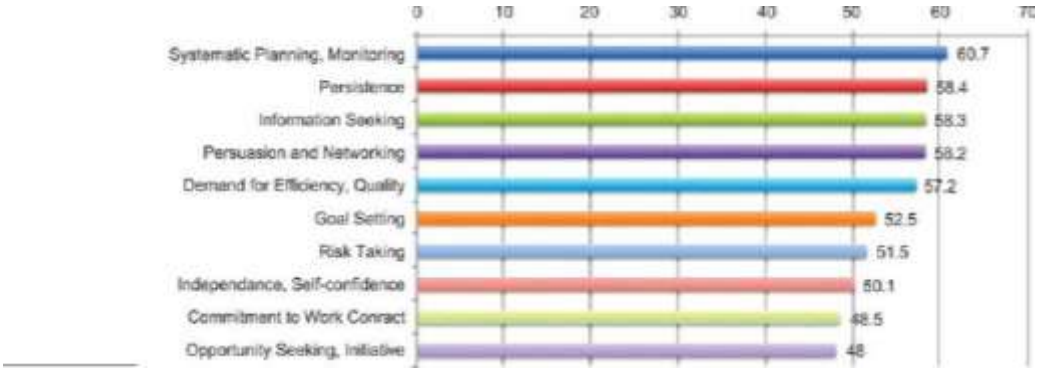

Figure 3. PCEs (entrepreneurs and the frequency). From "Entrepreneurial and innovative competences, are they the same?, by Santandreu-Mascarell, C., Garzon, D. & Knorr, H. (2013). *Management Decision* 51 (5).

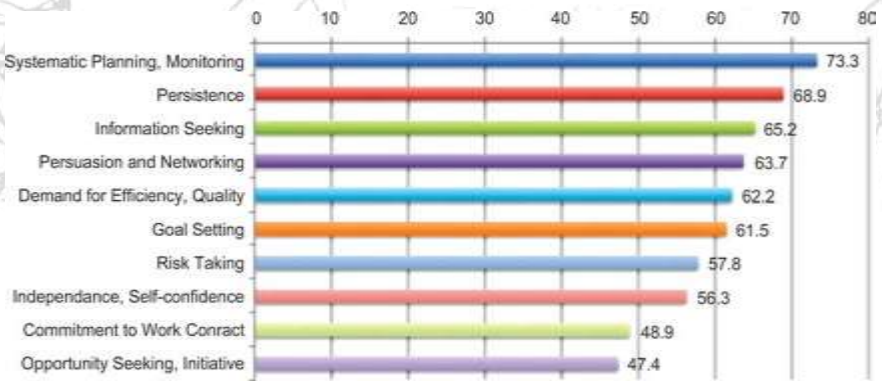

Figure 4. CEOs. From "Entrepreneurial and innovative competences, are they the same?, by Santandreu-Mascarell, C., Garzon, D. & Knorr, H. (2013). *Management Decision* 51 (5).

There are common competences: the entrepreneur puts into practice the PCEs "Goal setting" and "Persistence", but does so more often after years of experience; "Independence and self-confidence" become more important over time and the capacity for "Risk taking" increases. However, there are also four PECs in which differences between entrepreneurs before and after running a business can be highlighted. Those competences are: "Opportunity seeking and initiative", "Demand for efficiency and quality", "Systematic planning and monitoring" and "Independence and self-confidence", and this fact means that these four are the real characteristic competences of CEOs. The rest are non-defining ones. Once we identify these competences it would be interesting to see if they adapt to the reality of business. First, because there are no studies of the competences required by companies; instead, there are studies that evaluate workers for their skills. A research conducted by Canós and Santandreu (2010), shows common characteristics for innovative companies, all of them associated with employees' competences and skills. To compare competences with real world, we first have to explain briefly the methodology used in the paper Canós and Santandreu (2010). As shownin sectiontwo ofthisarticle.

Third research: Competences and skills in industrial engineering spanish universities

In an educational context, competencies and skills are defined by different international agencies and researchers. We use the concept defined by Bunk (1994): a person has professional competencies if he or she has the required knowledge, skills and attitudes to practice a profession, can solve problems in an autonomous and flexible way and is able to cooperate in the professional environment and work organization. In consequence, we define generic competencies as those forming an essential part of the professional and educational profile of all or most of the degrees. They are associated with higher education and include all cognitive and metacognitive skills, knowledge and instrumental attitudes considered valuable in the knowledge society. In addition, specific competencies belong to a concrete profile or are shared by few profiles. They are expressed through discipline-related knowledge or skills of the more common professional practice in the defined profile (Yániz &Villardón, 2006).

In Spain, guidelines exposed by Ministry through an official agency about degrees in Industrial Engineering state that engineers are able to analyze, model, design, implement and improve complex systems composed of people, materials, money, information, machinery, technology and energy (ANECA, 2005). In particular, the degree in Industrial Technologies Engineering has more to do with drafting, signing and the development of projects of construction, assembly or installation of structures, industrial plants or mechanical, electrical or energy equipment (Marin-Garcia et al., 2009; Marin-Garcia et al., 2010; Pons et al., 2012; Santandreu et al. 2012).

Basic competencies and skills required for an Industrial Engineer are regulated by a Spanish Ministerial Order CIN/351/2009 of 9th of February, 2009:

1. Ability to draft, sign and develop projects in the field of Industrial Engineering aimed, according to the foreground as provided in paragraph 5 of this order, construction, alteration, repair, maintenance, demolition, manufacture, installation, assembly or operation: structures, mechanical equipment, energy facilities, electrical and electronic installations, facilities and industrial plants and manufacturing and automation processes.

2. Ability to manage activities involved in the engineering projects described in the previous section.

3. Knowledge, understanding and ability to implement the necessary legislation in the exercise of the Industrial Engineer profession.

4. Knowledge of basic materials and technology to learn new methods and theories, giving them the versatility to adapt to new situations.

5. Knowledge for doing measurements, calculations, assessments, appraisals, surveys, studies, reports, work plans, and similar work.

6. Ability to deal with specifications, regulations and mandatory standards.

7. Ability to work in a multilingual and multidisciplinary environment.

8. Ability to apply principles and methods of quality.

9. Ability to solve problems with initiative, decision making, creativity, critical thinking and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.

10. Ability to analyze and evaluate social and environmental impact of technical solutions.

11. Ability to organize and plan in any company, and other institutions and organizations.
Following this list, Spanish universities have adapted new curricula to new needs. We have revised competencies and skills in offered degrees to establish if they follow these criteria or we can find some differences.

About the origin of information, we use official web sites belonging to Spanish public and some private universities, and corresponding schools. Some universities have not updated the information about degrees in Industrial Engineering, and they still have old plans information (in some cases, they are pending of approval).

In Table 2 (Canós et al. 2011) we can see competencies and skills that Spanish universities have implemented in their Industrial Engineering degree, including professional profiles.
From information obtained from universities and relating it to different papers discussed above (ANECA, 2005; Marin-Garcia et al., 2009; Marin-Garcia et al., 2008) we present the following ideas:

• Multidisciplinarity: It is about technical and multi-purpose training for industrial world. It consists in bringing a strong scientific background and a wide variety of expertise in various technologies. This competence covers various general skills about science, technology and business. Alluniversitiesunderstudyincludethiscompetence.

• R&D: We mark X if training about manage innovation is offered. Notice that this is a general competence. All universities under study include this competence.

• Management training: It is about organizing and planning in the field of business and other institutions and organizations. Ten universities under study consider this competence, through general skills about basic business and the specific competences: strategy management, information management and design and planning.

• Lecturer-researcher training: Dedicated to learn about teaching in secondary schools or professional training modules. Thirteen universities under study consider that engineers should achieve this competence. Nowadays, this competence is not mentioned in ANECA (2005), Marin-Garcia et al. (2009) and Marin-Garcia et al. (2008) because is not according to a professional profile for an Industrial Engineer.

• Team work: It is about team work techniques, roles, cooperation, status, coordination, etc. This general competence appears in the study plans of twelve listed universities.

• Project teams: It is based in the interpretation of top managers' ideals. In companies, teams play a key role because they provide a shared context where people can interact and establish an ongoing dialogue that enables effective reflection. Through dialogue and discussion, team members create different views that are integrated into a collective perspective. This competence can be both general and specific. We can found it in eleven degrees under study.

• Environment: It is about sustainable development, environmental responsibility and clean technologies. By achieving this competence students get the ability to valuate social and environmental impact of technical solutions. Eight of the listed universities consider this competence, whether as general, specific and even in others.

• Design of products and services: Design, develop, implement, manage and improve products, systems and processes in different industrial areas, by using appropriate analytical, computational or experimental techniques. OnlyoneUniversitydoesnotconsiderthisspecificcompetence.

• Quality management: Acquisition of the ability to apply principles and methods of quality to improve products and services. Eleven universitiesincludethiscompetence in theirdegrees.

• Commercial: Performing tasks related to the sale of facilities and equipment. Only seven universities in the case study above consider this specific competence in the design and planning process.

Table 2."Competenciesand skillsinSpanishIndustrial Engineering degrees". From Competences and skills for future Industrial Engineers defined in Spanish degrees

UNIVERSITY	Multidiscip-linarity	R&D	Management training	Lecturer-researcher training	Team work	Project teams	Environment	Design of product	Quality management	Commercial
Antonio deNebrija	X	X	X	X	X	X	X	X	X	
Cádiz	X	X	X	X	X	X	X	X	X	X
Cantabria	X	X	X	X	X	X	X	X	X	X
ACoruña	X	X	X	X		X		X	X	X
Deusto	X	X	X	X	X	X	X	X	X	X
Gerona	X	X				X		X		
JaimeI	X	X	X	X	X	X		X		X
Oviedo	X	X			X	X				
PaísVasco	X	X		X				X	X	X
Politécnica de Cartagena	X	X	X	X	X	X	X	X	X	
Politécnica de Cataluña	X	X	X	X	X		X	X	X	
Politécnica de Madrid	X	X	X	X	X	X	X	X	X	
Politécnica de Valencia	X	X	X	X	X	X	X	X	X	X
U.N.E.D.	X	X		X	X			X		
Zaragoza	X	X		X	X			X	X	

Source: Santandreu-Mascarell, C., Canós-Darós, L. & Pons-Morera, C. (2011).. *Journal of Industrial Engineering and Management*, 4 (1), p 13-30.

In Canós and Santandreu (2010) a theoretical framework which justifies the relationship of the organizational structure of companies and the circuit through which information flows is presented.

Table 3."Required competenciesinrealbusinessandIndustrialEngineeringdegrees". From Competences and skills for future Industrial Engineers defined in Spanish degrees,

UNIVERSITY	Shared vision	Rotation	Free Access To information	Team work	Project teams	Communication channels	Experience	Company vision	Corporative Strategy (Innovation)	Involvement of managers
Antonio de Nebrija		X		X	X		X	X	X	
Cádiz		X		X	X		X	X	X	
Cantabria		X		X	X		X	X	X	
ACoruña		X			X		X	X	X	
Deusto		X		X	X		X	X	X	
PaísVasco		X					X	X	X	
Gerona		X			X		X	X	X	
JaimeI		X		X	X		X	X	X	
Oviedo		X		X	X	X	X	X	X	
Politécnica de Cartagena		X		X	X		X	X	X	
Politécnica de Cataluña		X		X	X		X	X	X	
Politécnica de Madrid		X		X	X		X	X	X	
Politécnica de Valencia		X			X		X	X	X	
U.N.E.D.		X		X	X		X	X	X	
Zaragoza		X					X	X	X	

Source: Santandreu-Mascarell, C., Canós-Darós, L. & Pons-Morera, C. (2011).. *Journal of Industrial Engineering and Management*, 4 (1), p 13-30.

The competences wanted by companies for their staff, according to Canós and Santandreu (2010) as shown in section two of this article.

Table 3 (Canós et al 2011) shows the relationship between competencies considered by real companies, understood here as professional demands, and if skills are within the profile considered by universities in the definition of study plans.

As we can see, shared vision, free access to information and involvement of managers are not considered in new degrees, but required in real business. On the other hand, rotation, experience, company vision and corporative strategy are in all the Industrial Engineering degree study plans. In addition, team work and project teams are present in almost all the Spanish degrees, meanwhile communication channels is only considered by one University.

Good practices (competences and skills) to learn the student. Researchfindings

First, to check the theoretical model in real business world, we develop an experiment in some innovative companies in Spain and Brazil to identify good practices to innovative, are 34 in total: constant search of information, external partners, organizing committee, share knowledge, share information, competitiveness, communication, confidence, creativity, quality, culture, clear definition of objectives, strategy, experience, administrative flexibility, training, intranet, investment and development, continuous improvement, mission, motivation, multidisciplinary, patents, workers profile, publication, HR recognition, social networking, regular meetings, information systems, innovation systems, sustainability, differentiated work, group work, project work, technology transfer and vision. As we can see, all are related with the organizational structure, ideas and knowledge management and/or ICT.

The main objective of this research, know patterns in innovative companies that deal to success, is achieved. Moreover, managers can use this identified best practices in order to improve the innovation policies applied in the company.

This is what companies need. The training required of their employees for them to be innovative. Second, On one hand, we present competencies that individuals who want to become entrepreneurs need; on the other hand, we present competencies that these individuals must have individually and within an organization, The entrepreneurship spirit is therefore fostered both at the individual level, and within the organizational context. This results in an organization that has the ability to innovate and adapt continuously to a changing environment and new needs. In conclusion, we find that the above mentioned individual competencies that characterize the entrepreneur are found also in innovative organizations. We have measured characteristics of the entrepreneur and the innovative organization by looking at two different studies and finding common areas that are needed for fostering innovation. The areas we found in common represent an opportunity that can be used for training these skills at the individual and organizational level, for both the entrepreneurs and organizations seeking innovation.

These skills are also required by businesses. Entrepreneurs within it need sto be able to innovate. As Figure 5 shows, we have found that innovative organizations value six characteristics in their employees, which are related to entrepreneurs' characteristics. These are:

(1) persuasion and networking;
(2) opportunity seeking and initiative;
(3) information seeking;
(4) risk taking;
(5) independence and self-confidence; and
(6) commitment to the work contract.

All of the above describe individuals within the organization that are able to work in teams, are committed to their work, seek information and new opportunities, and are able to take risks in innovative ventures. However, there are characteristics that entrepreneurs have and that organizations that want to be innovative are not seeking. These are: goal setting, systematic planning and monitoring, demand for efficiency and quality and persistence. If employees had these characteristics and could apply them, they would have an optimum work strategy that would include goals, a plan on how to achieve them, as well as the best and more efficient strategic planning to achieve them. This would allow them to be persistent despite difficulties. Finally, we found that there is a competency that innovative organizations need but entrepreneurs may not have, this is previous experience in the field.

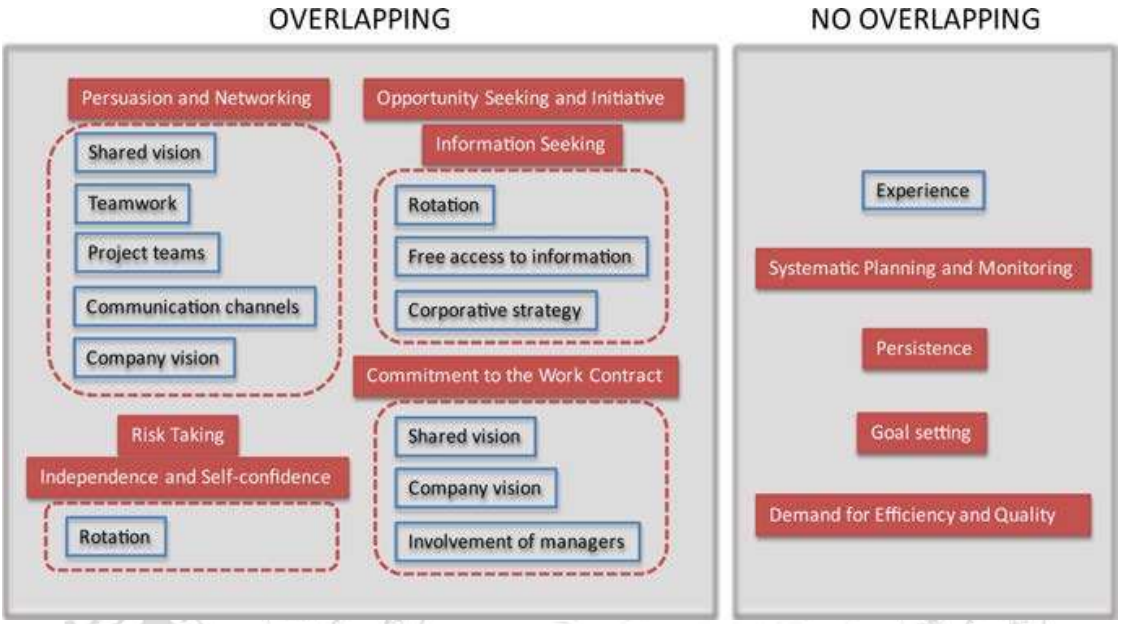

Figure 5. Overlapping and no overlapping. From "Entrepreneurial and innovative competences, are they the same?, by Santandreu-Mascarell, C., Garzon, D. & Knorr, H. (2013). *Management Decision* 51 (5).

Thirdly, first we have analyzed the competencies and skills proposed as ideals for an Industrial Engineer degree. For this, we have used some Ministerial documents and other reference papers that describe an ideal degree. Then, we have identified them in the current study plans implemented in Spanish universities. Competencies as multidisciplinariety and R&D are considered in all the universities, but commercial or environment are not so popular.

Moreover, we have checked the fit between competencies and skills described in Spanish Industrial Engineering degrees and a real business environment. We base our comparison in a study developed by Canós and Santandreu (2010), in which some competencies were highlighted by innovative companies. In this case, rotation, experience, company vision and corporative strategy are in all the analyzed study plans. On the other hand, competencies as shared vision, free access to information and involvement of managers do not appear in new degrees, but they are required in real business.

Conclusions

This paper presents two contributions. On the one hand, academia, the construction of the European Higher Education Area supposes the implementation of a new educational model that is forecasted to be a very good model because of new learning results.

Furthermore, the business environment requires companies to be innovative and therefore needs people with these skills. business environment requires entrepreneurs and intrapreneurs.

This paper demonstrates the need for further studies of this type to collect information on the needs of companies in terms of training people who will work in them the necessary skills. Thus, universities can adapt their curricula to these business needs.

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PIME A16/12. Análisis comparativo de competencias en los nuevos grados.

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