

# Contemporary Economy



Contemporary Economy  
Electronic Scientific Journal  
<http://en.wspolczesnagospodarka.pl/>

Vol. 9 Issue 4 (2018) 71-86  
ISSN2082-677X  
DOI [10.26881/wg.2018.4.07](https://doi.org/10.26881/wg.2018.4.07)

## **FACTOR THAT IMPACTS ENTREPRENEURIAL INTENTION AMONG ENGINEERING STUDENTS: EVIDENCE FROM INDONESIA**

Hari Kurniawan; Fulgentius Danardana Murwani; Aniek Indrawati

### **Abstract**

Entrepreneurial Intention was intensively examined within the research on entrepreneurship, but the results were diverse. The research was mostly focused on a non-engineering student. The inspiration for this paper was provided by (Law & Breznik, 2017) and (Karabulut, 2016) and its main goal is to determine the factor that pushes undergraduate students towards success in business and allows them to develop their entrepreneurial intention. This research is intended to ascertain the impact of innovativeness (Innov) and need for achievement (Nach) on entrepreneurial intention based on attitude towards entrepreneurship show among vocational high-school students having an extended curriculum in engineering. The examined sample was composed of 338 students of vocational high school (SMK) in an Indonesian District offering some extended courses in engineering. The adopted research methodology was of descriptive and correlational nature, with a quantitative method and a path analysis utilizing Lisrel 9.30. It was found that the need for achievement (Nach) and innovativeness (Innov) exert some significant indirect influence on entrepreneurial intention based on the attitude towards entrepreneurship, while the need for achievement (Nach) has lower direct influence on entrepreneurial Intention.

**Keywords:** Entrepreneurial Intention, Innovativeness, Need for Achievement, Attitude toward Entrepreneurship, Engineering

**JEL Classification:** L63, L26, D91, E71, O35

### **Introduction**

At the end of 2017, the unemployment rate (TPT) in Indonesia reached 5.5%, with a number of the unemployed reaching 7.04 million. In the previous year, the ranks of the group of

unemployed was extended by 10,000 people \*. This may turn into a serious problem if no preventive measures are undertaken.

Among graduates of vocational high schools, those majoring in education constitute the highest percentage (11.41%) of the unemployed when compared to other faculties. Even though they study a less scientific and more artistic discipline, this should not stop them from being competitive on the job market. The major of engineering was selected for a discussion in this paper because it comprises a larger set of skills (Ter Weel, 2009). However, it turns out that not all of such students succeed in finding employment, and the reason for this are the limited employment opportunities. The government must develop a strategy to work out a solution to this problem. In addition, greater rate of unemployment will potentially impact the mental state of job seekers (Drydak, 2015; Weich & Lewis, 1998) and lead to poverty (Corcoran & Hill, 1980).

Entrepreneurship is one of the solutions to overcome the problem of unemployment (Faria, Cuestas, & Gil-Alana, 2009; Thurik, 2003). Entrepreneurship is a skill that develops early in an individual and can be used as a benchmark of a country's economic growth, at the same time having the effect of reducing unemployment (Thurik, 2003). Entrepreneurial intention tends to lead a person to develop their own business adopting their abilities in addition to accepting the risk that comes with it. Attitude is one of the predictors of whether a person has an entrepreneurial intention (Fishbein & Ajzen, 1975; Krueger, Reilly, & Carsrud, 2000; Wijaya, Kuncoro, & Yogyakarta, 2015). In the Theory of Planned Behavior (TPB), the crucial predictor deciding a person's entrepreneurial intention is the attitude to entrepreneurship itself. In other words, an individual's behavior can predict whether they have an entrepreneurial intention or not (Ozaralli & Rivenburgh, 2016).

With a set of qualities of an entrepreneur studied by researchers, there are two striking characteristics comprising innovativeness (Edwards-Schachter & Wallace, 2017). When we have Innovativeness traits we can also improve the marketing performance (Ferdinand, 2018). On the other hand, some parties use Entrepreneurial Innovativeness as the spearhead determinant of entrepreneurship matrix (Law & Breznik, 2017; Lian & Yen, 2017).

In general, there is common understanding in terms of the need for research on the same level of engineering students in the acquisition of intention to become an entrepreneur (Law & Breznik, 2017). An indispensable need for engineering students to understand entrepreneurship (Luryi et al., 2007), contribute and recognize the market in their entrepreneurial endeavors (Ferdinand, 2018), which will provide some solid experience in the world of entrepreneurship (Luryi et al., 2007; Mat, Maat, & Mohd, 2015). Moreover, in order to create a new venture for students or graduates, there is a need for more creativity in entrepreneurial concepts while developing product designs, creating prototypes, recognizing technology and market analysis for the products (Nelson and Byers, 2010).

There is a striking difference in attitude toward entrepreneurship between a technical student and non-technical student background (Mat et al., 2015). There is a sizable opportunity for technical students to acquire the attitude towards entrepreneurship because they were provided with some higher skills when it comes to other levels of education. However, it turns out they are not fully absorbed by the job market due to the narrowness of the job itself. This is one of the problems that needs solving when it comes unemployment (Thurik, 2003). In addition, existence of self-employment supports the emergence of such entrepreneurial activity and reduction in unemployment (Faria, Cuestas, & Mourelle, 2010).

The Vocational High School (SMK) has a total agency of 13.950 spread in Indonesia, with the total of 4.911.184 students\*. The field of technology is chosen by a larger number of

---

\* Indonesia Statistical Bureau, 2017

\* National High School Vocational data, 2018

students than any other major. It has approximately 1.633.251 students or 33.26% when it comes to all majors available in SMK in Indonesia. And finally, the field of technology and engineering have become one of the causes in this research that increase and decrease the rate of unemployed. From the description and problems above, the researcher is willing to find out and perform some research on the impact of Need for Achievement and Innovativeness on Entrepreneurial Intention through the attitude towards entrepreneurship among engineering students in Indonesia .

## **1. Entrepreneurial Intention**

A strong intention in entrepreneurship comes from the motivation (Azjen, 2005). Essentially, entrepreneurship is a spirit in innovating (Naymier & Schumpeter, 1913). Entrepreneurship is defined as risky behavior in the role of taking advantage and achieving self-reliance and self-control (Ozaralli & Rivenburgh, 2016). According to (Krueger et al., 2000) in (Uddin, 2012), entrepreneurship is a process of identifying opportunities emerging on the market in an effort to find sufficient resources and act to get opportunities and maximize profit. Entrepreneurship is also a dynamic process of change, vision, and creation (Mat et al., 2015). Having its own passion and strong desire to reach a certain objective is the primary meaning of intention (Ismail et al., 2009). If the intention is very strong, the innovation will be more intensive, which can contribute to entrepreneurship (Packham, Jones, Miller, Pickernell, & Thomas, 2010). Such an intention may arise from internal or external conditions applicable for a given person.

The relationship of one's own intention to entrepreneurship is quite close as intention will provide a strong desire to undertake some entrepreneurial activities (Souitaris, Zerbinati, & Al-Laham, 2007). From that definition, the entrepreneurial intention is an individual commitment in an effort to establish a new venture (Elfving, Brännback, & Carsrud, 2009; Krueger et al., 2000; Mat et al., 2015). Some individuals are deeply willing to set up a business. One indication in the identification of an individual's entrepreneurial intention of is the psychological aspect. Therefore, it needs to be taken into consideration in an effort to measure one's Entrepreneurial Intention (Ferreira, Raposo, Rodrigues, Dinis, & do Paço, 2012). Therefore, in this research, the concept of entrepreneurial intention comprises of someone's ability to make decisions in order to run a business or venture and their readiness to take risky actions.

## **2. Attitude towards entrepreneurship**

“Attitude is best described as an individual intention” (Wijaya, 2007). Establishing a person's intention depends on this person's attitude. This is because attitude is defined as a response of love or hate, good or bad to a particular object (Fukukawa, 2002). Attitude is a kind of evaluation, the personal feelings, either favorable or unfavorable, and the enduring tendency towards someone in terms of a particular object or idea. In other words, the attitude was a response (Arpaci, 2009). The response emerges when a person is faced with a situation or a stimulus that requires them to show any reaction by expressing a certain attitude - either good or bad. Based on the description above, it can be stated that attitude is a tendency learned to provide a response to a stimulus to an object in an either positive or negative way.

Attitudes and behaviors are very closely related. It is clear that behavior is preceded by some conscious decisions to act, and afterwards the attitudes contribute to shapinig further behavior (Ajzen, 1991). The behavior shaped by attitudes can be described here as cognitive

abilities that are planned. A relationship between attitude and behavior is reciprocal (Kaplan, 1996).

To explain a behavior, attitudes need to appear first which are afterwards mediated by intention. Entrepreneurship behavior is a function of attitudes towards values, benefits, entrepreneurial feasibility (Ajzen & Fishbein, 1977). Therefore, the entrepreneurship attitude refers to individuals who hold either positive or negative personal judgments in terms of becoming entrepreneurs through evaluative considerations (Fayolle & Liñán, 2014). According to the above, it can be concluded that the attitude of entrepreneurship is a mindset that arises due to the influence of internal and external factors supported by a cognitive ability in running a business.

When it comes to the field of entrepreneurship, some researchers have found that Personality Traits can be a predictor of entrepreneurial intentions (De Pillis & Reardon, 2007; İrengün & Arikboğa, 2015; Karabulut, 2016; Louw, van Eeden, Bosch, & Venter, 2003; L. Zhao & Jung, 2018). According to Frese (2009) in Karabulut (2016), certain dimensions of Personality Traits are necessary for achievement, the locus of control (self-efficacy), innovation, and risk-taking. In this research, in addition to the need for achievement variable (Karabulut, 2016), there is also an indicator of innovation presented as a determinant of entrepreneurial intention (Rauch & Frese, 2007).

### **3. Need for achievement**

The need for achievement (nach) is someone's aim that is a drive to success (Karabulut, 2016). McClelland in Larsen and Buss (2002) defines nach as an attempt to become better, to be successful and competent. Similar to another definition, it is explained that the need for achievement is a desire or willingness to do something better, to undertake a new business venture (Hansemark, 2003). Nach will provide a positive energy to act with confidence in existing circumstances.

According to McClelland (1961), someone with a stronger desire and higher ambitions will be successful (nach) as they will have more potential to become an entrepreneur (Karabulut, 2016). There are several studies that support and show significant effects of the need for achievement on entrepreneurial intentions (Dinis, do Paço, Ferreira, Raposo, & Gouveia Rodrigues, 2013; Hussain, Fareed, Abidan, Shahzad, & Nayab, 2014; Roberts, 1989).

### **4. Innovativeness**

In his research, innovation is one of the most important characteristics of an individual that becomes an entrepreneur (Dollinger, 2002). The main and critical component for an entrepreneur is determined by an innovation indicator (Cusumano, 2016; Law & Breznik, 2017). Innovativeness can be broken down into two categories: general innovations and specific innovation (Flynn and Goldsmith, 1993 Marcati, et al 2008).

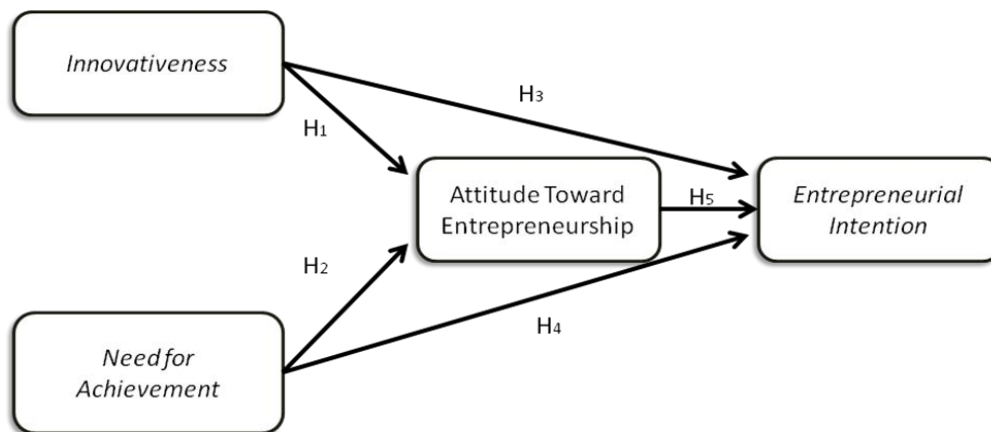
While adopting a theory of innovativeness, in general, it refers to conditions where a person is able to adopt, adapt and accept new ideas related to other personal members in a similar system, to create a new paradigm (Garcia & Calantone, 2002). In this research, the system is the willingness of entrepreneurship and the intention of entrepreneurship. It is suggested in other research that innovativeness has something to do with business and its mediation (Cusumano, 2016).

In addition, it is stated that one of the provisions of an entrepreneur is to be innovative and capable of turning ideas into business opportunities (Chaudhary, 2017). West and Farr (1990: 9) in Altinay et al. (2012) described innovation as an intention to introduce and apply new ideas,

processes, and products to new adoption units. What is more, innovation is a business innovation in every opportunity that there will be exploited through various paths in an effort to produce some innovative products and services (Altinay, Madanoglu, Daniele, & Lashley, 2012; Robinson, Stimpson, Huefner, & Hunt, 1991).

There was some research suggested to study some respondents who come from families with entrepreneurial background, with a purpose to find out if the innovation has any influence on the intention of running a new business (Altinay et al., 2012). That research was conducted and it proved some relationship between innovativeness and entrepreneurial intention (Chaudhary, 2017; Ferreira et al., 2012; Koh, 1995; Mueller & Thomas, 2001; Robinson et al., 1991; Yadav & Kashyap, 2017; Yar, Wennberg, & Berglund, 2008).

Based on the literature adopted in the above-mentioned research, it hypothetically examines the relationship between a research variable as conceptualized on Figure 1.



**Figure 1.** Conceptual Framework

Source: Author's own work

There are five hypotheses examined in this research: a relationship between Innovativeness and Attitude toward Entrepreneurship (H<sub>1</sub>), a relationship between Need for Achievement and Attitude towards Entrepreneurship (H<sub>2</sub>), a relationship between Innovativeness and Entrepreneurial Intention (H<sub>3</sub>), a relationship between Need for Achievement and Entrepreneurial Intention (H<sub>4</sub>), a relationship between Attitude towards Entrepreneurship and Entrepreneurial Intention (H<sub>5</sub>).

## 5. Innovativeness has a positive and significant effect on Attitude towards Entrepreneurship of an engineering student

The influence of Innovativeness and attitudes on students' entrepreneurial intention is obviously different for that in engineering and non-engineering students. (Law & Breznik, 2017). Broadly speaking, it is strongly agreed that this research focuses on engineering students compiling data which consider their interest in entrepreneurship (Law & Breznik, 2017). The engineering students need to understand entrepreneurship (Luryi et al., 2007) so they can contribute to and get to know the market. Furthermore, it also serves as an effort to comprehend the concept of entrepreneurship (Ferdinand, 2018), which will later provide some solid experience for those who are interested in the world of entrepreneurship (Luryi et al., 2007; Mat et al., 2015). Moreover, it will also trigger the student's creativity in analyzing the market for their products (Nelson and Byers, 2010).

There is a striking difference in the entrepreneurial attitude between engineering and non-engineering students (Mat et al., 2015). This is because vocational schools teach their students many more skills than any other level of education. However, it turns out that the students are not fully absorbed by the market due to the limited employment opportunities. For this problem to be solved, there is a need for the entrepreneurship to develop in order to overcome the problem of unemployment (Thurik, 2003). What is more, self-employment supports the emergence of these entrepreneurial activities and reduce the unemployment rate as a reciprocal effect (Faria et al., 2009).

## **6. Need for achievement has a significant effect on Attitude towards Entrepreneurship of an engineering student**

One of the personality traits necessary for achievement is the skill of predicting an entrepreneurial attitude. Previous researches have also proven that entrepreneurial attitudes can be determined from personality traits such as the need for achievement (Nishanta, 2009; Asmara and Djatmika, 2012; Ferreira, 2012; Marques et al 2012).

Personality Traits by Robbins pose a common characteristic which describes an individual's behavior (Judge, 2008). In this research, locus of control, need for achievement, risk tolerance, and entrepreneurial alertness are the dimensions of Personality Traits that cause a person to develop their Entrepreneurial Intention (Karabulut, 2016). The research by Iregun and Arikboga (2015), entitled "The Effect of Personality Traits on Social Entrepreneurial Intentions: A Field Research" shows that Personality Traits exert some positive and significant impact on the entrepreneurial intention of the.

According to McClelland (1961) in (Karabulut, 2016), people with good personality will be more confident, take more risks, also be more active in the environment and highly intentioned in particular steps taken to start a business. In the context of entrepreneurship, some researchers have found the contribution of Personality Traits as a predictor of entrepreneurial intentions (Karabulut, 2016, Ferdinira, 2012; Ozaralli, 2016; Susetyo and Lestari, 2014; Zhao, 2005; Ertuna and Gurel, 2011).

## **7. Innovativeness has a positive and significant effect on Entrepreneurial Intention of an engineering student**

It can be concluded that there are some significant results linking higher level of Innovativeness and individual potency to become entrepreneurs. This can be confirmed by a second hypothesis supported by some previous research (Altinay et al. 2012; Gurel et al. 2010; Gürol & Atsan 2006; Koh 1996; Yadav and Kashyap, 2017). It is weak in previous studies showing the lack of significance of Innovativeness variables in Entrepreneurial Intention (Ferreira et al. 2012). However, Mueller (2011) stated that determination of students personality will contribute to their entrepreneurial intention.

The difference between the current research and existing literature is that in we do not see more Entrepreneurial Intention in Innovativeness, but we see a lot in the direction of every possibility that Entrepreneurial Intention will arise when there is a program or training planned. Other sources also provide that Entrepreneurial Intention has numerous variables that generate impact, such as TPB, Attitude and personality traits. The research in the field of engineering also found out that the learning entrepreneurship variable serves as the main determinant of entrepreneurial intention. However, there are some who devoted their research to Entrepreneurial Intention based on the "keep being innovative" principle. Lingelbach et al. (2005) argue that entrepreneurs are focused on the market and its center in development of

cities. Thus, there is a need for a high level of innovation when it comes to market growth. This means that - in developing countries - especially the engineering students with their creativity must come up with Innovativeness and show their role in the country's economy. This also means that further research is needed in terms of Innovativeness in developing countries by establishing some favorable programs for future entrepreneurs.

In addition to that, Innovativeness is a business innovation in every opportunity that will be taken thorough various paths in the struggle to produce some innovative products and services (Altinay, Madanoglu, Daniele, & Lashley, 2012; Robinson, Stimpson, Huefner, & Hunt, 1991).

## **8. Need for achievement has no significant effect on Entrepreneurial Intention of an engineering student**

Indarti et al. (2016) claimed that the need for achievement exerts less influence on one's Entrepreneurial Intention. A gap leads to some significant weaknesses in this research. It was also assumed in another study that that differences in the need for achievement did not have any significant influence on Entrepreneurial Intention (Schwarz and Khan, 2015). There are five factors - personality extraversion, agreeableness, and openness to experience, among others - which can have strong implications for entrepreneurial interest (Hussein and Aziz, 2017). Finally, the need for achievement and risk-taking propensity were not significant for the entrepreneurial inclination (Chaudhary, 2017).

## **9. Attitude towards Entrepreneurship has a positive and significant effect on Entrepreneurial Intention of an engineering student**

The first factor of intention formation is the attitude (Wijaya, 2007). Intention or intention in entrepreneurship is derived from the assumption that an individual has an attitude that refers to the extent to which a person has a favorable evaluation or not (Fishbein & Ajzen, 1975).

Previous research was focused on finding the influence of entrepreneurship attitude, expressed positive attitude and some significant impact on Entrepreneurial Intention (Yousaf, Shamim, Siddiqui, & Raina, 2015). There are also many other researchers who raise the issue of entrepreneurial attitudes affecting the Entrepreneurial Intention (Dahiru Muhammad, 2015; Ferreira et al., 2012; Hussain et al., 2014; Schwarz, Wdowiak, Almer-Jarz, & Breiteneker, 2009; Zampetakis, Kafetsios, Bouranta, Dewett, & Moustakis, 2009). Entrepreneurship attitudes are believed to be the factors that can affect the Entrepreneurial Intention because entrepreneurial attitudes make a person more reluctant to react effectively in their response to risks that need to be faced when running a business.

## **Method**

The data were collected from a sample of prospective engineering students in Lumajang (a part of an Indonesian district), especially in vocational high schools. The research was carried out in 14 public and private schools scattered in the region. The population in this study consists of 2771 students who came from 14 Vocational High Schools teaching Technology and Engineering in the Lumajang district. The sample was taken by proportionate random sampling with the total of 338 samples necessary this research and by a certain formula (Krejcie and Morgan, 1970). The population and collected sample are presented in Table 1.

**Table 1:** Research Population and Sample

No	Vocational High School Major	Population	Sample
1	Automotive Engineering	256	31
2	Electrical Engineering	716	87
3	Electronic Engineering	404	49
4	Wood Crafting Engineering	457	56
5	Networking Engineering	610	74
6	Audio Video Technology	328	40
Total		2771	338

Source: Researcher, 2018

A survey questionnaire considering innovativeness, the need for achievement, attitude towards entrepreneurship and entrepreneurial intention was based on the previous research.

Moreover, every questionnaire included certain demographic information to confirm the student data. At first, the data were collected from 30 students of a varied sample - in SMKN Tempursari. The aim of this was to avoid the problem of inaccuracy in every question. Afterwards, the questionnaire was extended to cover 14 schools. The research adopted a closed-questions questionnaire, where each question or statement was provided with alternative answers, and the respondents only needed to select one.

The Likert scale was adopted to carry out measurements and guarantee either positive or negative responses to a single statement (Rensis, L. 1932). The Likert scale is related to a statement about the attitude toward something (Kinnear in Umar, 2003). Thanks to the Likert Scale, the variables to be measured are reflected by several measurable indicators.

There was an instrument measuring the variables adapted, and there were some modifications introduced to every instrument measurement that were tested in previous research. One sample item adapted from Jackson Personality Inventory (1994) and AT Entrepreneurial Handbook (1981) to measure Innovation was "I often surprise people with my novel ideas" (Mueller & Thomas, 2001). The overall Loading Factor for this instrument is 0.82 meaning that the instrument is reliable. Another sample item adapted from Mhango (2006) which is used to measure the Need for Achievement is "I desire and pursue success." (Karabulut, 2016). Furthermore, Cronbach's alpha for this instrument is 0.807 meaning that it is reliable in measurements. Another sample item to measure the Attitude Towards Entrepreneurship is "Among various options, I would rather be an entrepreneur" (Shah, 2017). The Cronbach's alpha for this instrument is 0.881 meaning that the instrument is reliable for measurement. The last sample item to measure the Entrepreneurial Intention is "My professional goal is to become an entrepreneur" (Wang et al., 2017), and the Loading Factor for this instrument is 0.91, meaning that it is reliable for measurement and it can analyze and examine a hypothetical relationship between the variables as mentioned before. The researchers adopted the LISREL 9.3 software for Windows.

## Findings and discussion

The result of a path analysis with LISREL 9.3 for Windows from a standardized solution shows some exact data. Further explanations are presented in Table 2.

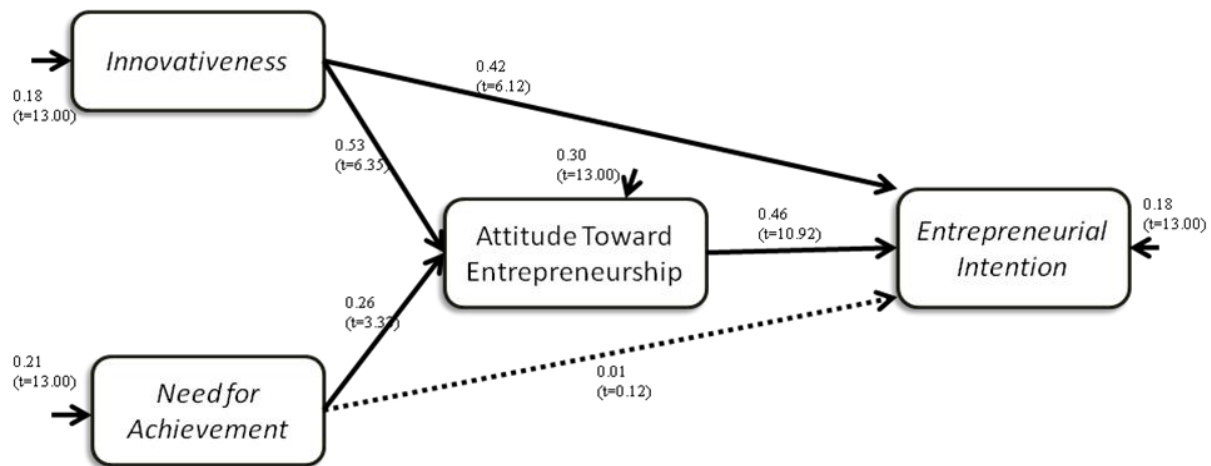
**Table 2:** The relationship among variables (Standardized solution)



No	Variables	Innovativeness (Gamma)	Need for Achievement (Gamma)	Attitude Towards Entrepreneurship (Beta)
1	Attitude Towards Entrepreneurship	0.53*	0.26*	--
2	Entrepreneurial Intention	0.42*	0.01* (Non Sig)	0.46*

\*) Significant at 0.05,

The relationship between all variables proved some significant effects, but the relationship between the need for achievement and the entrepreneurial intention is insignificant as shown by the dotted line in Figure 2.



Chi-Square=0.00, df=0, P-value=1.00000, RMSEA=0.000

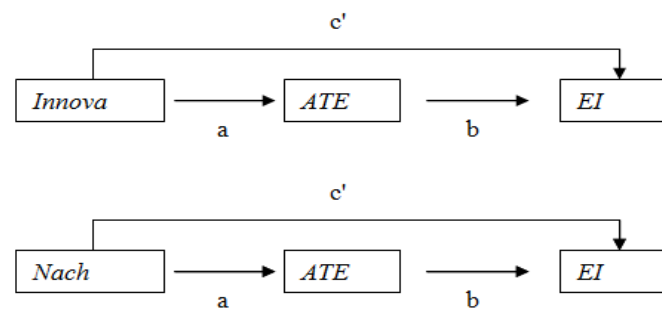
**Figure 2:** Research findings on the relationship between variables

The statistics show that the relationship between variables is definite as it presents some criteria with the following values: Chi-Square=0.00, df=0, P-value=1.00000, and RMSEA=0.000. This means that the model is suitable for use and it can examine the research hypothesis.

The innovativeness variables exert a direct positive effect on the Attitude towards Entrepreneurship in the case of students with a positive path coefficient of 0.53 and a significance value of 0.000 ( $\leq 0.05$ ). The Need for Achievement variable has a direct positive effect on Attitude towards Entrepreneurship when it comes to students with a positive path coefficient of 0.26 and the significance value of 0.040 ( $\leq 0.05$ ). The innovativeness variables have a direct positive effect on the Entrepreneurial Intention of students with a positive path coefficient of 0.42 and the significance value of 0.001 ( $\leq 0.05$ ). This means that the Need for Achievement variable which describes the individual's drive to succeed exert certain influence on the Attitude towards Entrepreneurship.

The Need for Achievement variable has a direct negative effect on Entrepreneurial Intention of students but it is *not significant*, with a positive path coefficient of 0.01 and the significance value of 0.089 ( $\leq 0.05$ ). This means that the Need for Achievement variable that describes the individual's drive to succeed does not affect the Entrepreneurial Intention of students in the major of engineering.

A mediation test is adopted to verify the causal chain hypothesis when one variable influences another variable and allows it to influence the third variable. There are 3 steps in a mediation test, where each of them is carried out as a regression process to observe the significance level of the researched coefficient (Baron and Kenny, 1986). This research examines two types of mediation, one for innovativeness and the other for the need for achievement.



**Figure 3:** Research Finding regarding Mediation among Variables

For mediation test results of Power and N, calculations for the Mediation which are derived from the David N Kenny website are as follows:

**Table 3:** Mediation block for Innovativeness

Effect	Beta	Partial r	Power	N
c (total)	0.664	0.664	virtually 1	338
a	0.53	0.53	virtually 1	338
b	0.46	0.522	virtually 1	338
c' (direct)	0.42	0.487	virtually 1	338
ab (indirect)	0.244		virtually 1	338

**Table 4:** Mediation block for Need for Achievement

Effect	Beta	Partial r	Power	N
c (total)	0.13	0.13	0.666	338
a	0.26	0.26	0.998	338
b	0.46	0.448	virtually 1	338
c' (direct)	0.01	0.011	0.055	338
ab (indirect)	0.12		0.998	338

These results can strengthen the hypothesis that normally mediates the Attitude towards entrepreneurship with an independent innovation variable, the need for achievement and the dependent variable, namely the Entrepreneurial Intention. In this case, the average power produced is virtually 1. Overall, the mediation test was successful to produce and analyze every path from the perspective of hypothetical research.

From the results of the mediation between Attitude towards entrepreneurship with independent variable (IV), the Innovation and the Need for Achievement adopt a dependent variable (DV) which is the Entrepreneurial Intention. It can be concluded that a standard error is 0.0437 and 0.03597 which is very low, so generally, the mediation of the Attitude towards entrepreneurship works and is better in mediating than in the case of previous innovation. Also in another mediation test, the Sobel test results from each mediation were 5.3507 and 3.2876 respectively, above the 5% standard Z value of 1.98. Thus, it can be ascertained that the mediation test is successful and can be adopted properly.

Hypothesis testing based on empirical findings concerning the research relationship between variables is presented in Table 5.

**Table 4: Hypothesis Testing**

No	Hypothesis	Empirical Results
1	Innovativeness has a positive and significant effect on Attitude towards Entrepreneurship in a technological student	Supported
2	Need for achievement has a significant effect on Attitude towards Entrepreneurship in a technological student	Supported
3	Innovativeness has a positive and significant effect on Entrepreneurial Intention in a technological student	Supported
4	Need for achievement has no significant effect on Entrepreneurial Intention in a technological student	Not Supported
5	Attitude toward Entrepreneurship has a positive and significant effect on Entrepreneurial Intention in a technological student	Supported

It can be seen in the Table that the Need for achievement has no significant effect on Entrepreneurial Intention of a technological student. The Need for achievement must be mediated first by the Attitude towards entrepreneurship, before it can be assumed to be the predicting variable of the entrepreneurial intention.

This result is also affected by the difference between socio-demographics background in Indonesia. This difference is sometimes the cause of the lack of significant results on some variables, specifically the need for achievement. In simple terms, Nishantha (2009) conducted some corroborating research that together with personality traits and social demographic factors, influence an individual's entrepreneurial interest. During the economic crisis, entrepreneurial intentions of students in Italy were affected by three socio-demographic factors, Demographic variables, Experiential variables, and Contextual support (Arrighetti et al., 2016). In other research on entrepreneurial intention conducted in Indonesia and Norway, it was concluded that Demographic factors had a positive effect on Entrepreneurial Intention (Kristiansen and Indarti, 2004). Marques et al. (2012) and Chaudhary (2017) stated that demographic factors were influential and significant for the Entrepreneurial Intention, in the same way as in the case of gender, age, school (education) and family background. Other empirical research states that Entrepreneurial intention is related to predictors of background demographics (Nishantha, 2009; Nga and Shamuganathan, 2010; şeşen and Basim, 2012; Marques, et al. , 2012; Nimalathan, et al., 2015; Chaudhary, 2017; Kurniawan and Sanjaya, 2017).

In this digital era, it is highly necessary to have creativity and innovation to become successful after graduation from high school. An entrepreneurial spirit in undertaking a new business must be known at an earliest stage possible as this will provide students with the best capital after graduation and prepare them to compete in the international arena.

## Conclusion

Certain conclusions can be drawn from the data analysis. First of all, the description of the innovation, the need for achievement, the attitude towards entrepreneurship variables and the entrepreneurial intention is intended to demonstrate the significance of entrepreneurship for technology students. There are numerous factors that affect students in reaching their entrepreneurial intention. This research found two sizable factors influencing the entrepreneurial intention among engineering students. First, the innovation exerts some direct and indirect impact on the entrepreneurial intention. Second, the Need for Achievement has indirect influence on the entrepreneurial intention through the attitude towards entrepreneurship but its direct impact on the Entrepreneurial intention of engineering students is lower.

In the technological era, the intention of entrepreneurship is mostly needed by engineering students as their creativity leads them to develop substantial innovations in order to win the market. This is also true for those majoring in social or non-engineering students. Last but not least, the engineering students could compete freely without any hesitation if they had the entrepreneurial intention.

## Limitation

This research is related to development of entrepreneurship within the area of entrepreneurship economics adopting a field survey. Since it is one of the first of such a kind, there were a lot of difficulties to overcome. Although the researcher stayed in Indonesia, we had to cover a considerable number of institutions or schools, thus there is a gap between our understanding and the understanding of the respondents. We chose questions from known questionnaires and surveys which were already tested multiple times, yet the respondents found those questions very difficult. This could be due to cultural differences, but the GEM consortium adopts the same questions in different questionnaires all over the world.

A low number of respondents hinders the results because they are now less robust. Furthermore, since some observations are dropped out and some variables are omitted, a significant issue arises since the output does not change by including or excluding those missing observations, only the complete models are listed in the paragraph concerning the results. Another statistical problem is that the joint significance for all models did not give a significant positive result, except for the restricted model of the control variables.

Future research needs to identify other variable that leads engineering students to have an intention in entrepreneurship. Engineering student intention in entrepreneurship was a common subject of previous research, but not in a developing country (Law & Breznik, 2017), and (Karabulut, 2016). This research has more than one variable by excluding the need for achievement like risk taking propensity and entrepreneurial alertness. We could bring this variable in order to identify other variables which can drive the entrepreneurial intention among engineering students in a developing country. The researchers suggest the need for further studies on this topic to have a thorough investigation regarding the best practices for educational institutions to reach the best government economy and decrease the unemployment in Indonesia.

## References

- Ajzen, I. (1991), The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)

- Ajzen, I., & Fishbein, M. (1977), Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84(5), 888–918. <https://doi.org/10.1037/0033-2909.84.5.888>
- Altınay, L., Madanoğlu, M., Daniele, R., & Lashley, C. (2012), The influence of family tradition and psychological traits on entrepreneurial intention. *International Journal of Hospitality Management*, 31(2), 489–499. <https://doi.org/10.1016/j.ijhm.2011.07.007>
- Arpaci, I. (2009), *Managing technological innovation process in the public organizations*. In *Proceedings of International Entrepreneurship Congress 2009: "SMEs and Entrepreneurship" October, 14-15-16, 2009*.
- Azjen, I. (2005), Attitudes, Personality & Behaviour. Retrieved from <https://psicoexperimental.files.wordpress.com/2011/03/ajzeni-2005-attitudes-personality-and-behaviour-2nd-ed-open-university-press.pdf>
- Chaudhary, R. (2017), Demographic factors, personality and entrepreneurial inclination: A study among Indian university students. *Education and Training*, 59(2), 171–187. <https://doi.org/10.1108/ET-02-2016-0024>
- Corcoran, M., & Hill, M. (1980), Unemployment and poverty. *The Social Service Review*, 54(3), 407–413. <https://doi.org/10.1086/643847>
- Cusumano, M. A. (2016), The puzzle of Japanese innovation and entrepreneurship. *Communications of the ACM*, 59(10), 18–20. <https://doi.org/10.1145/2988441>
- Dahiru Muhammad, A. (2015), Entrepreneurial Intention Among Nigerian University Students. *American Journal Of Business Education – Fourth Quarter*, 8(4), 23–25.
- De Pillis, E., & Reardon, K. K. (2007), The influence of personality traits and persuasive messages on entrepreneurial intention: A cross-cultural comparison. *Career Development International*, 12(4), 382–396. <https://doi.org/10.1108/13620430710756762>
- Dinis, A., do Paço, A., Ferreira, J., Raposo, M., & Gouveia Rodrigues, R. (2013), Psychological characteristics and entrepreneurial intentions among secondary students. *Education + Training*, 55(8/9), 763–780. <https://doi.org/10.1108/ET-06-2013-0085>
- Drydakis, N. (2015), Social Science & Medicine The effect of unemployment on self-reported health and mental health in Greece from 2008 to 2013 : A longitudinal study before and during the financial crisis. *Social Science & Medicine*, 128, 43–51. <https://doi.org/10.1016/j.socscimed.2014.12.025>
- Edwards-Schachter, M., & Wallace, M. L. (2017), ‘Shaken, but not stirred’: Sixty years of defining social innovation. *Technological Forecasting and Social Change*, 119(December), 64–79. <https://doi.org/10.1016/j.techfore.2017.03.012>
- Elfving, J., Brännback, M., & Carsrud, A. (2009), Understanding the Entrepreneurial Mind. <https://doi.org/10.1007/978-1-4419-0443-0>
- Faria, J. R., Cuestas, J. C., & Gil-Alana, L. A. (2009), Unemployment and entrepreneurship: A cyclical relation? *Economics Letters*, 105(3), 318–320. <https://doi.org/10.1016/j.econlet.2009.09.004>
- Faria, J. R., Cuestas, J. C., & Mourelle, E. (2010), Entrepreneurship and unemployment: A nonlinear bidirectional causality? *Economic Modelling*, 27(5), 1282–1291. <https://doi.org/10.1016/j.econmod.2010.01.022>
- Fayolle, A., & Liñán, F. (2014), The future of research on entrepreneurial intentions. *Journal of Business Research*, 67(5), 663–666. <https://doi.org/10.1016/j.jbusres.2013.11.024>
- Ferdinand, A. T. (2018), Salespeople ’ s innovativeness: a driver of sales performance. <https://doi.org/10.2478/mmcks-2018-0016.Introduction>
- Ferreira, J. J., Raposo, M. L., Rodrigues, R. G., Dinis, A., & do Paço, A. (2012), A model of entrepreneurial intention: An application of the psychological and behavioral approaches. *Journal of Small Business and Enterprise Development*, 19(3), 424–440. <https://doi.org/10.1108/14626001211250144>
- Fishbein, M., & Ajzen, I. (1975), Belief Attitude, Intention, and Behavior. An Introduction to Theory and Research. *Philosophy & Rhetoric*, 10(2), 130–132.
- Fukukawa, K. (2002), a Framework for Ethically Behavior Questionable Kyoko Fukukawa in Consumption. *Journal of Business Ethics*, 41(1/2), 99–119.
- Funder, D. C. (1991), Global Traits: A Neo-Allportian Approach to Personality. *Psychological*

- Science*, 2(1), 31–39. <https://doi.org/10.1111/j.1467-9280.1991.tb00093.x>
- Garcia, R., & Calantone, R. (2002), A critical look at technological innovation typology and innovativeness terminology: A literature review. *Journal of Product Innovation Management*, 19(2), 110–132. [https://doi.org/10.1016/S0737-6782\(01\)00132-1](https://doi.org/10.1016/S0737-6782(01)00132-1)
- Hansemark, O. C. (2003), Need for achievement, locus of control and the prediction of business start-ups: A longitudinal study. *Journal of Economic Psychology*, 24(3), 301–319. [https://doi.org/10.1016/S0167-4870\(02\)00188-5](https://doi.org/10.1016/S0167-4870(02)00188-5)
- Hussain, S., Fareed, Z., Abidan, Z. ul, Shahzad, F., & Nayab, H. H. (2014), An empirical investigation of entrepreneurial intentions among business students of Pakistan. *Studia Universitatis Babeş-Bolyai. Serie: Oeconomica*, 59(2), 68–80. Retrieved from <http://search.proquest.com/docview/1625336930?accountid=39066>
- Hwee Nga, J. K., & Shamuganathan, G. (2010), The influence of personality traits and demographic factors on social entrepreneurship start-up intentions. *Journal of Business Ethics*, 95(2), 259–282. <https://doi.org/10.1007/s10551-009-0358-8>
- İrengün, O., & Arikboğa, Ş. (2015), The Effect of Personality Traits on Social Entrepreneurial intentions: A Field Research. *Procedia - Social and Behavioral Sciences*, 195, 1186–1195. <https://doi.org/10.1016/j.sbspro.2015.06.172>
- Ismail, M., Khalid, S. A., Othman, M., Jusoff, H. K., Rahman, N. A., Kassim, K. M., & Zain, R. S. (2009), Entrepreneurial Intention among Malaysian Undergraduates. *International Journal of Business and Management*, 4(10), 54–60. <https://doi.org/10.5539/ijbm.v4n10p54>
- Kaplan, H. b. (1996), Self-Attitudes and Deviant Behavior: New Directions for Theory and Research. *American Behavioral Scientist*, 39(6), 676–683. <https://doi.org/10.1177/07399863870092005>
- Karabulut, A. T. (2016), Personality Traits on Entrepreneurial Intention. *Procedia - Social and Behavioral Sciences*, 229, 12–21. <https://doi.org/10.1016/j.sbspro.2016.07.109>
- Klotz, A. C., & Neubaum, D. O. (2016), Research on the Dark Side of Personality Traits in Entrepreneurship: Observations from an Organizational Behavior Perspective. *Entrepreneurship: Theory and Practice*, 40(1), 7–17. <https://doi.org/10.1111/etap.12214>
- Koh, H. C. (1995), Factors Associated With Entrepreneurial Inclination: an Empirical Study of Business Undergraduates in Hong Kong. *Journal of Small Business & Entrepreneurship*, 12(2), 29–41. <https://doi.org/10.1080/08276331.1995.10600487>
- Kristiansen, S., & Indarti, N. (2004), Entrepreneurial Intention Among Indonesian and Norwegian Students. *Journal of Enterprising Culture*, 12(01), 55–78. <https://doi.org/10.1142/S021849580400004X>
- Krueger, N. F., Reilly, M. D., & Carsrud, A. L. (2000), Competing models of entrepreneurial intentions. *Journal of Business Venturing*, 15(5), 411–432. [https://doi.org/10.1016/S0883-9026\(98\)00033-0](https://doi.org/10.1016/S0883-9026(98)00033-0)
- Law, K. M. Y., & Breznik, K. (2017), Impacts of innovativeness and attitude on entrepreneurial intention: among engineering and non-engineering students. *International Journal of Technology and Design Education*, 27(4), 683–700. <https://doi.org/10.1007/s10798-016-9373-0>
- Leutner, F., Ahmetoglu, G., Akhtar, R., & Chamorro-Premuzic, T. (2014), The relationship between the entrepreneurial personality and the Big Five personality traits. *Personality and Individual Differences*, 63, 58–63. <https://doi.org/10.1016/j.paid.2014.01.042>
- Lian, J. W., & Yen, D. C. (2017), Understanding the relationships between online entrepreneurs' personal innovativeness, risk-taking, and satisfaction: Comparison of pure-play and click-and-mortar. *Journal of Organizational Computing and Electronic Commerce*, 27(2), 135–151. <https://doi.org/10.1080/10919392.2017.1297650>
- Naymier, L. B., & Schumpeter, J. (1913), Theorie der Wirtschaftlichen Entwicklung. *The Economic Journal*, 23(89), 105. <https://doi.org/10.2307/2222219>
- Ozaralli, N., & Rivenburgh, N. K. (2016), Entrepreneurial intention: antecedents to entrepreneurial behavior in the U.S.A. and Turkey. *Journal of Global Entrepreneurship Research*, 6(1), 3. <https://doi.org/10.1186/s40497-016-0047-x>
- Packham, G., Jones, P., Miller, C., Pickernell, D., & Thomas, B. (2010), Attitudes towards entrepreneurship education: A comparative analysis. *Education + Training*, 52(8–9), 568–586. <https://doi.org/10.1108/00400911011088926>
- Rauch, A., & Frese, M. (2007), Let's put the person back into entrepreneurship research: A meta-

- analysis on the relationship between business owners' personality traits, business creation, and success. *European Journal of Work and Organizational Psychology*, 16(4), 353–385. <https://doi.org/10.1080/13594320701595438>
- Roberts, E. B. (1989), The personality and motivations of technological entrepreneurs. *Journal of Engineering and Technology Management*, 6(1), 5–23. [https://doi.org/10.1016/0923-4748\(89\)90012-X](https://doi.org/10.1016/0923-4748(89)90012-X)
- Robinson, P. B., Stimpson, D. V., Huefner, J. C., & Hunt, H. K. (1991), An Attitude Approach to the Prediction of Entrepreneurship. *Entrepreneurship Theory and Practice*, 15(4), 13–32. <https://doi.org/10.1177/104225879101500405>
- Sabiu, I. T., Abdullah, A., Amin, A., & Tahir, I. M. (2018), An empirical analysis of the need for achievement motivation in predicting entrepreneurial persistence in &lt;i>Bumiputra&lt;/i> entrepreneurs in Terengganu, Malaysia. *International Journal of Business and Globalisation*, 20(2), 190. <https://doi.org/10.1504/IJBG.2018.089867>
- Schwarz, E. J., Wdowiak, M. A., Almer-Jarz, D. A., & Breitenecker, R. J. (2009), The effects of attitudes and perceived environment conditions on students' entrepreneurial intent: An Austrian perspective. *Education and Training*, 51(4), 272–291. <https://doi.org/10.1108/00400910910964566>
- Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007), Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration, and resources. *Journal of Business Venturing*, 22(4), 566–591. <https://doi.org/10.1016/j.jbusvent.2006.05.002>
- Ter Weel, B. (2009), Review of The Race Between Education and Technology by Claudia Goldin and Lawrence F. Katz. *De Economist*, 157(3), 353–356. <https://doi.org/10.1007/s10645-009-9124-7>
- Thurik, R. (2003), Entrepreneurship and unemployment in the UK. *Scottish Journal of Political Economy*, 50(3), 264–290. <https://doi.org/10.1111/1467-9485.5003001>
- Weich, S., & Lewis, G. (1998), Poverty, unemployment, and common mental disorders: population based cohort study. *BMJ*, 317(7151), 115–119. <https://doi.org/10.1136/bmj.317.7151.115>
- Wijaya, T. (2007), Hubungan adversity intelligence dengan intensi berwirausaha (studi empiris pada Siswa SMKN 7 Yogyakarta). *Jurnal Manajemen Dan Kewirausahaan*, 9(2), 117–127. <https://doi.org/10.1007/978-1-1411-1-1438>
- Wijaya, T., Kuncoro, A. M., & Yogyakarta, U. N. (2015), Intensi Berwirausaha Mahasiswa : Perspektif Pengambilan Risiko. *Siasat Bisnis*, 19(2), 109–123. <https://doi.org/10.20885/jsb.vol19.iss2.art2>
- Yadav, A., & Kashyap, S. K. (2017), Socio-Economic, Personal and Psychological Characteristics Affecting Entrepreneurial Intention of Agricultural Students, 6(7), 2241–2246.
- Yar, D. H., Wennberg, W., & Berglund, H. (2008), Creativity in entrepreneurship education. *Journal of Small Business and Enterprise Development*, 15(2), 304–320. <https://doi.org/10.1108/14626000810871691>
- Yousaf, U., Shamim, A., Siddiqui, H., & Raina, M. (2015), Studying the influence of entrepreneurial attributes, subjective norms and perceived desirability on entrepreneurial intentions. *Journal of Entrepreneurship in Emerging Economies*, 7(1), 23–34. <https://doi.org/10.1108/JEEE-03-2014-0005>
- Zampetakis, L. A., Kafetsios, K., Bouranta, N., Dewett, T., & Moustakis, V. S. (2009), On the relationship between emotional intelligence and entrepreneurial attitudes and intentions. *International Journal of Entrepreneurial Behavior & Research*, 15(6), 595–618. <https://doi.org/10.1108/13552550910995452>
- Zhao, H., & Seibert, S. E. (2006), The big five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of Applied Psychology*, 91(2), 259–271. <https://doi.org/10.1037/0021-9010.91.2.259>

Kurniawan, Hari

Graduate School Universitas Negeri Malang

Jl. Semarang No.5, Sumber Sari, Kec. Lowokwaru, Kota Malang, Jawa Timur 65145

E-mail: [harikurniawan1985@gmail.com](mailto:harikurniawan1985@gmail.com)

Murwani, Fulgentius Danardana  
Faculty of Economics, Universitas Negeri Malang, Indonesia  
Jl. Semarang No.5, Sumbersari, Kec. Lowokwaru, Kota Malang, Jawa Timur 65145  
E-mail: f.danardana.fe@um.ac.id

Indrawati, Aniek  
Faculty of Economics, Universitas Negeri Malang, Indonesia  
Jl. Semarang No.5, Sumbersari, Kec. Lowokwaru, Kota Malang, Jawa Timur 65145  
E-mail: aniekindra@yahoo.co.id