# Entrepreneurial Intentions of Information Technology students: The Theory of Planned Behavior, the role of Gender and Education

### Abstract

Entrepreneurial activity and self-employment is considered a major motor of innovation, and economic development. Entrepreneurial intention, introduced in the Theory of Planned Behavior (TPB), is considered a major predictor of actual entrepreneurial career. Statistical Regression analysis was used for the empirical examination of the entrepreneurial intentions of Information Technology (IT) students, in order to identify possible points of intervention, in the direction of fostering the entrepreneurial spirit. The contribution of the TPB antecedents was evaluated, along with the effect of gender and entrepreneurial course. Personal Attitudes and Perceived Behavioral Control proved to play a vital role in Entrepreneurial Intentions, whereas Social Norm had no significant effect. Female students showed reduced intentions towards entrepreneurship, in comparison to their male counterparts. Finally the role of entrepreneurship course attendance was not significant. These findings have considerable implications for educators, curriculum designers and policy makers.

#### **Keywords**

Entrepreneurship, Entrepreneurial Intention, Theory of Planned Behavior, Entrepreneurship Education.

# **1** Introduction

The production of wealth and the reduction of the unemployment rates, are presumed upon the creation and the exploitation of new entrepreneurial opportunities (Van Praag and Versloot, 2007). European Union and the Organization for Economic Co-operation and Development (OECD), call for measures fostering entrepreneurship, especially in novel and innovative sections of the economy. In the same spirit, the G20 Leaders' Summit 2014 in their final communiqué, indicated the encouragement of youth entrepreneurship, among the strategies to reduce unemployment.

According to Howard Stevenson, **entrepreneurship** is the pursuit of opportunity beyond resources controlled. The Business Dictionary quotes entrepreneurship as "the capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit". Combining these two definitions, we may refer to Entrepreneurship as a set of activities involving one's willingness along with the available resources, aiming to exploit market opportunities and obtain profit.

Additionally entrepreneurship is considered the art of inventing ways to overcome the various constraints met during this opportunity exploitation process.

The Global Entrepreneurship Monitor (GEM) is an international consortium responsible for studying entrepreneurial activity on more than 100 countries around the globe, and communicating the results in an annual basis. The last report of the GEM regarding Greece, shows serious fluctuations of the Total early stage Entrepreneurial Activity (TEA), for the recent years. The steadily high interest in entrepreneurship is unfortunately undermined by the deep economic recession (Ioannides, Korra and Giotopoulos, 2016). Therefore the study of the intentions of Greek tertiary students towards entrepreneurship, especially in the promising field of Information Technology, is of great interest.

## **1.1 Entrepreneurial Intention**

The involvement to any kind of entrepreneurial activity is not solely dependent on opportunity but, it is rather, considered an intentional behavior. Thus it reflects an amount of cognitive processing of stimuli from the environment, prior to startup (Krueger et al., 2000). The intention to get involved with entrepreneurship refers to one's will or belief to one's entrepreneurial future and is called the **Entrepreneurial Intention**. Intention actually is the cognizant process prior to one's actual involvement into self-employment (Liñán and Chen, 2009). Contemporary research suggests that entrepreneurial intention is a major predictor of the actual entrepreneurial activity (Ferreira et al., 2012; Krueger and Carsrud, 1993; Shapero and Sokol, 1982). Subsequently, entrepreneurial intention, has become a rapidly evolving field (Liñán and Fayolle, 2015), with an increasing number of studies in the last decade.

# 1.2 The Theory of Planned Behavior.

Intention is a central factor of the Theory of Planned Behavior (Ajzen, 1991), which shows one's willingness to try and exercise a behavior, and the amount of effort one plans to invest. The Theory of the Planned Behavior (TPB) (Ajzen, 1991) is probably the most widely accepted explanatory theory on entrepreneurial intentions, providing also a link between intention and actual behavior (Krueger et al., 2000). The three explanatory constructs proposed by the TPB are Perceived Behavioral Control, Personal Attitude and Subjective Norms.

Concisely, Perceived Behavioral Control (PBC), refers to the subjective perception of the individual over the degree of difficulty or convenience, with respect to a behavior (Karimi et al., 2014). Personal Attitude (PA), is a psychological parameter showing the inclination of an individual towards the behavior, shaped by experience. Subjective Norm (SN), refers to the social pressure perceived towards the adoption of

the behavior, originating from the broader environment of the individual. The TPB constructs express different aspects of the behavior, which may serve as areas of possible intervention for improvement (Ajzen, 1991).

# **1.3** The role of Education

According to Ajzen (1991), the attitude of an individual in regard to a specific behavior, is affected by the inclination towards that behavior. Attitudes can be altered through education and training (Kolvereid and Isaksen, 2006). Moreover, **entrepreneurial education** seems to have a positive effect on Entrepreneurial Intention (Franke and Lüthje, 2004; Pittaway and Cope, 2007a) in conjunction with the fact that it is considered to influence directly the components of the TPB (Wu and Wu, 2008). So, by manifesting the influential factors of EI, we gain better understanding of the students' needs and we can more efficiently promote entrepreneurial mindset through the design of more targeted educational interventions (Peterman & Kennedy, J., 2003).

## 1.4 Study aims and hypotheses

The purpose of this article is to apply the TPB, in order to assess the Entrepreneurial Intentions of Information Technology (IT) students. Additionally, by measuring the contribution of each one of the motivational antecedents of the TPB on EI, we will have the chance to specify the appropriate interventions required in order to foster the entrepreneurial spirit of students. Our first hypothesis, concerns the applicability of the TPB.

 Hypothesis H1: the Theory of Planned Behavior and the three constructs involved, namely Perceived Behavioral Control, Personal Attitude and Subjective Norms adequately predict the Entrepreneurial Intention (EI) of IT students.

Additionally, the effect of gender on entrepreneurial intention is controversial. On the one hand, some studies show differences in the entrepreneurial intentions between male and female subjects (Ledyaeva et al., 2008; Singh Sandhu et al., 2011) and actual startup behaviors (Joensuu-Salo et al., 2015), whereas other studies show no effect of gender on EI (Díaz-García and Jiménez-Moreno, 2009; Shinnar et al., 2009). In what concerns Greece, despite the higher educational level and the increased presence of women in managerial jobs, the gender gap still remains in entrepreneurship (Apergis and Pekka-Economou, 2010). As Zampetakis et al. (2009) attest, more investigation is required on the role of gender on EI and the different entrepreneurial processes of men and women. In order to evaluate the influence of gender on EI, the next hypothesis is posed.

• Hypothesis H2: Female students have decreased EI in comparison to male students.

Finally, regarding the effect of entrepreneurial education, the majority of studies suggest that it has a positive effect on EI (Bae et al., 2014; Franke and Lüthje, 2004; Peterman & Kennedy, J., 2003); however, a few researchers found that this phenomenon is not unique, since in some cases, the effect of entrepreneurship education proved to be opposite to the expected (Oosterbeek et al., 2010). In order to investigate the influence of Entrepreneurship Education on EI, we pose the next hypothesis.

• Hypothesis H3: The attendance of an entrepreneurial course positively affects the entrepreneurial intention of students.

# 2 Research Methodology

In order to investigate the intentions towards entrepreneurship of tertiary IT students, a quantitative empirical research was conducted, utilizing a cross-sectional survey as an instrument. Cross sectional surveys provide empirical data on a research topic at a particular point in time and are frequently used in previous EI related research (Kolvereid and Isaksen, 2006).

# 2.1 Sample and data collection

The sample was chosen between individuals who were close to taking crucial career decisions. As such, tertiary students were ideal candidates. The sample was drawn among graduate and postgraduate students in the field of Information Technology. The invitation to participate was emailed to the students, along with a cover letter explaining the importance of the research and the anticipated results. The participants answered an online questionnaire, anonymously and in a voluntarily basis. A reminder email was sent after one week. A number of 193 respondents, graduate and postgraduate students completed the questionnaire. The low effective response rate of about 19%, is justified by the fact that the survey was administered right before the semester examination, and by the time demanding nature of the questionnaire. The data was first screened for missing data, resulting in the exclusion of 31 questionnaires. The 162 remaining questionnaires were retained for further analysis.

## 2.2 Questionnaire development

The questionnaire consisted of a series of self-reporting items examining the TPB constructs, Course attendance and demographic data. The items measuring all constructs were chosen from selected academic articles based on reliability measures.

The questions were translated into Greek by native speakers and then a reverse translation, into English, was used to verify the accuracy of notations (Harkness & Schoua-Glusberg 1998). Additionally the appropriateness of the measures for each conceptual variable was confirmed by a panel of academic experts from entrepreneurship related disciplines. The final form of the questionnaire, including the suggested improvements, was administered to a group of students, in order to check clarity of the items. All measures were assessed on a 5-point Likert scale (1="I completely disagree", 5="I completely agree"). The items measuring each construct are outlined below.

The items examining the constructs of the TPB, were previously validated in the Entrepreneurial Intention Questionnaire (EIQ) introduced by Liñán & Chen (2009).

The 5 items used to measure Entrepreneurial intention (EI), following the behavioral approach to intention, were : (EI1) "I am determined to create a firm in the future", (EI2) "My professional goal is to become an entrepreneur", (EI3) "I have very seriously thought of starting a firm" (EI4), "I will make every effort to start and run my own firm", and (EI5) "I am ready to do anything to be an entrepreneur". Personal Attitude (PA) was measured by the 4 items from EIQ questionnaire.

The 4 items were: (PA1) " Being an entrepreneur has more advantages than disadvantages for me", (PA2) "Being an entrepreneur would give me great satisfaction", (PA3) "If I had the chance and the resources I would start my own business" (PA4), "I would like to make a career as an entrepreneur".

Perceived Behavioral Control was measured by the next 5 items: (PBC1) "It is easy for me to start and maintain my own business", (PBC2) "I am ready to start a viable business", (PBC3) "I think I can face the creating procedure for a new business", (PBC4) "I am informed about the required details about starting my own business", and (PBC5) "I know how to develop a business plan".

Subjective Norm was measured by the following 3 items: (SN1)" My parents & relatives would approve my decision to start my own business ", (SN2) " My friends would approve my decision to start my own business " and (SN3) " My colleagues would approve my decision to start my own business".

Finally, the attendance of an entrepreneurship course (COURSE) was examined by the following dichotomous item: "I currently attend, or I have recently attended some entrepreneurship course in my school".

The methodology used, followed the step concisely presented here:

As a first step, an exploratory factor analysis was conducted, on the measuring items, to validate that each item corresponds to the right underlying construct. In order

to evaluate the applicability of the TPB on the sampled data, a multiple regression analysis was conducted between the resulting factors,. Finally, the control variables for Gender and Entrepreneurship Course attendance were entered in the model, and some conclusions will be drawn, on their role on Entrepreneurial Intentions.

## 2.3 Data Analysis

The sample was composed of N=162 students of Information Technology, 63% males and 37% females (GENDER), in their great majority (77%) between 18 and 24 years of age (AGE). Only a small percentage (41%) of them had an entrepreneurial role model (PARENTS) in their close social environment and a 40.1% had attended an entrepreneurial course. In regard to the level of their studies, a 82% were graduate students and about 18% were postgraduates (STUDIES).

The descriptive statistics of the sample are presented in Table 1. The data were skewed to the right on AGE and STUDIES variables, indicating that most of the respondents were young graduate students.

Descriptive Statistics								
		GENDER	AGE	PARENTS	STUDIES	COURSE		
Ν	Valid	162	162	150	162	162		
	Missing	0	0	12	0	0		
Median		1,00	1,00	0,00	1,00	1,00		
Std. Deviation		,484	,760	,494	,385	,425		
Skewness		,542	2,492	,356	1,690	-1,265		
Std. Error of Skewness		,191	,191	,198	,191	,191		
Kurtosis		-1,728	6,245	-1,899	,868	-,406		
Std. Error of Kurtosis		,379	,379	,394	,379	,379		

#### **Table 1. Sample Descriptive statistics**

The values of the control variables used for GENDER are Male=1 and Female=2, for the existence of role models (PARENTS) in the family Yes = 1, No = 0 and for the age groups (AGE) "18-24"=1, "25-34"=2,"35-44"=3, "45-55"=4, "55+"=5, and the attendance of entrepreneurial course (COURSE) Yes = 1, No = 0, respectively.

## 2.4 TPB Testing

In order to test our two hypotheses, H1 and H2, concerning the applicability of the TPB on students' EI, and evaluate the relations of the TPB constructs, all items were entered into factorial analysis.

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling was calculated, in order to measure the degree of common variance among the observed variables. A "meritorious" value of 0.88 (Chi-Square=1816.571, df=136, Sig.=0.000), was an indication, for a substantial amount of variance to be expected (Beavers et al., 2013).

The Principal Axis Factoring method was selected for factor extraction, since it is superior in comparison to Maximum Likelihood, in cases of small samples and non-normality of data, as in our case (de Winter and Dodou, 2012).

The communality values of all the indicator variables, were satisfactory (>0.3), meaning that all items explained an adequate amount of variance through the common factors (Costello and Osborne, 2005).



Figure 1. Scree Plot: Principal Axis Factoring method

The three of the four factors extracted, had initial Eigenvalues greater than 1,0. The fourth factor with an Eigenvalue of 0.939, which added an extra 5,5% of variance, was depicted by the Scree Plot presented in Figure 1. An oblique rotation method (Promax, Kappa=4) was used to improve the structure of the factor pattern matrix (Costello and Osborne, 1994).

The total cumulative variance explained by the 4 factors is equal to 64.5%, which is acceptable for the social sciences research (Sparkman et al., 1979). The rotation pattern matrix presenting the four factors and their loadings is illustrated in Table 2.

	I	Pattern Matrix <sup>a</sup>			
		Facto	r		
	1	2	3	4	
EI1	,931				
EI4	,924				
EI3	,742				
E12	,736				
EI5	,565				

#### **Table 2. Rotated Pattern Matrix**

PBC4	,939	
PBC2	,757	
PBC5	,728	
PBC3	,643	
PBC1	,552	
PA2		,941
PA4		,886
PA3		,627
PA1		,444
SN2		,973
SN1		,705
SN3		,701
Extraction Method: Principal Axis Factoring.		
Rotation Method: Promax with Kaiser Normalization.		
a. Rotation converged in 6 iterations.		

The loadings of all items on each factor, show a simple structure, with no crossloadings between the 4 factors. The cutoff value for cross-loadings was set to 0.3 in order to improve clarity (typical values for EFA are 0.3 to 0.4). The percentage of nonredundant residuals with an absolute value greater than 0.05, was 11%.

**Table 3. Factor Correlations and Reliability** 

			Factor	Correlation N	/latrix
Factor	(Cronbach's $\alpha$ )	1	2	3	4
1	(0,911)	1,000	,569	,713	,410
2	(0,858)	,569	1,000	,466	,237
3	(0,863)	,713	,466	1,000	,555
4	(0,833)	,410	,237	,555	1,000

From Table 2, it becomes clear that all the factors are considered "strong", since all loadings are on average greater than .7, showing adequate convergent validity. Additionally, all the factor correlations in Table 3 are less than 0.8, indicating high discriminate validity (Costello and Osborne, 2005).

The reliability of the factors was evaluated with the Cronbach's Alpha coefficient, shown in parentheses next to each factor in Table 3. All factors, exhibit a high degree of internal consistency, since values over .8, are considered "Good", and values over .9 are considered "Excellent" (Litwin, 1995).

### 2.4.1 Factor Scores

The total score of every factor was calculated (Distefano and Mîndril, 2009) as a standardized measurement of each specific characteristic of the respondent. The

regression method was chosen for the calculations of scores, because it is a multivariable procedure, which takes in account the correlations between the factors. Each score was named after the correspondent factor with a "TPB" prefix, i.e. TPB\_EI, TPB\_PBC, TPB\_PA, TPB\_SN.

A Kolmogorov-Smirnov test of normality, with p-values greater than 0.5, indicated a normal distribution for all score variables, except the TPB\_SN, indicating a non normal distribution for SN (Garth, 2008).

Accordingly the Spearman's rank correlation test was adopted (McCrum-Gardner, 2008). The correlation matrix offers a better observation of the dependencies between the four factors, namely TPB\_EI, TPB\_PBC, TPB\_PA and TPB\_SN. The results are presented in Table 4.

	Correlations									
			TPB_EI	TPB_PBC	TPB_PA	TPB_SN				
Spearman's	TPB_EI	Correlation Coefficient	1,000	.500**	.634**	.357**				
rho		Sig. (2-tailed)		,000,	,000	,000				
	TPB_PBC	Correlation Coefficient	.500**	1,000	.369**	.193 <sup>*</sup>				
		Sig. (2-tailed)	,000		,000	,014				
	TPB_PA	Correlation Coefficient	.634**	.369**	1,000	.490**				
		Sig. (2-tailed)	,000	,000,		,000,				
	TPB_SN	Correlation Coefficient	.357**	.193 <sup>*</sup>	.490 <sup>**</sup>	1,000				
		Sig. (2-tailed)	,000	,014	,000					
		Ν	162	162	162	162				

**Table 4. Spearman's Correlations** 

The correlations between Entrepreneurial Intention and the three factor variables of the TPB are statistically significant and in the expected direction. The correlation of Entrepreneurial Intention and Personal Attitude is the highest with a correlation coefficient of ,634. Second comes the correlation of EI to Perceived Behavioral Control with a ,500 coefficient. With a correlation coefficient of ,357, EI and Subjective Norm have a weaker association, nevertheless in the expected direction. However the SN has a positive correlation with Personal Attitude. These results on the association of Personal Attitude and Perceived Behavioral Control to Entrepreneurial Intention are consistent with previous research of Liñán & Chen (2009), and Kolvereid & Isaksen (2006) who also found Personal Attitude and Subjective Norms to be significantly correlated with Intentions, and previous research of van Gelderen et al. (2008), on the relation of Entrepreneurial Intention and Perceived Behavioral Control &

Subjective Norm. Additionally the association of Subjective Norm to the other two variables of the TPB, Perceived Behavioral Control and Personal Attitude Is in line with previous research of Liñán et al. (2011) and Fretschner & Weber (2013). All findings by those researches were similar with minor differentiations among the various cultures.

## 2.4.2 Multiple Regression analysis

In order to confirm the causal relations of the TPB constructs according to theory and test our first hypothesis H1, a Multiple Linear Regression with TPB\_EI as the dependent variable, was conducted. In the first model, the three predicting variables of the TPB, namely the TPB\_PBC, TPB\_PA and TPB\_SN, were used alone as independent variables. On the second model, the Gender dummy variable was entered and on the third model the Course dummy variable was entered.

The Model Summary presented in Table 5, shows the correlation coefficients (R) and the coefficients of determination (R square) of the three regression models. For model 1, an R value equal to .693, suggests that there is a medium to strong positive relationship between Entrepreneurial Intention and the three independent variables. The R square coefficient denotes that the variance explained by the model with the three predictor variables is 48.1%.

			Model Summary		
Model	Variables entered	R	R Square	Adjusted R	Std. Error of the
				Square	Estimate
1	TPB_SN, TPB_PBC, TPB_PA	.693	,481	,471	,727
2	GENDER	.704	,496	,483	,718
3	COURSE	.706	,499	,483	,719
	Dependent Variable: TPB_EI				

#### **Table 5. TPB Model Summary**

For model 2, an R value equal to .704, suggests that there is a medium to strong positive relationship between Entrepreneurial Intention and the four independent variables. The R square coefficient denotes that the variance explained by the model of the four predictor variables is 49,6%. This means that Gender adds only 1.5% of variance to the model.

For model 3, an R value equal to .706, suggests that there is a medium to strong positive relationship between Entrepreneurial Intention and the four independent variables. The R square coefficient denotes that the variance explained by the model of the five predictor variables is 49,9%. This means that Course variable does not actually add variance to the model.

These measures show a goodness of fit for the three models. The Adjusted R values, have taken in account the sample size and the Standard Error of the Estimate, show the degree of spread of the residuals around the regression line, in means of standard deviations.

	ANOVA								
Model		Sum of	df	Mean Square	F	Sig.			
		Squares							
1	Regression	77,415	3	25,805	48,779	.000			
	Residual	83,585	158	,529					
	Total	161,000	161						
2	Regression	79,852	4	19,963	38,623	.000			
	Residual	81,148	157	,517					
	Total	161,000	161						
3	Regression	80,306	5	16,061	31,050	.000			
	Residual	80,694	156	,517					
	Total	161,000	161						

## Table 6. Analysis Of Variance

According to the Analysis of Variance results demonstrated in Table 6, the three predictor variables PBC, PA and SN, can explain a significant amount of variance of the Entrepreneurial Intention. When Gender is entered the model is further improved by another 1.5% of variance.

Table 7. Coefficient table	
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	Coefficients (Dependent Variable: TPB_EI)										
M	odel	Unstand Coeffi	lardized cients	Standardi zed Coefficie nts	t	Sig.	C	Correlations		Colline Statis	earity stics
		В	Std.	Beta			Zero-	Partial	Part	Tolera	VIF
			Error				order			nce	
1	(Constant)	-8,9E-18	,057		,000	1,000					
	TPB_PA	,463	,070	,463	6,638	,000	,619	,467	,381	,676	1,478
	TPB_PBC	,327	,062	,327	5,286	,000	,514	,388	,303	,861	1,161
	TPB_SN	,071	,066	,071	1,066	,288	,375	,085	,061	,746	1,340
2	(Constant)	,354	,173		2,052	,042					
	TPB_PA	,457	,069	,457	6,629	,000	,619	,468	,376	,675	1,481
	TPB_PBC	,306	,062	,306	4,951	,000	,514	,367	,281	,841	1,190
	TPB_SN	,072	,066	,072	1,093	,276	,375	,087	,062	,746	1,340
	GENDER	-,258	,119	-,125	-2,171	,031	-,231	-,171	-,123	,966	1,035
3	(Constant)	,276	,192		1,440	,152					
	TPB_PA	,454	,069	,454	6,580	,000	,619	,466	,373	,674	1,483
	TPB_PBC	,289	,064	,289	4,494	,000	,514	,339	,255	,776	1,289
	TPB_SN	,079	,066	,079	1,199	,232	,375	,096	,068	,735	1,360
	GENDER	-,275	,120	-,133	-2,285	,024	-,231	-,180	-,130	,945	1,058
	COURSE	,132	,141	,056	,937	,350	,150	,075	,053	,897	1,114

The Regression Coefficients shown in Table 7, give information about the regression line. The B value marked as Constant provides the intercept of the Y axis (X=0), and the B values for the predictor variables indicate how higher or lower the dependent variable is, when the independent variable is increased by one standard deviation unit, with all other predictor variables held constant. The t-test informs us whether the corresponding variable makes a statistically significant contribution to the predictive power of the model. All the VIF values, are well below 2, with tolerances greater than 0.5, indicate there is no significant multi-collinearity distortion in the models. (O'Brien, 2007).

More specifically, Model 1 presented in Figure 2, shows that Personal Attitude has the highest impact on EI (B=0.463, sig=0.000). Perceived Behavioral Control is the second higher influential construct (B=0.327, sig=0.000), whereas Subjective Norm has a weak but not statistically significant effect (B=0.071, 0.29). The fact that the Subjective Norm, has a non-significant contribution to the predictive ability of the model, is consistent with prior research (Hui-Chen et al., 2014), as the construct often shows increased instability (Carsrud and Brännback, 2011; van Gelderen et al., 2008).



Figure 2. Regression Analysis (Model 1)

Nevertheless, these findings confirm the applicability of the TPB for the prediction of Entrepreneurial Intentions through Perceived Behavioral Control and Personal Attitude in our population, therefore Hypothesis H1 is supported, for the most part.



Figure 3. Regression Results (Model 2)

Examining the second model presented in Figure 3, no significant differentiation from the previous analysis is evident, except for the role of GENDER (Male=1, Female=2), which has a weak negative impact on the prediction of Entrepreneurial Intention (B= -0.125, sig.=0.03). This finding, indicates that female students have decreased EI, compared to male students, supporting our second hypothesis H2.





Finally, examining the third model presented in Figure 4, a slight differentiation from the previous analysis arises. The contribution of the TPB variables remains basically unchanged, whereas, the negative impact of gender has a minor increase on the prediction of Entrepreneurial Intention (B= -0.133, sig.=0.031). The COURSE variable (Yes=1, No=0) has a weak but not statistically significant impact on the prediction of EI (B=0.056, sig=0.350), although from the correlation table (not included) becomes evident that there is a weak correlation in the expected direction between the COURSE and EI (.150, t=.000). There is also a strong correlation between COURSE and PBC (.261,t=.000), which is expected, as the attendance of a course, is expected to

positively influence the ability related TPB component (Wu and Wu, 2008). These findings, indicate that the attendance of an entrepreneurial course does not actually have a causal relation to intentions of students towards entrepreneurship, in our sample. Therefore, our third hypothesis H3, attesting a positive relation of entrepreneurship course to EI, cannot be verified.

# **3** Discussion

In the previous chapter the results of the statistical analysis were presented, to provide some evidence concerning our hypotheses. A synopsis of the evaluation of our hypotheses is presented in Table 8. A further discussion of the findings follows.

	Hypothesis	Result
H1	The Theory of Planned Behavior is a valid predictor of Entrepreneurial Intention (EI), therefore the three constructs involved, namely Perceived Behavioral Control, Personal Attitude and Subjective Norms can statistically predict EI.	✓
H2	There is a statistically significant difference in EI between the two genders. More specifically female students have decreased EI in comparison to male students.	✓
H3	The attendance of an entrepreneurial course positively affects the entrepreneurial intention of students.	×

#### Table 8. Synopsis of the Hypotheses evaluation

Regarding the applicability of the Theory of Planned Behavior and the contribution of the three constructs involved, namely Perceived Behavioral Control, Personal Attitude and Subjective Norms (Ajzen, 1991), in the prediction of the Entrepreneurial Intention (EI), we relied on the first regression model (see model 1).

Firstly, Personal Attitude has the highest impact on EI, which was expected. The fact that PA is an important predictor of EI is established by previous research (Do Paço et al., 2011; Fretschner and Weber, 2013; Liñán et al., 2011; Veciana et al., 2005)(Mukundan and Thomas, 2016). A positive personal attitude is a good starting point towards entrepreneurial behavior (Wu and Wu, 2008). Therefore, a better understanding of the ways this attitude is shaped, could offer educators new methods to enhance entrepreneurial intentions. As a result, an increased number of students with an enhanced entrepreneurial attitude, are more likely to be found among actual

entrepreneurs after their graduation (Zampetakis et al., 2009). Moreover, the right attitude assisted by the endowments of creativity, decision making, self-confidence etc, will reinforce students' adaptation in front of rapid economic changes (De Jorge-Moreno et al., 2012)

Secondly, Perceived Behavioral Control is the second higher affecting factor of EI, which means that the belief of the individual in his/her capabilities is essential to the realization of intentions. This fact is also in line with previous research (Liñán et al., 2011; Veciana et al., 2005), showing the importance of self-capability evaluation in the shaping of intentions. Perceived behavioral Control can be developed with educational interventions, based on practical experience, business planning activities, interactive elements or integrated feedback processes (Mueller, 2011).

Finally, the result concerning the effect of Subjective Norm on EI was ambiguous. Subjective Norm is considered the weakest predictor of the TPB (Liñán et al., 2013), often gives non-significant results as a predictor of EI (Goethner et al., 2012; Krueger et al., 2000), shows increased instability (Carsrud and Brännback, 2011; van Gelderen et al., 2008) and in some cases it is totally omitted (Veciana et al., 2005). In a number of articles, SN was found to have practically no effect on EI (Hui-Chen et al., 2014; Solesvik et al., 2012; Sizong Wu and Wu, 2008), or having only an indirect effect, especially through PA (do Paço et al., 2011; Ferreira et al., 2012), which in our case is indicated by the strong correlation between SN and PA (see Table 4). Additionally, SN is considered to be less influential to people with increased locus of control or a strong orientation in taking action (Krueger et al., 2000). However, the role of SN should be handled with skepticism, since SN is sometimes affected by cultural differences (Pruett et al., 2009). Furthermore, this finding is consistent with the 2016 GEM report, that points out a 3.6 weighted average of sufficiency for Social Norms in Greece, which is below the global mean of 4.5 (Kelley et al., 2016). These results, denote that entrepreneurship is not considered an attractive career option in Greece, and special effort is required in the universities in order to develop positive social norms (Mueller, 2011).

Nevertheless, the positive effects of PA and PBC on EI and the total amount of variance explained by the basic TPB model 1 (48.1%), support **Hypothesis 1**, regarding the applicability of the TBP upon the prediction of Entrepreneurial Intentions.

With respect to our second hypothesis, Hypothesis H2, querying the differentiation in Entrepreneurial Intention between the two genders, we argued that female students have decreased EI in comparison to male students. The evaluation of the second model (model 2), proved that Gender, has a weak negative impact on the prediction of EI. As a result **Hypothesis 2** is confirmed. This finding suggests that female students have decreased EI, compared to their male counterparts, and is

consistent with previous research (Coleman and Kariv, 2014; Liñán and Chen, 2009; Mukundan and Thomas, 2016; Singh Sandhu et al., 2011; Zhao et al., 2005). In a study by Karimi et al., (2014), it was found that women entrepreneurs are more influenced by Social Norms, whereas their male counterparts are more influenced by their Attitude towards Entrepreneurship. However, in several cases, the effect of gender varies between different regions or countries (Veciana et al., 2005); therefore the cultural background of the students should also be taken into account by course designers, in order to cope with the gender gap.

Finally, in pursuance of investigating the link between entrepreneurship education and entrepreneurial intentions, we posed Hypothesis 3. The evaluation was based on the causal model of Figure 4. The findings indicated that course attendance has a weak positive but not statistically significant effect on EI. In general, entrepreneurial education is considered to be positively related to Entrepreneurial Intention of business students (Franke and Lüthje, 2004; Pittaway and Cope, 2007b; Zhang et al., 2013), but unfortunately, Hypothesis 3 could not be confirmed by our analysis. Although mainstream research claims entrepreneurship related major students have a more developed inclination towards entrepreneurship (Guerrero et al., 2008), in the case of general business studies, there is often no positive effect on EI (Chen et al., 1998; Piperopoulos, 2012), besides, occasionally entrepreneurial intentions may vary with academic major (Wu and Wu, 2008). Since the effect of Entrepreneurship Education is not consistent across different countries (Giacomin et al., 2011; Haase et al., 2011; Sesen and Pruett, 2014; Stamboulis and Barlas, 2014), hence, course designers ought to carefully consider cultural differences when developing entrepreneurship education programs (Bae et al., 2014; Pittaway and Cope, 2007b).

On the role of entrepreneurship education, Carayannis et al., (2003) suggest that entrepreneurial education can alter perceptions toward entrepreneurship related to the surrounding social culture, but legal and financial difficulties cannot be eliminated. This aspect may provide some explanation to our findings, as the data was sampled in a period of deep economic recession. The insurmountable barriers raised by the situation may have heavily influenced entrepreneurial intentions in a negative manner, demanding excessive efforts and inventiveness from educators.

This research has some limitations. Firstly, the duration of the research was restricted and sampling of the population was conducted in a non-probabilistic manner. Although, the population was adequately defined and respondents answered the questionnaire completely voluntarily and in a random manner, we cannot 100% attest that the sampled data was absolutely representative of the population, because

those willing to participate in a research may differ in important ways from those that did not participate (Kitchenham and Pfleeger, 2002). Moreover, the data examined in this study, are of a cross sectional nature due to time and resource constraints. A longitudinal study of entrepreneurial intentions could provide more detail in the evaluation of entrepreneurial intentions. A methodology incorporating the diagnosis of differentiation in students' perceptions before and after some specific educational intervention, could provide valuable information in the mental procedures that take place during the decision to engage into self-employment. Finally, a larger sample size would add extra robustness to the results.

# **4** Conclusion

Entrepreneurship is of great importance for the economic prosperity and the reduction of unemployment. Entrepreneurial Intentions, a construct of the TPB (Ajzen, 1991), is a major predictor for the engagement to self employment and as a result it has attracted a lot of research attention in the recent years.

According to our findings, the Theory of Planned Behavior is adequately predicting the Entrepreneurial Intentions of tertiary Information Technology students. The two of the three predictor variables, namely Personal Attitude and Perceived Behavioral Control constructs, expressing personal inclination towards entrepreneurship and belief to self capabilities respectively, proved to be satisfactory predicting Entrepreneurial Intention, whereas the third variable, Subjective Norm, which expresses the social conception of entrepreneurship and the social pressure towards self-employment, had no significant effect in our sample.

Moreover, when the gender variable was entered in our model, the results indicated that, the level of Entrepreneurial Intention differentiated between the two genders, with female students exhibiting reduced Entrepreneurial Intentions, in comparison to their male counterparts.

Finally, the attendance of an entrepreneurial course had a small positive but not statistically significant effect on the EI of the students, indicating possible inefficiencies in the design of entrepreneurship courses.

These findings have significant implications for stakeholders, since, the TPB constructs can serve as different points of intervention in order to change different aspects of the behavior of interest (Ajzen, 1991).

University professors, in the first place, should design appropriate interventions in entrepreneurship courses, to provide both valuable knowledge and distilled entrepreneurial experience (Piperopoulos, 2012). This will enable students to experientially articulate links between theory and practice. Consequently, professors

should not only sense the fears and hesitations of students in the classroom, but also, take these factors into account during the design phase of the course, in order to fulfill their expectations (Giacomin et al., 2011). Moreover, explorative approaches and experiential learning techniques should be utilized, through which students could gain their own experience and extend their own potential (Mueller, 2011). Some interesting educational approaches to Entrepreneurship, incorporating means of Information Technology, such as Digital Game Based Learning (DGBL) techniques, have recently been proposed by a number of researchers (Fellnhofer, 2015; Singer and Johnsson, 2015).

Curriculum designers, on the other hand, should include the appropriate educational content in order to meet the demanding expectations arising from the rapid changes in economy (De Jorge-Moreno et al., 2012). Additionally, the use of innovative ways of mimicking real world entrepreneurial situations, featuring successful entrepreneurs examples, will act as positive entrepreneurial role models (Singer and Johnsson, 2015), and will foster entrepreneurial spirit in the university (Mueller, 2011). It is suggested that the faculty members should be by the same entrepreneurial spirit first, in order to successfully disseminate it to students (Piperopoulos, 2012). Moreover, special care should be taken on the issue of gender differentiation regarding entrepreneurial intentions. Female students need more encouragement, more targeted training and mentoring, in order to defeat their fears, given that female entrepreneurship is a promising resource for economic growth in Greece (Apergis and Pekka-Economou, 2010).

Policy makers, correspondingly, should create a supportive framework for entrepreneurship, by publicly acknowledging the positive contribution of the entrepreneurs in economic development and the beneficial outcomes of entrepreneurial activity for the society (Kuratko, 2011). Moreover, they should actively support citizens' career choice towards entrepreneurship, by providing appropriate institutional support and by eliminating the barriers to entrepreneurship. Furthermore, they should take measures to nurture entrepreneurial culture in the society, by improving the social image of the entrepreneur and by setting up initiatives to increase motivation towards entrepreneurship, especially among women and other socially excluded parts of the population (Kautonen et al., 2013). Finally, by addressing unemployment and social exclusion that rage among young people (Kyrgidou et al., 2013), they will help the breeding of the next generation of high achievers and innovators (Kuratko, 2011).

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