Evaluation of the Innovation Output of Businesses during Financial Crisis: The Case of Greece

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Abstract—**Going through a spell of acute financial crisis, Greece has to compete in a highly competitive, uncertain and rapidly changing environment. Within this environment, innovation can significantly boost the development and competitiveness of a business. In this research, it is examines the role that innovation plays for companies during the crisis. The aim of this study is to record the innovations that are being applied, as well as to explore the environment and the conditions of the companies' environment in relation to the development of innovation. At the same time, it is examined to which extent the average educational level of the employees, the market sector of a business and the number of employees could affect innovation. An e-questionnaire was sent to Greek companies from different market sectors in Greece. Despite this acute financial crisis, these companies have applied innovation of various types and they welcome any expression and creation of innovation to their business. Factors such as the employees' educational level and the market sector have a significant impact on the balance between companies and innovation, while, on the contrary, the number of employees does not affect the level a business encourages participation in the expression of ideas and creative thinking.**

Index Terms— **innovation, Greece, financial crisis, entrepreneurship, competitive advantage**

I. INTRODUCTION

Over the past few years the global community has been going through a spell of acute financial instability and decline. Following the global financial crisis, Greece come up against financial problems since 2008 [1]. The Greek economy has experienced an unprecedented collapse [2], and as a result the GDP ratio between 2008 and 2017 was reduced by 25% [3] the debt ratio regarding the GDP in 2017 went up to 176.1% [4], the unemployment rate reached 27.5% in 2013 (18.9% in 2018) and the unemployment rate for young people-under 25 years old-exceeded was 58.3% in 2013 (36.8% in 2018) [5]. Furthermore, Greece's fall in real investment was larger and more prolonged than in other euro area countries whiles aggregate investment has yet to recover [6]. Upon that, OECD's Economic Survey of Greece [7] suggesting the boosting of the investments as one of the key challenges of Greek economy. In order for the country to recover from the deep depression a high pace of development has to be

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achieved, and businesses play a key role in this direction. Indeed, companies must adopt management tools that incorporate innovative practices and furthermore, organisations should create an environment in which change and improvement can flourish.

If companies aim at gaining a strategic advantage in this constantly evolving environment, they should not just be able to keep up with the changes but also they should become pioneers and lead the changes. Consequently, innovation today is considered as the central process driving economic growth [8] and a resource that could generate competitive advantages [9]. Within the context of Europe's 2020 strategy, innovation is a key to achieving smart, sustainable and inclusive growth [10] and Innovation Union, which was launched in 2010, focuses on making Europe more competitive [11]. Furthermore, EU provides various schemes to help policy makers and practitioners to support innovation and stimulate industrial competitiveness [12]. The aforementioned is in line with arguments in PricewaterhouseCoopers (PwC) reports of 2005 and 2015 [13]-[14]. A research by PwC [13] in the U.S.A., dealing with the issue of innovation development in U.S. companies, showed that innovation constitutes the most competitive advantage that the most rapidly growing businesses possess. Moreover, 2015 PwC's report [14] points out that for businesses, being innovative is implicit for growth.

The need for evolution, change, and pioneering ideas, seems nowadays more important than ever [15]-[16]. All companies need to be innovative, as innovation is the source that could result in revenue stream [17]. Consequently, a company's success is even more dependent on the efficiency of innovation management [18]. It is a pressing need for businesses to manage, maintain and further improve their market competitiveness, by turning innovation into their main strategic goal [19]-[20], but unfortunately Greece's innovation index decreased by 0.9 percentage points between 2000-2017 [21].

In this frame, the aim of this research is to study and analyse the views of Greek companies in terms of the role that innovation plays within crisis. At the same time, it will attempt to record if these companies implement innovations and in which areas and also if they create a suitable environment for innovation development and to which extent. Simultaneously, it intends to research whether the educational level of the employees, the market sector and the number of employees affect innovation in companies.

II. LITRATURE REVIEW

Nowadays, there is general insecurity and upheaval in the business world; therefore, it is very important for businesses to adopt strategic innovation as a key concept so as to gaining and sustaining competitive advantage [22]. Concerning the notions of innovation and invention, it should be mentioned that they are quite different, since inventions by themselves do not produce financial results. According to Bozeman and Link [23] an invention is the creation of something new but invention is transformed into innovation only when it starts to be used. According to the Oslo Manual, innovation refers to transformation of an idea into a marketable product or service and four types of innovation are defined: product innovation, process innovation, marketing innovation and organisational innovation [24]. Hence, a new form of company organisation, a new or improved functional production method, a new way of presenting a product (design, marketing) or even a new method of service provision could be considered an innovation. As well, innovation may refer to the design and manufacture of new industrial equipment, to the accomplishment of a work or task with a new way of managing or it could imply a new way of thinking when dealing with a situation or a problem. For the European Union [25] innovation is the renewal and the expansion of product range and services and the purchase of those, the establishment of new production and distribution methods, the introduction of changes in management, in organisational structure, in job conditions, and in terms of the employees' skills.

For Porter [26], innovation is the way with which the company creates and maintains the competitive advantage. The innovations are usually developed through changes in the structure of the organization. Also, he points out that innovation could be the design of a new product, a new production process, a new marketing approach, or a new way of training and organising. Besides that, he supports that innovation is a result of both organizational learning as well research and development, offering a competitive advantage to the company that administration in turn, should take advantage of this opportunity

For Schumpeter [27], innovation is placed in the centre of financial life and is considered as the process of development of new or improved products, new markets and raw material resources or inputs, new production processes and organisational structures. According to Goudi, Skuras and Tsegenidi [28] innovation is about radical changes, changes that come as the result of the application of a new idea or invention through the creation of a new product or process. These changes constitute technical progress and they aim at the creation or the maintenance of the competitive advantage. But, is very restrictive innovation to be defined only as technical innovation. Nowadays, organisational and social innovation are also important aspects of modern economies, to become sustainable in economic, environmental and social terms [29]. Furthermore, innovation is multidimensional and embodies three important approaches: a) Incremental/Radical innovation, b) Technological/Administrative innovation and c) Product/Process innovation [30].

Although, till today, it is difficult to define the concept of innovation [31]-[32], Schumpeter proposed in 1934 the following types of innovation: product, process, market and organizational innovations [33]. Neely and Hii [34] argue that innovation can be classified into product, process and organisational innovation, without excluding each other, but on the contrary, one can lead to the other.

Concerning process innovation it is found that companies can use their human resources to the become process innovators. According to Hirzel [35], eight personal factors (management commitment, managerial business ties, managers' mindset, transactional leadership style, employees' organisational trust, employees' level of creativity, IT competencies, employees' process-orientation) and five human-resource-related organisational capabilities (employee empowerment, organisational learning, process representation, knowledge management, project management) are revealed to successful process innovation.

Moreover, innovative culture is vital for an organization for survival and growth [36]. To sustain competitive advantage, organizations should cultivate the culture of creativity and to develop the ability to adapt innovation within the organizational culture and management processes [37]. Therefore, a shift in business philosophy and culture to the direction of encouraging innovation is a need. Kaluzny, Veney and Gentry [38] argue that the importance of change, the participation in the decision making procedure and the level of satisfaction concerning the performance of the company are significant innovation development factors. Yet, a survey conducted in Greek industries, investigating whether there is a relationship between corporate culture and innovation, found that corporate culture influences innovation [39]. According to Trott [40], businesses should be distinguished by certain features to support and encourage the innovative process:

- Development Orientation: To incorporate ways of development into long term design,
- Vigilance: To dispose people who constantly examine the external environment as part of a typical procedure,
- Commitment to Technology: To be characterised by commitment to intellectual resources associated with science, technology and mechanics,
- Risk Acceptance: To demonstrate eagerness towards a careful evaluation of opportunities which bear an estimated risk, in order to achieve a balanced portfolio with high and low risk,
- Department Cooperation: To promote the cooperation among employees placed in different sections-operations (e.g. marketing, R&D,)
- Receptiveness: To be up to date and make effective use of technologies developed beyond their market sector,
- Relaxation: To give people freedom to think, experiment, discuss one's ideas and be creative,
- Adaptability: To have the ability to adapt through changing conditions,
- Different Range of Skills: To employ people of a hybrid nature, with the ability to perceive several technical issues and who are also able to facilitate the transfer of knowledge towards operation.

In addition to the relationship between corporate culture and innovation and the features that support and encourage the innovative process, it is worth mentioning that patents become, in many cases, the most common measure of innovation output [41] although, it reveals some problems [42]. Another important factor of a company's innovation performance is the educational level of managers. Sözbilir [43] points out that in Turkey there is a difference between the managers who have master's degree and the managers who have other training/educational level in affecting firm's innovation capacity and innovation performance. Also the 76.9% of the inventors that granted by the European Patent Office (EPO) between 1993 and 1997 was with tertiary education [41]. Besides, various studies examine the process of innovation in companies of diverse sectors [44]-[45]-[46]. Furthermore, businesses may use various tools that could support the establishment of innovation culture. Such tools are for example Fishbone Diagram, Pareto Chart, FMEA, 5-Why Analysis, Mind Map, and Stakeholder Analysis.

III. METHODOLOGY

A. Innovation performance in Greece

According to preliminary data published from the National Documentation Centre, the official statistical survey for innovation in Greek enterprises reveal that 57.7% of enterprises, for the three-year period 2014-2016, characterized as innovative. In the same research, it is also pointed out that during the same period, the 59.5% of the enterprises in the "Manufacturing" sector were innovative (55.1% in 2012-2014 and 53.6% in 2010-2012). In the Services sector, the largest proportion of innovative enterprises is recorded in the "Information and Communication Industry" (62.5% in 2014-2016, 59.7% in 2012-2014 and 62.9% in 2010-2012) [47].

On the other hand however, according to European Innovation Scoreboard, Greece was placed in the category of moderately innovative countries based on countries' average performance scores. Greece's performance between 2010 and 2017 declined by 0.9% due to a very strong decline in 2014 [21]. On the contrary between 2010 and 2016 Greece's performance was improved by 0.7% and PCT patent applications increased by 5.3% [48] but research productivity in terms of the number of patents per researcher and per R&D spending was low [49].

Also, a national strategy for the period 2014-20 addresses the weaknesses in the innovation system and aim at regaining competitiveness and sustainable growth and improving the framework conditions for innovation is considered crucial. In this context, initiatives are adopted like The Enterprise Europe Network-Hellas, to support innovation in firms [50]. In support to aforementioned are the key findings concerning Greece, of Flash Eurobarometer report for the 19 EU Member States, where the 84% of the businesses, consider that the lack of financial resources is a problem when trying to commercialize innovative goods or services [51]. Consequently, the 56% of early stage entrepreneurs exploit technologies or procedures required for their product / service that have been available longer than five years [52].

B. Research method

In this research the sample comprised of companies operating in Greece. In order to collect data by various companies the questionnaire was sent, by e-mail, to several market sector companies such as chemicals, travelling and recreation constructions, communications, food and drinks, banking, pharmaceutical and biotechnology, high technology, retail, information, oil, media, education and research and others, regardless of their size. Filled questionnaires were collected by e-mail as well as with personal contact. The response rate of the survey was 77% (270 out of 350). The 350 companies were randomly selected. The questionnaire consisted of 23 variables concerning innovation management activities:

- The business promotes creativity and innovation to produce better products and services
- The business sells products that are unique or provide services in a unique way
- The business operates in a way that enables adaption to change
- Business management encourages open discussions and leverages the ideas of its staff
- There is cooperation and mutual exchange of knowledge and information between departments and people within the enterprise
- The business encourages participation in the expression of ideas and creative thinking
- The business is "afraid" of the change
- The business promotes creative decision-making
- The business has set up a policy on innovation
- The business sets out innovation goals
- There are no barriers to creativity within the business
- The Company over the last three years introduced new or significantly improved products
- The Company over the last three years introduced new or significantly improved services
- The Company over the last three years introduced new or significantly improved manufacturing methods
- The Company over the last three years introduced new or significantly improved service methods
- The Company over the last three years introduced new or significantly improved methods of supply, delivery or distribution of inputs, products and services
- The Company over the last three years introduced new or significantly improved support activities for its processes such as maintenance systems or purchasing, accounting, or information systems
- Number of innovations over the last three years regarding new or significantly improved products
- Number of innovations over the last three years regarding new or significantly improved services
- Number of innovations over the last three years regarding new or significantly improved manufacturing methods
- Number of innovations over the last three years regarding New or significantly improved service methods
- Number of innovations over the last three years regarding new or significantly improved methods of supply, delivery or distribution of inputs, products and services
- Number of innovations over the last three years regarding

new or significantly improved support activities for its processes, such as maintenance systems or purchasing, accounting, or information systems

In the first place, descriptive statistics were estimated: frequency distribution, central tendency estimators and dispersion. Also, Explanatory Factor Analysis was used in order to form groups of the variables of the questionnaire and to export crucial factors. Finally, three research questions were tested so as to find out whether the educational level of enterprises, their business sector, their years of operation and the number of their employees have great, little or no influence on whether or not companies apply innovation in their operations, and the degree of implementation.

To test these three research hypotheses, the method of analysis of variation (ANOVA) was used, to estimate the possibility that the differences in the averages may be statistically significant, using F-test. ANOVA is preferable than t-test as can compare the means of more than two groups.

1) Factor analysis

The validity of the questionnaire was tested through factor analysis to identify unobservable variables in the survey data and to determine the important characteristics of their groups. To assess the suitability of the method several tests were used such as Kaiser-Meyer-Olkin (KMO) Measure, Bartlett's Test of Sphericity, Communalities, Total Variance Explained, Factors Loadings (Component Matrix and Rotated Component Matrix) and Cronbach's α (alpha).

The KMO test returned a 0.830 value (over 0.6) and Bartlett's Test of Sphericity was 0.000 (p-value less than 0.05). Consequently, the sample is considered adequate and the answers valid and suitable. The values of the Communalities of the variables (23 in total) indicate that variables are reflected well via the extracted factors. The computation of eigenvalues and the percentages of variance associated with each variable, shows that five variables have high eigenvalues (over 1.0), and account for 64.9% (accumulated percentage) of explained variance of the variance, which is an acceptable fit (Figure 1) Regarding factor loadings, values above 0.6 are considered high, while values lower than 0.3 are not included in factor analysis. Component Matrix and Rotated Component Matrix are used to identify and name unobservable variables (factors). Firstly five factors are determined, but only for three of them Cronbach's alpha is more than 0.6. Therefore, three factors were determined. The first factor has high loadings from 6 variables and its' name could be "Business environment and innovation". The second factor has high loadings from 6 variables and could be named "Introducing innovation areas." The third factor has the highest loadings from 5 variables and its' name could be "Operations based on Innovation". The Cronbach's alpha measure for the three extracted factors are 0.807, 0.820 and 0.7333 (Cronbach's α>0.6), accordingly. Hence, these factors (the derivative variables) determine reliable scales.

Therefore, these factors in particular, create scales which are reliable.

2) Hypotheses testing

For this study, three hypotheses were tested using one-way ANOVA. The *main research hypothesis* is: "Are the averages of various groups different from each other?" and is formulated as follows
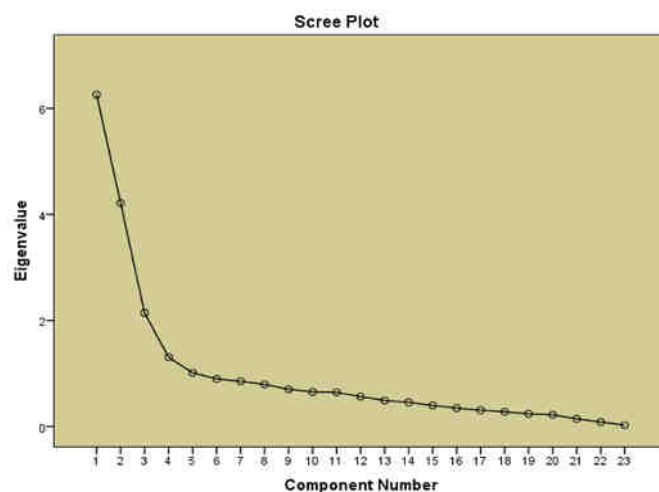

Figure 1 Scree Plot of the 23 variables about business's innovation management activities

- H0: The averages of groups being examined are the same (differences are due to random factors).
- H1: The averages of groups are different (the difference is due to the effect of the independent variable.)

For each hypothesis the analysis of the participating variables is presented and homogeneity test is performed to prove that their mean difference is not due to random factors. Also, it is examined whether the probability (p) of the F-test is statistically significant.

The *first hypothesis is* "the average level of employee education does not affect the fact that the company sets targets for innovation" and the two research hypotheses are defined as follows:
- H0: The averages of the variables 'Employee Educational Level' and 'Businesses Set Innovation Goals' are equal.
- H1: The averages of the variables are different.

The *second hypothesis* is "The industry in which businesses operate does not affect the entrance of new or significantly improved products" and the two research hypotheses are formed as follows:
- H0: The averages of the variables 'Entrance of new or significantly improved products' and 'The industry's business' are equal.
- H1: The averages of the variables are different.

The *third hypothesis* is "The number of the company employees does not affect the company's encouragement for the participation in idea expression and creative thinking" and the two research hypotheses are defined as follows:
- H0: The averages of the variables 'Number of the company employees' and 'The Company encourages the participation in idea expression and creative thinking' are equal.
- H1: The averages of the variables differ.

IV. RESEARCH METHOD

A. Companies' profiles

The first results of the research concern the profile of the companies that took part. The quantity data that was taken into consideration are the years of operation, the number of employees, the average education and their sector. It is found that the majority of enterprises occupies up to 26 employees, the years of operation exceed 26 years, and the average educational level includes graduates of Higher Education Institution and Technological Vocational Institution, while the sample included companies operating at approximately the same percentages in various sectors.

Furthermore, the attitude of companies towards innovation was examined. More specifically, it was surveyed whether the workplace promotes the application of innovation or not, if the companies generally encourage innovation and finally, to what extent these companies introduced some kind of innovation over the last three years. It was found that 77% of the companies promotes creativity and innovation in order to create better products and services, 54% sells products which are unique or provides services in a unique way, 75% operates in a way that enables them to adapt to change, at 73% business management encourages open discussions and makes use of the staff's ideas, and finally, 75% of them have cooperation and mutual exchange of knowledge and information among departments and employees of the company. About the attitude the companies maintain towards innovation, it was found that 75% encourages the participation in the expression of ideas and creative thinking, 20% "fears" change, 70% promotes creative decision making, 40% has a policy regarding innovation, 52% sets goals associated with innovation while in 52% of the companies there are no creativity barriers. Finally, about the extent to which the companies introduced some sort of innovation over the past three years and in which areas, the results showed the following: 65% has applied innovation concerning new or significantly improved products, 63% applied innovation associated with new or significantly improved services, 44% applied innovation regarding new or significantly improved product manufacturing methods, 55% applied innovation associated with new or significantly improved service production methods, 51% applied innovation associated with new or significantly improved supply methods, input , product, and service delivery or distribution, and finally, 68% applied innovation associated with new or significantly improved supporting activities for its processes, like maintenance systems or purchase operations, accounting and information systems.

B. Research Hypotheses Results

From the descriptive analysis of the variables involved in the first hypothesis, it was observed that the average level of education of the firm, which includes Master's degree graduates, affects a little more that the company sets innovation targets.

From the descriptive analysis of the variables involved in the second hypothesis, it was deduced that in the education and research, telecommunications, IT, hi-tech, media and chemical sectors there was the largest percentage of new or significantly improved products.

From the descriptive analysis of the variables involved in the third hypothesis, it was noted that the number of company's employees (50-100) affects the company's encouragement towards the expression of ideas and creative thinking.

The above findings for the three questions are not enough to conclude that the educational level, the sector of activity and the number of employees respectively are significant. This is because the difference in the averages could be due to random factors. Therefore, a homogeneity test is carried out for the three hypotheses and the results are displayed in Tables 1, 2, 3

Levene's test examines the hypothesis that the variation is the same among the four educational levels. At this point, it is true that Levene Statistic is 0.349 (Sig=p>0.05), (Table 1), therefore, it is concluded that the four groups which differ at the educational level are homogenous in terms of variation.

In Table 2, Levene's examines the hypothesis that the variation is the same among the market sectors of companies. At this point, it is true that Levene Statistic is 0.775 (Sig=p>0.05), therefore, it is deduced that the numbers of the variable "market sector" are homogenous in terms of variation.

In Table 3, Levene's test examines the hypothesis that the variation is the same between the variables "The number of a company's employees" and "The company encourages the participation in idea expression and creative thinking". At this point, it is true that Levene Statistic is 0.968 (Sig=p>0.05), therefore, it is deduced that the variable values 'the number of the company's employees' which are differentiated according to how many people in total work for the company, are homogenous in terms of variation.

In Tables 4, 5, 6 the last column gives the possibility (p) of the F-test. For 1st and 2nd hypothesis p is statistically significant so it is accepted that a) the educational level affects the fact that the company sets innovation goals b) the business sector affects the entrance of new or significantly improved products. Concerning 3rd hypothesis p is not statistically significant. Therefore, it is accepted that the number of the employees of the company does not affect the encouragement towards participation in idea expression and creative thinking.

Table 1: Homogeneity check- Levene's Test, 1st Hypothesis

Test of Homogeneity of Variances			
The company sets goals regarding innovation			
Levene Statistic	df1	df2	Sig.
,349	2	261	,706

Table 2: Homogeneity Check-Levene's Test, 2nd Hypothesis

Test of Homogeneity of Variances			
Introduction of new or significantly improved products			
Levene Statistic	df1	df2	Sig.

,775	13	249	,686

Table 3: Homogeneity Check-Levene's Test, 3rd Hypothesis

Test of Homogeneity of Variances			
The company encourages the participation in idea expression and creative thinking			
Levene Statistic	df1	df2	Sig.
,968	5	254	,438

Table 4: Variables variation analysis, 1st hypothesis

ANOVA					
The company sets goals regarding innovation					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10,684	3	3,561	3,477	,017
Within Groups	267,301	261	1,024		
Total	277,985	264			

F = 3,477 (df = 3, p<0.05).

Table 5: Variables variation analysis, 2nd hypothesis

ANOVA					
New or significantly improved products input					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31,332	13	2,410	2,232	,009
Within Groups	268,827	249	1,080		
Total	300,160	262			

F = 2,232 (df = 13, p<0.05).

Table 6: Variables variation analysis, 3rd hypothesis

ANOVA					
The company encourages the participation in idea expression and creative thinking					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,321	5	,464	,560	,731
Within Groups	210,676	254	,829		
Total	212,996	259			

F = 0,560 (df=5, p>0.05).

Furthermore, in the research in addition to innovation management activities, it was examined if businesses use management tools that support creativity and innovation (Table 7)

From these results it is obvious that Greek businesses use mainly the technique of Flowchart (45.9%), Brainstorming (44.1%) and control cards (47.8%). Besides that businesses don't use management tools that require more technical skills like PDCA, Six Thinking Hats, Value Mapping, Mind Map, Critical to Quality, TRIZ methodology and FMEA. In many cases Greek enterprises have no resources to implement the aforementioned tools (38.8%). Moreover, for the 46.7% of the businesses there are no available data for the implementation of these tools.

Table 7: Use of management tools

	Know and apply (%)	Know but not apply (%)	Don't Know and don't use (%)
Problem determination			
Fishbone	27.4	31.1	41.5
5 whys	14.4	26.3	59.3
Pareto Chart	23.7	25.2	51.1
Histogram	32.2	19.3	48.1
FMEA	18.1	21.1	60.7
Scatter Diagram	19.3	17.8	63
Check Sheets	47.8	17	34.8
Problem solving			
6 sigma methodology	13.3	23.7	63
TRIZ	11.1	19.3	69.6
Stakeholder analysis			
Critical to Quality	16.7	18.1	65.2
Stakeholder Analysis	25.9	17.4	56.7
360° feedback	25.6	16.3	58.1
Process Mapping			
Flowchart	45.9	15.2	38.9
Value Stream Mapping	15.6	14.4	69.6
Value Add Chart	23.7	17.4	58.9
Mind Map	13	15.9	71.1
Creative Thinking Techniques			
Six Thinking Hats	11.1	16.7	71.9
Brainstorming	44.1	15.9	40
Correction and Improvement			
Balance Scorecard	21.9	20	58.1
PDCA	8.5	15.2	75.9

V. RESEARCH METHOD

The survey involved 270 enterprises, of which the largest percentage employs up to 26 employees, their operating years are over 26, and the average educational level of these includes Higher Education graduates, while the sample included companies operating at approximately the same percentages in various sectors.

By examining the prevailing conditions in the business

environment, most of them welcome any expression and innovation in their operations. There is promotion of creativity in order to produce better products or services and the way they work makes them adaptable to changes and, more generally, there is encouragement from the management side to the employees in the creative expression of ideas but also in the cooperation and mutual exchange of knowledge and information.

Also, the percentage of companies found to have implemented some kind of innovation is particularly satisfying, taking into account the period of the economic crisis that the survey took place. More specifically, the percentages of enterprises that have implemented some kind of innovation regarding new or significantly improved products are high, as well as the new or significantly improved services and new or significantly improved supporting activities for the processes, such as maintenance systems or operations for purchasing, accounting, or information systems. At lower rates companies have implemented some kind of innovation for new or significantly improved methods of manufacturing products, new services or significantly improved production methods and new or significantly improved methods of supply, delivery or distribution of inputs, products and services.

The results could also be compared with the European Commission survey that took place in 2016 and concerns all European countries. It was found that during the economic crisis more than two thirds of EU companies have introduced at least one innovation since January 2013, slightly ahead (+1 pp) of results in 2014. Four in ten EU companies have introduced new or significantly improved goods services or products. At least three in ten EU companies have introduced new or significantly improved organizational methods, marketing strategies and processes [51].

The survey revealed significant results associated with the average level of employee education, market sector and number of employees. It has been found that the average level of employee education has a significant impact on whether the company sets innovation goals. The business activity industry has been found to have a significant impact on the introduction of new or significantly improved products.

Contrary to the two above findings, the number of employees was found not to effect on a company's encouragement for the participation in idea expression and creative thinking. However, Porter [26] argues that innovative businesses are often not large but new, flexible or small businesses. Also, the results should be discussed considering the research of Greek National Documentation Center [47], where it was found that both small and medium-sized enterprises and large companies are innovative during the period 2014-2016. However, the innovation rate is progressively increasing with the size of the enterprise. More specifically, the innovation rate is 53.3% in enterprises with 10-49 employees, 67.2% in enterprises with 50-249 employees and 83.8% in enterprises with more than 250 employees.

Greek companies, in order to maintain and further improve their competitiveness, must set innovation as their mail strategic goal. Based on the results of the survey, it is necessary to pay special attention to human capital and employee training. Companies should invest in improving the educational level of employees, as education can provide the necessary knowledge and skills to succeed in innovative activities. A high educational level can support a new way of thinking - the culture of innovation, helping businesses to cope with the challenges of the period of intense crisis. Also, it is important for Greek companies to invest and incorporate innovative products of IT and new technologies into the company's policies and processes, as well as have collaborations with businesses from industries that introduce and create innovation. Companies can therefore, develop, improve and sustain in the constantly changing environment that the financial crisis has created.

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