

Higher Technological Education Graduates' Entrepreneurship: Results and Conclusions of a Nation-Wide Research Study

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ABSTRACT

Higher education graduates constitute one of the most important parts of the young workforce, and their transition to the labour market is among the main concerns of governments, policy makers and higher education institutes. It has also been argued by numerous scientists that there is a noticeable recognition of the relationship between entrepreneurship and economic growth, and moreover increasing self-employment rates tend to bring subsequent decreases of unemployment. This paper concentrates on the investigation of technological higher education graduates' entrepreneurship through the analysis of the results of a nation-wide research study carried out in Greece. The conducted survey was addressed through a structured questionnaire to a large random, yet stratified sample of 708 self-employed graduates of five consecutive years. Descriptive statistics was used for investigating the main variables sketching graduates' entrepreneurship, such as their demography and education, their professional status, the characteristics of their enterprises, the satisfaction from self-employment; and multivariate analysis was applied for detecting the variables affecting significantly the turn to entrepreneurship. The main findings are highlighted and future relevant work is suggested.

Keywords: *Entrepreneurship, Higher Technological Education, Graduate, Greek Labor Market*

1. Introduction

The promotion and support of entrepreneurship are nowadays among the main priorities of governments, employment policy makers, as well as of several establishments of higher education for their students and graduates. The reason is a notable recognition for both the relationship between entrepreneurship and economic growth, and the dire need for linking closer higher education (HE) and labour market [1]. It has also been argued that the increase of self-employment tends to bring subsequent decreases of unemployment rates. Furthermore, the recent economic crisis and the increase of the public debt in many countries resulted in a current and, even more, forthcoming diminution of the public sector, a fact that makes the turn to or at least the interest for entrepreneurial activities more urgent and perhaps more challenging.

The Green Paper on entrepreneurship in Europe (2003) confirmed that the development of entrepreneurship has important benefits in both; economically, by contributing to job creation and growth and being crucial to competi-

tiveness, and socially, by unlocking personal potential, promoting societal interests and contributing to personal fulfillment and achievement of social objectives [2].

As a consequence, several institutions of higher education promote entrepreneurship through the addition of courses in their study programmes, relevant seminars, academic entrepreneurial research, as well as personal advice services usually via their Career Services [3-5]. Regarding the entrepreneurial activation of HE graduates, it has been argued that many HE institutions play a vital role in supporting entrepreneurship by providing their students with appropriate knowledge, skills and qualifications [6].

Despite the hard efforts to incorporate entrepreneurial education into the study programmes, the proportion of graduates actually turning to self-employment is rather small or, in several cases, unknown. The main identified reasons for the former phenomenon are the significant changes of the employment conditions: flexible work, part-time schedules, abolishment of several jobs and

emerging of new ones, short-term contracts, and growing hetero-employment are nowadays among the new employment statuses, disorientating the graduates from entrepreneurial activities [7,8]. The inability to determine exact self-employment rates can be explained by the fact that very few European Universities track the transition of their graduates to the labour market, and even less their vocational career [9].

Nevertheless, HE graduates' entrepreneurship has been the theme of several published articles and studies, some of them focusing on the identification of the factors affecting this activation. Scholars of entrepreneurship in a variety of disciplines agree that age, employment status, education, income and perceptions are significant socio-economic factors in a person's decision to start business [10-12]. Other identified significant reasons for turning to entrepreneurship are the profit motivation and the independence by being one's own boss [13], the origin from a self-employed family [3], as well as autonomy, self-realization and family tradition [6]. On the contrary, the socioeconomic background and the entrepreneurial education did not prove to be significant factors.

Regarding the relevant situation in Greece, the national rate of entrepreneurs is significantly higher than the EU corresponding average. However, more than half of the businesses have been created due to necessity or due to family tradition rather than to opportunity [14]. The entrepreneurship of HE graduates mounts up to 8.7% placing Greece in the 4th position in EU-25 and in the 15th position worldwide [15]. The first nation-wide published survey on the transition of University graduates to the labour market examining a large sample of 13600 graduates was carried out by Karamesini (2008). Gender and specialty of bachelor studies were identified as the most important factors regarding the graduates' self-employment rates (the identified average graduates' entrepreneurship rate was 12.8%) [16].

Our findings of a recent institutional survey in Greece revealed similar results, proving additionally that gender (male) and postgraduate studies abroad play a significant positive role towards entrepreneurial activities. They also indicate that the majority of the self-employed graduates are satisfied with their professional career, self-employed women are less than double than self-employed men, and some professions demonstrated significantly higher self-employment than others. Also, graduates with lower degree mark seem to me more involved in entrepreneurship [17].

This paper focuses on the results of a national survey carried out in Greece and addressed to higher technological education's graduates of five consecutive years. Next Section is devoted to the methodology adopted,

whereas Section 3 concentrates on the description and analysis of principal results that cover the main aspects of graduates' entrepreneurship. Paper's last Section highlights the main findings and suggests future relevant work.

2. Methodology

The nation-wide research study on which is based this work used original first-born data collected during 2009 from all the participating Technological Educational Institutions (TEI) of Greek higher education. The 11 local surveys were conducted by the institutional Career Offices which used the same research tool: a specially designed structured questionnaire consisting of three parts (demographic issues, educational issues, and employment issues), and including 43 closed, pre-coded questions. The survey method selected for the collection of the empirical data was telephonic interviews carried out by trained personnel (graduating students or Career Offices' employees). The surveys were addressed to randomly selected and stratified (according to gender, institution and department of origin) samples of graduates. A large number (5210) of filled and valid questionnaires was collected, corresponding to graduates of 11 TEIs having acquired their bachelor degrees in a five-year time interval (1997-2001).

The Statistical Package for the Social Sciences (SPSS) was used for the statistical analyses. Descriptive, as well as inferential bivariate and multivariate statistical techniques were used for the analysis of graduates' responses. The Chi-square (X^2) test was used for the examination of the statistical dependence between two variables for all possible combinations. Linear regression was applied to identify the effects of the selected independent variables on the dichotomous dependent variable 'employed or self-employed'.

3. Results and Discussion

3.1. Entrepreneurs' Demography and Education

Out of the 5210 examined graduates, 708 reported that they are currently self-employed (13.6%). The majority of them (61.6%) are men, and 38.4% are women, whereas their proportion in the examined total sample is nearly reverse (42% of the graduates are men and 58% are women), showing a significantly stronger tendency of men to turn to entrepreneurship. Sixty per cent of the self-employed graduates have graduated in their secondary education from a general lyceum, and just over half (51%) of them were married at the time of the study. Nevertheless, type of secondary education and marital status do not affect significantly graduates' entrepreneur-

rial attitude towards entrepreneurship. Eleven per cent of the self-employed graduates have acquired a postgraduate degree, which is slightly lower than the corresponding overall percentage [18].

The main demography and education statistics of the self-employed graduates per broader specialty (corresponding to different faculty) are presented in **Table 1**.

3.2. Professional Statuses

Seven to eleven years after graduation, 88.5% of the graduates reported that they are currently employed; nearly 75% of them are employees and 13.6% are self-employed. More than 11% of the graduates were unemployed (7.4%) or inactive (4.1%) during the conduct of the study. Self-employed men are more than double than self-employed women (20% versus 9%) whereas their unemployment rate is much lower (4% versus 10%). These differences are statistically significant ($X^2 = 207.37 > 7.81$). A worth to mention percentage of women graduates (6%) remain inactive, mainly for fam-

ily reasons (**Table 2**).

The calculated unemployment rate of TEI graduates (7.4%) is well below the corresponding national average, as according to a recently published nation-wide labor force survey, conducted by the Hellenic Statistical Authority, the mean unemployment rate of graduates of similar age groups was 9.15% [19].

Table 3 presents the type of employment of the working graduates. Women turn significantly more than men to work as employees, and only very few of them (3%) take the risk to establish their own business employing other persons. Part-time employment does not appear to be popular yet, as just 4% of the graduates prefer (or have to turn to) this type of employment.

The type of employment was found to be statistically dependent on graduates' gender, institution of graduation, type of lyceum (secondary education) and degree grade, and independent of graduates' marital status, year of graduation and acquisition of a postgraduate degree.

Table 1. Self-employed graduates' statistics per broader specialty.

Broader specialty	Number of self-employed	%	Men	Married	Duration of studies	Postgraduate studies
Agriculture	61	8.7%	77%	48%	6.3	6%
Care	4	0.6%	25%	100%	5.3	0%
Engineering	237	33.7%	79%	47%	6.4	10%
Food & Nutrition	32	4.5%	41%	46%	6.0	16%
Graphics & Arts	48	6.8%	33%	47%	5.9	18%
Health	87	12.4%	43%	61%	4.7	22%
Health Technologies	18	2.6%	50%	72%	4.5	0%
ICT	35	5.0%	83%	50%	6.3	12%
Management & Economics	182	25.9%	51%	53%	5.9	9%
Total	704	100%	61%	51%	6.0	12%

Table 2. Employment status of TEI graduates.

Employment Status	Number	%	Men	Women
Employed	3902	74.9%	74%	76%
Self-employed	708	13.6%	20%	9%
Unemployed	387	7.4%	4%	10%
Inactive	213	4.1%	2%	6%
Total	5210	100%		

Table 3. Type of employment for working graduates.

Gender	Full-time employees	Part-time employees	Entrepreneurs	Free lancers
Men	76%	3%	9%	12%
Women	85%	5%	3%	7%
Total	81%	4%	6%	9%

3.3. Characteristics of Graduates' Enterprises

The majority of the self-employed graduates (60%) work independently as free-lancers; the rest (40%) have their own enterprise with employees. The residence in one of the two large cities of Greece (Athens or Thessaloniki) appears to play a decisive role towards increased entrepreneurial activities, as over 20% of the corresponding graduates (22% and 28% respectively) are self-employed. Small towns do not favor self-employment; nearly in all cases less than 10% of the relevant graduates turn to entrepreneurship (Table 4).

Over six out of ten (62%) self-employed graduates reported that they established by themselves their businesses after graduation, whereas 30% stated that they work in their family business, and the remaining 8% reported other means of enterprise creation.

Regarding the graduates' enterprises size, most of them (78%) employ one to five persons, and 21% employ six to 50 employees. Only 1% of the enterprises belonged to the examined graduates are larger.

Nearly half of the self-employed graduates (49%) reported that they have been financed by their family for establishing their enterprise, 13% from bank loans, 12% from national or EU entrepreneurship funding programmes, and 26% from other, in most cases not specified, sources.

3.4. Satisfaction from the Decision for Self-Employment

The degree of graduates' satisfaction from their decision to turn to entrepreneurship is quite high, especially if they own an enterprise with employees. In total, nearly nine out of ten of them (86%) reported a quite high or high satisfaction, and only 14% declared minimal or small dissatisfaction. The detailed classification of the corresponding responses in a four-point Likert scale is presented in Table 5 [20].

The implementation of inferential statistical tests about the existing differentiations in the degree of satisfaction from self-employment of the graduates of the nine broader specialties (faculties) of the higher technological education did not reveal any statistically significant differences (Table 6).

In comparison with the findings of a recent national study in Greece, the satisfaction degree of the self-employed graduates is significantly higher compared to that of the graduates who work as employees, as according to this study only 63% of the employed graduates are satisfied with the content of their present position [18].

3.5 Variables Affecting Graduates' Entrepreneurship

The selection of the independent variables was based on

Table 4. Self-employed graduates per educational institute.

TEI	Numbers of self-employed graduates			
	Entrepreneurs	Free-lancers	Total	%
Athens	45	110	155	22%
Crete	36	38	74	10%
Epirus	5	5	10	1%
Kavala	41	37	78	11%
Lamia	13	15	28	4%
Messolonghi	9	19	28	4%
Serres	22	43	65	9%
SPTE ¹	10	9	19	3%
Thessaloniki	74	122	196	28%
Western Macedonia	27	28	55	8%
Total	282	426	708	100%

SPTE¹: School of Pedagogical and Technological Education.

Table 5. Satisfaction degree from entrepreneurship.

	Minimal	Small	Quite high	High
Entrepreneur	2%	7%	48%	42%
Self-employed	5%	12%	52%	31%
Total	4%	10%	50%	36%

Table 6. Satisfaction degree of self-employment per broader specialty.

Broader specialty	Minimal	Small	Quite high	High
Agriculture	2%	18%	52%	28%
Care	0%	0%	50%	50%
Engineering	3%	11%	52%	34%
Food & Nutrition	6%	6%	38%	50%
Graphics & Arts	4%	15%	31%	50%
Health	2%	8%	54%	36%
Health Technologies	6%	11%	50%	33%
ICT	3%	9%	34%	54%
Management & Economics	4%	7%	58%	31%
Total	3%	10%	51%	36%

the prerequisite of the reliable implementation of the Chi-square (X^2) test regarding the required minimum corresponding sample size. The variables included in the analysis are the following: gender, marital status, type of secondary education, bachelor degree grade, postgraduate studies, and satisfaction from self-employment. The relationships among the variables have been calculated using a 0.05 significance level. Vertebrate **Table 7** includes the existing relationships among all the studied variables for the 708 examined self-employed graduates. The first of the three consecutive tables includes the X^2 values, the second one reports the critical values, and the third goes into the results about the existence or not of statistically significant effects (D stands for dependent variables, and I denoted independence). According to these results the most important factor affecting the main self-employment variables is graduate's gender.

Additionally, regression analysis was implemented for predicting whether a graduate becomes self-employed or

employee. As this variable is dichotomous, the Hosmer-Lemeshow goodness-of-fit test was used. Values of more than 0.05 indicated reliability of the model that was tested [21]. The procedure of multiple regressions identified that the degree grade, the gender, the age and the specialty of bachelor studies can explain statistically the dependent variable 'type of employment' (**Table 8**).

According to the value of the evaluation criterion, the outcomes are considered to be satisfactory. The odds (probability) of graduates with a 'good' degree grade to become self-employed are 2.56 times more than those with an "honours" degree. There are no statistically significant differences between graduates with a "very good" or "honours" degree grade. The odds of graduate men to become self-employed are 1.89 more than of graduate women. A one year increase of graduate's age results to the increase of the probability of becoming self-employed increases by 5.4%. Regarding the specialty of bachelor studies, the odds of Agriculture graduates to

Table 7. Relationships between all study variables (for all self-employed graduates).

X^2 values	Gender	Marital status	Type of lyceum	Degree grade	Postgraduate studies	Employment	Satisfaction
Gender	0	21.91	11.92	16.63	6.73	9.32	1.26
Marital status	21.91	0	12.24	0.52	2.57	4.13	2.33
Type of lyceum	11.92	12.24	0	27.12	11.20	0.98	8.14
Degree grade	16.63	0.52	27.12	0	6.71	0.68	7.22
Postgraduate studies	6.73	2.57	11.20	6.71	0	0.11	5.77
Employment	9.32	4.13	0.98	0.68	0.11	0	13.48
Satisfaction	1.26	2.33	8.14	7.22	5.77	13.48	0
Critical values	Gender	Marital status	Type of lyceum	Degree grade	Postgraduate studies	Employment	Satisfaction
Gender	0	3.84	9.49	5.99	5.99	3.84	7.81
Marital status	3.84	0	9.49	5.99	5.99	3.84	7.81
Type of lyceum	9.49	9.49	0	15.51	15.51	9.49	21.03
Degree grade	5.99	5.99	15.51	0	9.49	5.99	12.59
Postgraduate studies	5.99	5.99	15.51	9.49	0	5.99	12.59
Employment	3.84	3.84	9.49	5.99	5.99	0	7.81
Satisfaction	7.81	7.81	21.03	12.59	12.59	7.81	0
Statistical Dependence (D) or Independence (I)	Gender	Marital status	Type of lyceum	Degree grade	Postgraduate studies	Employment	Satisfaction
Gender		D	D	D	D	D	I
Marital status	D		D	I	I	D	I
Type of lyceum	D	D		D	I	I	I
Degree grade	D	I	D		I	I	I
Postgraduate studies	D	I	I	I		I	I
Employment	D	D	I	I	I		D
Satisfaction	I	I	I	I	I	D	

Table 8. Results of logistic regression predicting type of occupation (employed versus self-employed).

Variables	Odds	95% C.I.	p-value
Degree grade (Good)	2.558	1.212 - 5.399	0.014
Gender (Man)	1.886	1.53 - 2.326	<0.001
Age	1.054	1.019 - 1.081	0.002
Specialty: Agriculture	2.632	1.581 - 4.382	<0.001
Specialty: Graphics and Arts	4.477	2.304 - 8.700	<0.001
Specialty: Management & Economics	2.232	1.452 - 3.432	<0.001
Specialty: Health Technology	2.655	1.397 - 5.045	<0.003
Specialty: Health	2.347	1.464 - 3.763	<0.001
Specialty: Food & Nutrition	4.486	2.546 - 7.905	<0.001
Specialty: Engineering	3.774	2.479 - 5.447	<0.001
Model evaluation criterion	Value		
Hosmer-Lemeshow	0.223 > 0.05		

Note: Comparison categories: Degree grade is Honours, Gender is Woman, Specialty is ICT.

become self-employed are 2.63 times more compared to those of IT graduates. Similarly, the odds of Graphics and Arts, Management and Economics, Health Technology, Health, Food and Nutrition, and Engineering graduates to become self-employed are 4.48, 2.23, 2.66, 2.35, 4.49 and 3.77, respectively, times higher compared to the odds of IT graduates respectively. Conclusively, men, older graduates, and graduates of Food and Nutrition, Graphics and Arts and Engineering have more chances than the others to turn to entrepreneurship.

4. Conclusions

This research work dealt with the transition of higher technological education graduates into the labour market and focused on the analysis of the vocational rehabilitation of the graduates which turned to entrepreneurship. First-born nation-wide data was collected from 11 Technological Educational Institutions of Greece through telephonic interviews addressed to a random and stratified sample of 5210 graduates. Both descriptive and inferential statistical techniques were used for the analysis of all main parameters related to self-employment and the identification of the variables affecting graduates' attitude towards entrepreneurship.

The outcomes of this national study show that about one out of seven higher education graduates (13.6%) turns to entrepreneurship; men presenting double relevant interest than women (20% versus 9%). Most self-employed graduates (60%) work individually as free-lancers.

The majority of self-employed graduates (62%) established their businesses by themselves; nevertheless the role of the family in graduates' entrepreneurial activities is very strong: 30% of them work in their family enterprise, and the establishment of nearly half of the existing business has been financed by family funds. On the contrary, bank loans and national or EU supporting programmes are less popular financing means. Self-employed graduates are significantly more satisfied than those working as employees. The residence place appears to play an important role towards entrepreneurship, the large cities offering significantly more opportunities.

Regarding the affecting factors, it has been found that gender, bachelor degree grade, age and specialty are the variables explaining satisfactorily graduates' self-employment. Men graduates, graduates with lower degree marks, and older graduates have significantly more probabilities to turn to entrepreneurship. Graduates of Food and Nutrition, Graphics and Arts, and Engineering faculties have in turn more chances to turn to entrepreneurship after graduation.

Suggested future relevant work would be the repetition of the survey with an extended questionnaire addressed exclusively to self-employed graduates, and aiming to include additional factors, such as deeper reasons for their vocational choice and influences from sources such as education and family. A comparative study among higher education graduates of different countries with similar social and/or economic status would be also very interesting.

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