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**THE RELATIONSHIP BETWEEN ENTREPRENEURIAL  
CHARACTERISTICS AND ENTREPRENEURIAL INTENTION**

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*Abstract*

The twenty first century provided vast opportunities for the entrepreneurs. Start-ups and technopreneurship are highly valued and encouraged by public organizations and private funds. Moreover, the entrepreneurial career orientation of the engineers became much more important in all over the world. Recent studies have already tried to discover the antecedents of entrepreneurial intention among potential technopreneurs. Entrepreneurial intention and entrepreneurial personality characteristics which were popular at the beginning of this century are still hot topics in the literature due to the fact that repeated analyses resulted in surprisingly mixed results. This paper investigates the predictors of the entrepreneurial intention of engineers and engineering students focusing on their psychological characteristics of innovativeness, need for achievement, need for independence and risk-taking propensity. A survey conducted on 607 respondents revealed that all these traits were correlated positively to their entrepreneurial intention. Multiple regression analysis indicated that all the traits except need for achievement are significant predictors of entrepreneurial intention. Managerial and further research implications are forwarded.

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**Keywords:** Entrepreneurial Characteristics, Entrepreneurial Intention, Innovativeness, Need for Achievement, Need for Independence, Propensity to Take Risks.



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## **1. Introduction**

Entrepreneurial ventures' significance in wealth and jobs creation is well understood. New ventures are not only vital for their role in healthy economies but they are also hubs for innovation. For these and similar reasons there is a consensus that revealing entrepreneurial potential has great importance. Entrepreneurial intention and its antecedents are one of the most empirically and conceptually researched areas in the entrepreneurship field due to their importance in indicating the entrepreneurial potential of the individuals. Still, the factors that play a role for an individual's decision to start a company are still not completely understood. (Linan, Rodriguez-Cohard et al. 2011). Many studies about personal characteristics resulted in controversial results and there are possible gaps and weaknesses in many of them. Therefore, reviews of the past literature had inferred that there is no reliable connection between traits and entrepreneurship and that future studies would therefore be unnecessary (e.g., Brockhaus & Horwitz, 1986; Gartner, 1988). Nevertheless, at the beginning of this century, entrepreneurship research field faced increased number of studies about individuals' personalities and trait research become once again a popular topic (e.g., Baum, Locke, & Smith, 2001; Ciavarella et al., 2004). Especially with the rise of the technical entrepreneurship or technopreneurship concept the entrepreneurial career orientation of the engineers became much more important in all over the world.

This paper tries to uncover the possible antecedents of entrepreneurial intention of the engineers and engineering students and specifically focuses on their individual characteristics. In the literature, there are plenty of such possible drivers, however, some of them are well established as a personal trait specifically pertaining or related to entrepreneurship i.e. entrepreneurial characteristics. For instance most important ones are related to the potential, courage or inner motivation of the individuals. Our research goal is to test whether these characteristics have positive effects on entrepreneurial intention.

The paper proceeds in the following manner: in the second section following introduction, we mention the related theoretical framework and develop hypotheses, in the third section, we refer to our research methodology and the fourth one we report our findings. The paper concludes with managerial and further research implications.

## **2. Literature Review and Theoretical Framework**

### **2.1. Entrepreneurial Intention**

Entrepreneurial intention reflects an individuals' idea of setting up a business and initiating an enterprise. Entrepreneurial tendencies guides the constitution of new organizations. According to Gartner (1985) entrepreneurial intention is seen as the first step in a long journey of forming and developing a new organization.

There are various ways for interpreting how an 'entrepreneur' may emerge. Starting from childhood, the influencing factors for the development of "the entrepreneurially oriented adult" are diverse. Those factors affecting entrepreneurial behaviours can be group as personal, familial, environmental and educational but they are not limited to them.

## **2.2. Entrepreneurial Characteristics**

Relations of personality traits to entrepreneurial tendencies have been the subject of much debate. Karimi (2012) argued entrepreneurship intention is altered by many factors including entrepreneurial characteristics but Gartner (1985) suggested that entrepreneurs form a considerably heterogeneous group and therefore common antecedents do not exist. However, entrepreneurs are believed to possess distinct behaviors than individuals who are not entrepreneurially inclined. Contextual factors are not irrelevant in how an entrepreneur may act but psychological traits largely shape their behaviors. Some of the personality characteristics extensively studied and presumed to be related to the entrepreneurial intention are; locus of control, innovativeness, need for achievement, self-confidence, need for independence, conscientiousness, emotional stability, risk-taking propensity etc. Although there are vast number of entrepreneurship studies linked to personality traits; results are mixed and there is room for further studies that consider different environmental factors and possible moderators, or specific scopes, sectors, regions etc.

### **2.2.1. Innovativeness**

Innovativeness is converting an idea or concept into production of a product or service. Innovativeness may also mean coming with brand-new solutions and generate novel ideas in order to overcome difficult unsolved problems. Innovativeness is one of the key properties of entrepreneurs and widely researched in this field (Schumpeter, 1934). Both earlier and recent research showed that entrepreneurs are fundamentally more innovative than others (Robinson et al., 1991, Alpkan, et al., 2002, Gürol and Atsan 2006, Ozaralli and Rivenburgh 2016). Those people endowed with innovative skills or inclinations are aware of their entrepreneurial potential and desire to start their own company in the future. For these reasons, we propose;

*H1: Innovativeness is positively related to entrepreneurial intention.*

### **2.2.2. Need for achievement**

Need for achievement (nAch) can be defined as a desire or a tendency to overcome difficulties, spending considerable amount of effort to do demanding tasks and getting extensive pleasure from goal achievement. McClelland's (1976) defines need to achieve as one of the three basic acquired social needs. Besides need for affiliation and power, the need to achieve is commonly associated with entrepreneurial behaviours thus influences individual and society in different manner. Those people who have already acquired a higher degree of the need for achievement are supposed to try hard to be successful either in somebody else's job as a paid employee or in their own firm as an entrepreneur; but the amount of possible success is limitless in the latter. An entrepreneurial position when compared to other positions seems to bring more satisfaction of this kind of need (Ozaralli and Rivenburgh 2016). Therefore, we propose;

*H2: Need for achievement is positively related to entrepreneurial intention.*

### **2.2.3. Need for independence**

Need for independence can be described as the willingness to act alone without strict boundaries, possibility to set one's own work schedule and taking actions with more freedom. Entrepreneurs prefer to make the business all alone in light of the fact that they would prefer not to get orders from others; rather they need to be free from others. Starting a business is the route to "life, liberty, and the pursuit of happiness," and decision-making independence is very important for the entrepreneurs, no matter how risky (Zwilling, 2011). Hence, we have the following hypothesis:

*H3: Need for independence is positively related to entrepreneurial intention.*

### **2.2.4. Propensity to take risk**

Taking high risks is associated with reduced inhibition and is related with undesirable behaviours in psychological contexts. However, in business framework it is one of the distinguishing factors and mostly required for higher returns. Although a common agreement among academicians do not exist; Mill (1984) proposed willingness to take risks as one of the key properties that differs entrepreneurs from others. A meta-analysis done by Zhao et al. (2010) has already shown that risk propensity, as a dimension of personality, was positively associated with entrepreneurial intentions but was not related to entrepreneurial performance. In the dynamic markets old products get outmoded while customer preferences are rapidly changing (Alpkan et al., 2003); risk prone employees observing this kind of market opportunities before everyone else may choose to establish their own high tech start-ups. Consequently, our last hypothesis is:

*H4: Risk-taking propensity is positively related to entrepreneurial intention.*

## **3. Research Method**

### **3.1. Measurement**

Liñán, F., & Chen's (2009) cross culturally validated questionnaire has been translated to Turkish and used to assess entrepreneurial intention of the individuals. As for measuring risk taking propensity we employed the scale developed by Koh (1996) and for the other traits scales created by Özer (2017) are used.

### **3.2. Sample and Data Collection**

The survey instrument is conducted both on engineering students and graduates studying and/or working in Istanbul, Turkey, via an online questionnaire form. The questionnaire was sent to approximately 5000 mail addresses across several universities; only 607 of them were properly and consistently answered to be utilized in the analyses.

## 4. Analyses and Results

### 4.1. Exploratory Factor Analysis

Exploratory factor analysis is used to reduce data to a smaller set of summary variables and to explore the underlining theoretical structure of the phenomena. Used to simplify the column of the factor matrix so that the factor extracts are clearly associated and there should be some separation among the variables (<http://www.statisticssolutions.com>). Exploratory factor analysis, reported in the Table 1, produced five factors namely Entrepreneurial Intention, Innovativeness, Need for Achievement, Risk taking, and Need for Independence. Every question except “My desire to be independent in my work is very high.” has shown to measure purely the intended factor with 68.79 % of the variance explained. For this item, we took into consideration only it’s loading on need for independence. High Cronbach’s alphas ( $\alpha=0,930$ ,  $\alpha=0,916$   $\alpha=0,884$ ,  $\alpha=0,885$ ,  $\alpha=0,820$ ) of the factors reassure internal consistency of the scales.

**Table 01.** Factor Analysis Results

Survey Items	Factors	Entrepreneurial Intention	Innovativeness	Need for Achievement	Risk taking	Need for Independence
I'm determined to create a firm in the future.		.875				
I will make every effort to start and run my own firm.		.859				
I've got the firm intention to start a firm someday.		.840				
My professional goal is becoming an entrepreneur.		.821				
I have very seriously thought in starting a firm.		.754				
I'm ready to make anything to be an entrepreneur.		.724				
I'm open to new ideas.			.810			
When I do things, I try new ways, new methods.			.801			
I like to try new things.			.789			
I see myself as innovative.			.748			
I can create spontaneous solutions to new problems.			.697			
I like to deal with unsolved problems.			.621			
My desire to be successful in my work is very high.				.823		
I master what I'm doing.				.791		
I'd like to do the best I can at the job.				.775		
I plunge into tasks with all my heart.				.748		
I give great importance to being more successful than others at the job				.686		
I aim to reach targets above certain standards.				.654		
My job strategy is taking high risks.					.833	
I generally do not avoid taking risks.					.832	
I don't avoid investments possibly with high returns just because they are risky.					.774	
I usually do not stop taking risks because of fear of making mistakes					.773	
I do not hesitate to take the risk, even if I cannot foresee the results of some investments clearly.					.724	

I prefer a risky job that gives premiums and profit shares to sales over a fixed salaried job that has a pay guarantee.				.619	
I set my work methods myself, without regard to others' considerations.					.760
I do not mind being different if I need to be independent.					.697
In my work assignments I try to be my own boss					.655
Instead of taking orders from others, I would like to make my own decisions about my work.					.592
My desire to be independent in my work is very high.		.401			.550
<b>% of variance</b>	<b>15.957</b>	<b>15.631</b>	<b>14.250</b>	<b>14.139</b>	<b>8.819</b>
<b>Cronbach's <math>\alpha</math></b>	<b>0,930</b>	<b>0,916</b>	<b>0,884</b>	<b>0,885</b>	<b>0,820</b>

Total variance explained: 68.79 %

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

## 4.2. Means and Standard Deviations

**Table 2.** Means and standard deviations of the variables

Descriptive Statistics	N	Mean	Std. Deviation
Entrepreneurial Intention	607	3.4717	1.10657
Innovativeness	607	4.2098	.75733
Need for Achievement	607	<b>4.3844</b>	.66807
Risk Propensity	607	3.0780	.91910
Need for Independence	607	3.8626	.75721
Valid N (listwise)	607		

Means of the five point Likert scale shows us individuals in the sample are inclined to entrepreneurial characteristics. Achievement motive of the sample is remarkably high with a mean of 4.3844 out of 5.

## 4.3. Correlation Analysis

**Table 3.** Correlations of the variables

Variables	Entrepreneurial Intention	Innovativeness	Need for Achievement	Risk Propensity	Need for Independence
Entrepreneurial Intention	1				
Innovativeness	.423**	1			
Need for Achievement	.323**	.630**	1		
Risk Propensity	.485**	.384**	.275**	1	
Need for Independence	.413**	.618**	.510**	.384**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Correlation Analysis of the factors revealed that all the entrepreneurial traits and entrepreneurial intention are significantly and positively correlated to each other as seen on Table 3.

#### 4.4. Multivariate Regression Analysis

**Table 04.** Effects on Entrepreneurial Characteristics on Entrepreneurial Intention

Independent variables	Standardized Beta coefficients	T-values	Significance
(Constant)		-.119	.905
Innovativeness	.167**	3.398	.001
Need for Achievement	.043	.973	.331
Risk Propensity	<b>.351**</b>	9.429	.000
Need for Independence	.153**	3.435	.001
	R <sup>2</sup> : 0,313	F: 70,18**	0,00

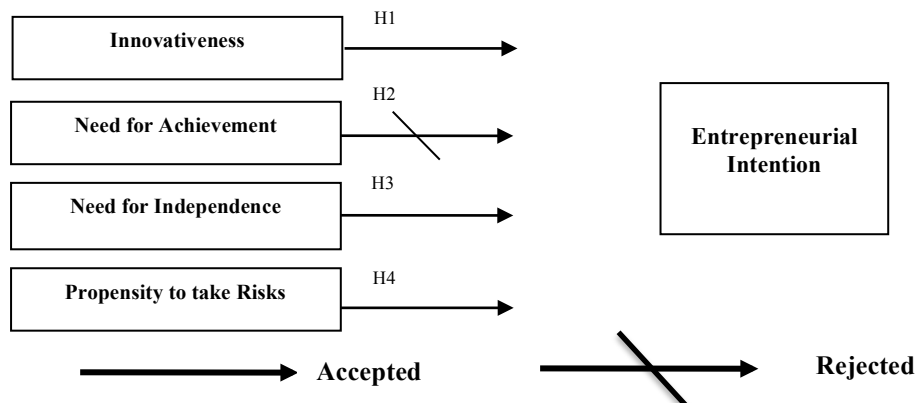
\*\*significant at the 0.01 level.

Multivariate regression analysis exhibited on Table 4 revealed that innovativeness, risk propensity and need for independence factor are impacting positively on the dependent variable, confirming the following hypotheses: H1, H3, H4. However, the need for achievement's effect on entrepreneurial intention is found insignificant rejecting H2 as depicted on Table 5.

**Table 05.** Hypotheses' Acceptances or Rejections

Hypothesis Statements	Status
H1: Innovativeness is positively related to entrepreneurial intention.	Accepted
H2: Need for achievement is positively related to entrepreneurial intention.	Rejected
H3: Need for independence is positively related to entrepreneurial intention.	Accepted
H4: Risk-taking propensity is positively related to entrepreneurial intention.	Accepted

After regression analysis findings, our empirically tested model of relations is shown below:



**Figure 01.** The Empirical model

## **5. Conclusion and Discussions**

### **5.1. Summary of the findings**

Engineers and engineering students in our sample self-reported higher levels of innovativeness and risk taking propensity. Their two other entrepreneurial characteristics and their entrepreneurial orientations were rather at moderate levels. As for the hypotheses about the drivers of this intention, on one hand all the entrepreneurial characteristics were found positively correlated to the entrepreneurial orientation; but on the other hand, regression analysis revealed that the effect of the need for achievement was overshadowed by the other characteristics' stronger effects and then became non-significant. Therefore, innovativeness, need for independence, and risk-taking propensity are found positively impacting on the intention of becoming an entrepreneur. A plausible explanation why the need for achievement is not among these confirmed drivers may be that the satisfaction of this need is also possible even without starting a risky venture. An engineer even with innovative ideas may still choose a secure professional career path where achievement means promotion not profit.

### **5.2. Managerial implications**

Managers should be continuously following their employees' personality characteristics and entrepreneurial tendencies that could affect their task performance and organizational commitment. Entrepreneurially oriented workers can both be assets and risks for the organization at the same time. They can foster on one hand innovation, calculated risk-taking, out of box thinking if directed properly. However, on the other hand, they may also quit at improper times in order to form their own start-ups and leave the company in critical situations. For these reasons, managers should be aware of their employee's both entrepreneurial characteristics and intentions. Those managers who try to avoid any risk related to losing their entrepreneurial assets should establish such an intrapreneurial climate where various kinds of support (Bulut and Alpkın, 2006) and benefit are provided to the innovative, courageous and independent-minded skilful employees to keep them committed to the organization.

### **5.3. Limitations and future research implications**

The paper tested the effects of only a limited number of personality traits as the drivers of the entrepreneurial intention. There are certainly several other well-established constructs or dimensions such as self-confidence, locus of control, extraversion, and openness to experience among others that can be linked to entrepreneurial intentions. Beside the survey method based on the self-reported evaluations of the respondents other sources of information could be tried to use i.e. observations or experiments about their risk taking, independence or innovation inclinations. More importantly longitudinal studies are also need to overcome simultaneity bias and confirm causal linkages. Survey is conducted on limited number of participants and there can be respondent bias as questionnaire is distributed via online form and all the questions were required to be answered. Another limitation is that this survey is conducted only on Turkish participants, therefore additional potential moderators can be tested in further studies such as national culture if it can be administrated in different countries and contexts.



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