

# ICT Self-Efficacy, Entrepreneurial Orientation and Technopreneurship Intention: A Single Mediated Model

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**Abstract---** *This study aims to analyse the effect of ICT self-efficacy on technopreneurship intention that is mediated by entrepreneurial orientation. ICT self-efficacy is measured through computer self-efficacy and internet self-efficacy. Technopreneurial intention is measured through desire, preference, plans, and behaviour expectancies indicators. Entrepreneurial orientation is measured through inovative, proactive, and take risks. The research method used was the explanatory survey method, with data collection techniques through a questionnaire distributed to the young generation of Indonesia in the West Java region of 261 people from a population of 750 people. Data analysis techniques used descriptive statistics, inferential statistics, and regression analysis. The results of the study show that ICT self-efficacy has a significant effect on technopreneurship intention and entrepreneurial orientation mediates the relationship between ICT self-efficacy and technopreneurship intention. These findings imply that to improve technopreneurship intention will be more effective by increasing ICT self-efficacy and entrepreneurial orientation.*

**Keywords---** *ICT Self-Efficacy, Entrepreneurial Orientation, Technopreneurship Intention.*

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## I. INTRODUCTION

Technopreneurship is considered important for the point of view of social development (Hoque, Awang, & Siddiqui, 2017) and technopreneurship can also be taken as a dynamic pathway for economic growth, competitiveness, and solutions from social interests (Linan, et al., 2005; European Commissions, 2003). Therefore, academics are aware of technopreneur, technopreneurship, and technopreneurial intentions among students (Hoque, Awang, & Siddiqui, 2017). The term technopreneurship as a technology-based company, technical company, or even a high-tech company to describe a new business that combines entrepreneurial skills and technology (Kakati, 2003; Oakey, 2003, Machmud, et al, 2019).

Technopreneurship has been considered as a way of life in order to overcome unemployment among graduates who have become a global problem (Hanapi & Nordin, 2014) so that graduates are encouraged to become a technopreneur. Technopreneurship intention creates a state of mind that directs and guides individual actions towards the development and application of new technology business concepts (Hoque, Awang, & Siddiqui, 2017). Business intention in business is a commitment to do a new business in the business world as a form of behavior (Job, Nasip, Fabeil, & Buncha, 2017). To start being a creative and effective entrepreneur is the main capital to be able to start a business (Nguyen, 2018).

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Self-efficacy factor becomes an important internal factor to foster technopreneurship intention. ICT self-efficacy simply refers to self-confidence or self-felt ability to do something (Koe, et al, 2018; Bandura, 2006). It is believed that individuals who have ICT self-efficacy can be explained as the ability that was felt previously in carrying out tasks related to computers and the internet (Fraillon, 2015). Thus, ICT self-efficacy consists of internet self-efficacy and computer self-efficacy (Papastergiou, 2010). Technopreneurship development requires intelligent, innovative, young, and intelligent individuals in the ICT field so that it is natural for technopreneur to have high ICT self-efficacy (Koe, et al, 2018). People who have a high level of ICT self-efficacy then the work intention for a technopreneur career is getting stronger (Oakey, 2003; Machmud, et al, 2020). Self-efficacy is suitable as a consequence of the combination of personality and environmental aspects and to be a convincing prognosticator of technopreneur intentions (Urban, 2010; Hoque, Awang, & Siddiqui, 2017). Another factor that can affect technopreneurship intention is entrepreneurial orientation (Herlinawati, et al, 2019).

Entrepreneurial orientation is a combination of skills between knowledge and awareness obtained by individuals that leads to actions to behave in entrepreneurship and actualization of new business ventures (Abubakar, Yakubu, & Shehu, 2019). Some researchers argue that entrepreneurial orientation must be assessed as forming patterns on individual perceptions (Robinson & Stubberud, 2014). It is important to assess its relationship with the entrepreneurial mindset, specifically in identifying components that are important in developing entrepreneurial behavior through education, training, and organizational intervention (Krueger & Sussan, 2017). Entrepreneurial orientation emphasizes dimensions such as innovation, proactivity, and risk taking (Koe, et al, 2018; Millers, 1983), and entrepreneurial orientation as a tendency to explore opportunities in new business (Bolton & Lane, 2012). Young entrepreneurs with a better entrepreneurial orientation will have better productivity and performance in business operations (Kumar, 2012). Thus, entrepreneurial orientation must be further investigated and entrepreneurial theory must support the study of technological entrepreneurship (Singhry, 2015).

Innovation is a willingness to introduce newness and something new through a process of experimentation and creativity that aims to develop new products and services and new processes. Proactivity is a characteristic of a forward-looking perspective that has a foresight to look for opportunities in anticipating future demand (Herlinawati, et al, 2019). Risk taking means daring to take risks, adjusting the risk profile and knowing the risks and benefits of a business (Vitale, Giglierano, & Miles, 2003; Olson, 2000; Lumpkin, 1996). With innovation, proactivity, and risk taking requires that individuals are able to exploit competitive advantage in the context of certain environments and entrepreneurship looking for competitive deity (Kuratko & Audretsch, 2009; Salisu, et al, 2017) because entrepreneurial orientation is a construct that integrates entrepreneurship and strategic management (Eshima, & Anderson, 2017; Montoya, Martins, & Ceballos, 2017).

Studies on the relationship between ICT self-efficacy, technopreneurship intention, and entrepreneurial orientation have been extensively studied (Martins & Perez, 2020; Koe, et al, 2020; Sahban & Syahchari, 2019; Koe, et al, 2018; Krueger & Sussan, 2017 ; Reijonen, et al, 2015; Gupta & Gupta, 2015; Koe, 2016; Singhry, 2015; Ibrahim & Lucky, 2014; Yurtkoru, Acar., & Safest, 2014; Krabel, 2013; Remeikiene, 2013; Bolton & Lane, 2013 2012; Kumar, 2012,

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Machmud, et al., 2019). Previous studies generally only explained two variables, not all of the variables had been jointly reviewed. For this reason, this study was conducted to analyze the effect of ICT self-efficacy on technopreneurship intention which is moderated by entrepreneurial orientation. This study is expected to be used as input for policy makers related to technopreneurship intention.

## II. METHODOLOGY

This study intends to:

1. Explain and analyze the relationship between ICT self-efficacy and technopreneurship intention.  
H1: There is a positive effect of ICT self-efficacy on technopreneurship intention.
2. Explain and analyze the relationship between ICT self-efficacy, entrepreneurial orientation, and technopreneurship intention.  
H2: Entrepreneurial orientation mediates the effect of ICT self-efficacy on technopreneurship intention.

### 1) *Sample*

The population of this research is undergraduate students of the Computer Science and Economic Education Study Program, Universitas Pendidikan Indonesia (UPI) of 750 students. Based on Slovin's calculations, the samples in this study were 261 students. Based on gender, there are 53% female students and 47% male students. Based on age dominated by 20 years by 31%, age 19 years by 30.3%, age 21 by 18.4%, age by 18 years by 13.4%, age by 22 years by 4.6%, age by 17 years 1, 15%, age 24 years 0.77%, while age 23 years 0.38%

### 2) *TOOL*

To measure the level of technopreneurship intention indicators used are referring to research (Handaru, et al., 2015), namely preferences, plans, desires, and behavior expectations. Measurement of ICT self-efficacy refers to research (Koe, et al, 2018) namely internet self-efficacy and computer self-efficacy. Measurement of entrepreneurial orientation uses indicators that refer to research models (Vitale, Giglierano, & Miles, 2003), namely innovation, proactive, and take risks. Data collection was performed using a questionnaire and then analyzed using descriptive statistics and inferential statistics. The data collected was analyzed with a 5-point Likert scale scoring system from strongly disagree (1) to strongly agree (5) to get interval data and given a score or value. The research instrument was tested through validity and reliability testing. Hypothesis testing is done by multiple regression moderate moderate regression analysis (MRA), with the research model as shown in Figure 1.

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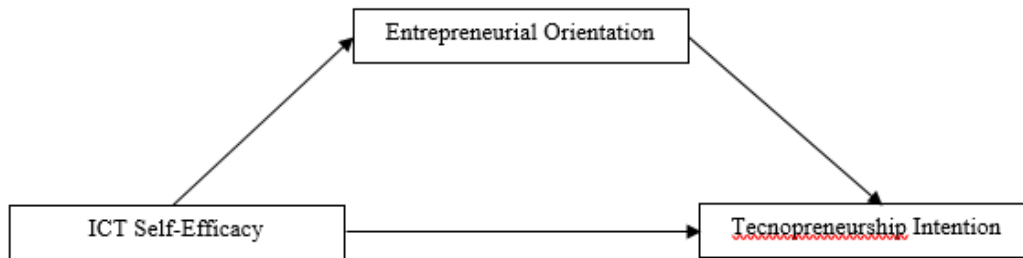


Figure 1 : Research Model

### III. RESULTS AND ANALYSIS

#### 1) An Overview of Technopreneurship Intention Level, ICT Self-Efficacy, and Entrepreneurial Orientation

The level of technopreneurship intention in this study is the dependent variable while ICT self-efficacy and entrepreneurial orientation are the dependent variable. The results were obtained based on the overall statement of technopreneurship intention consisting of 11 statements, ICT self-efficacy consisting of 10 statements and entrepreneurial orientation consisting of 9 statements. In detail, the score of each variable can be seen in Table 1

Table 1: Technopreneurship Intention Level Score, ICT Self-Efficacy, and Entrepreneurial Orientation

Total Items	Score					Total Score	Criteria
	Strongly Disagree	Disagree	Doubt	Agree	Strongly Agree		
Technopreneurship Intention Level Score							
11	38	410	2268	5096	3600	10802	Very High
ICT Self-Efficacy Level Score							
10	22	262	1965	4972	2795	10016	Very High
Entrepreneurial Orientation Level Score							
9	32	242	1839	4404	2410	8927	Very High

Based on Table 1 that the level of technopreneurship intention of students is in the very high category with a range of 10802. This very high category means that students have 1) desires ie high desire or desire to start a business, 2) preferences that are having high desire for businesses or businesses that independent, 3) plans namely high expectations and plans that exist in a person to start a business in the future, and 4) expectancies behavior that is a high likelihood review for entrepreneurship followed by a target for the start of a business venture.

The level of ICT self-efficacy of students is in the very high category with a range of 10016. This very high category means that students have 1) high self-confidence potential in the internet and computers, 2) high business success beliefs that were pioneered by the internet and computers, and 3) confidence persisted in high business with the internet and computers. The level of entrepreneurial orientation of students is in the very high category with a range of 8927. This very high category means students 1) innovating that is having a novelty of emphasis in research development, the ability to introduce new products, and changes in current products. 2) proactive, namely having a level of simplicity towards competitors, simplicity towards introducing new products, and the position of the overall entrepreneur. 3) risk

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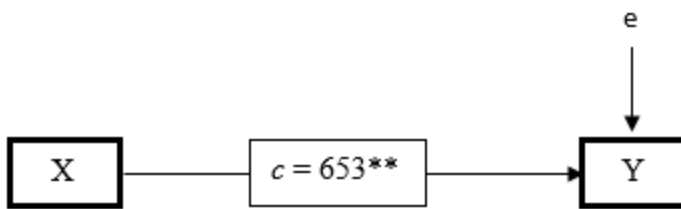
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taking is having a level of willingness to take risks, accepting uncertainty, and being able to explore potential opportunities.

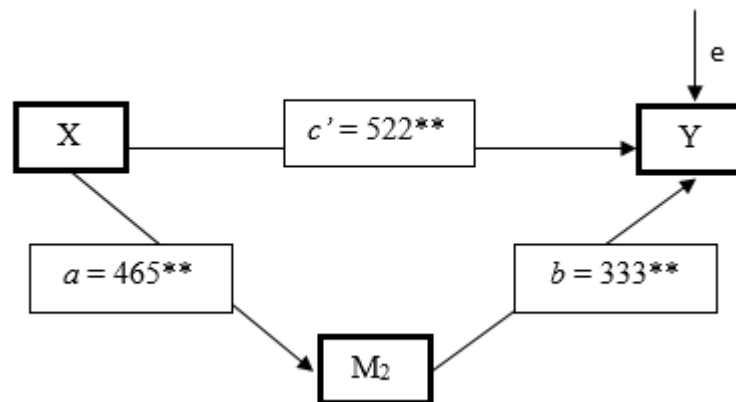
**2) MRA Statistical Test Results**

The test in this study is the validity and reliability testing obtained using the Microsoft Excel program in 2016. Based on the results it can be seen that all the validity test results  $r_{count} > r_{table}$  of 0.244 with  $\alpha = 0.05$  or 5%, then the conclusions can be drawn all statement items for The research variable was declared valid and was eligible to be used as a research instrument. Reliability test results that are worth more than the value of  $r_{table}$  (0.244) with  $\alpha 0.05$  means that all research variables are declared reliable so that all instruments contained in this study are trustworthy instruments.

Furthermore, the results of the multiple regression Moderate Regression Analysis (MRA) effect of ICT cell-efficacy on technopreneurship intention and ICT self-efficacy, technopreneurship intention and entrepreneurial orientation as mediation are shown in Figure 2, Figure 3, Table 3, and Table 4.



**Figure 2: The Direct Effect of ICT Self-Efficacy on Technopreneurship Intention**



**Figure 2: The Indirect Effect of Entrepreneurial Orientation between ICT Self-Efficacy on Technopreneurship Intention**

**Table 3: Regression Equation Results Effect of ICT Self-Efficacy on Technopreneurship Intention**

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Model	R	R <sup>2</sup>	B	Std. Error	Beta	(F) t	P
Model 1	0.637	0.405				(176.536)	
Constant			16.323	1.914		8.527	0.000
ICT Self-Efficacy (X)			0.653	0.049	0.637	13.287	0.000

Table 4: Results of Hierarchical Regression Effect of Entrepreneurial Orientation Mediation between ICT Self-Efficacy to Technopreneurship Intention

Model	R (p)	R <sup>2</sup> (Adjusted R <sup>2</sup> )	R <sup>2</sup> Change (p)	B	Std. Error	Beta	(F) t	P
Model 1	0.672 (0.000)	0.452 (0.448)	0.471 (0.000)				(106.312)	
Constant				11.148	0.149		5.188	0.000
X				0.506	0.057	0.493	8.902	0.000
M <sub>1</sub>				0.317	0.068	0.259	4.676	0.000
Model 2	0.694 (0.041)	0.483 (0.475)	0.492 (0.041)				(105.006)	
Constant				11.599	0.681		1.380	0.019
X				0.522	0.223	0.509	2.341	0.020
M <sub>1</sub>				0.333	0.232	0.273	1.434	0.023
X*M <sub>1</sub>				0.204	0.216	0.226	1.974	0.041

Based on Table 3 it can be seen that the regression equation

$$Y = 16,323 + 0.653X \quad (1)$$

Based on these equations it can be seen that

1. A constant of 16,323 states that when the ICT self-efficacy variable is 0, the students' technopreneurship intention is 16,323.
2. The regression coefficient for the ICT self-efficacy variable is 0.653 with a positive direction, meaning that every addition of the value of the ICT self-efficacy variable will cause an increase in the technopreneurship intention variable.

The coefficient of determination (R<sup>2</sup>) in this study is used to see the magnitude of the influence together with the exogenous variables in the analyzed model.

Based on Table 4, it can be seen that the calculation result R<sup>2</sup> is 0.405, meaning that the ICT self-efficacy variable influences the technopreneurship intention variable by 40.5% and the remaining 59.5% is influenced by other variables outside this study. Based on Table 4 it can be seen that the regression equation :

$$Y = 11,599 + 0.522X + 0.333M_2 + 0.204XM_2 \quad (2)$$

Based on these equations it can be seen that

1. A constant of 11,599 states that when the ICT self-efficacy variable is 0, students' technopreneurship intention is 11,599.
2. The regression coefficient for the ICT self-efficacy variable is 0.522 with a positive direction, meaning that each additional value of the ICT self-efficacy variable will cause an increase in the technopreneurship intention variable.

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3. The regression coefficient for the entrepreneurial orientation variable is 0.333 with a positive direction, meaning that every addition of the value of the entrepreneurial orientation variable will cause an increase in the variable technopreneurship intention.
4. Regression coefficient for mediating variables or interaction results between ICT self-efficacy and entrepreneurial orientation is 0.204 with a positive direction, meaning that every addition of the mediating variable value will cause an increase in the variable technopreneurship intention.

Based on Table 4 the information in this study can be obtained as follows:

1. Model 1 is a model without mediating variables while model 2 is a model after the interaction of mediating variables. The percentage of  $R^2$  in model 1 before the interaction is equal to 47%, the rest of 53% is influenced by other variables outside the model, while the percentage of  $R^2$  change in model 2 after the interaction variable is 49%, the remaining 51% is influenced by other variables outside the model with probability of 0.041. This result can be stated that model 2 is influential, meaning that model 2 is a model with the presence of interaction variables more effectively describing the phenomenon of Y compared to model 1.
2. Model 1 with variable X has a significant effect on Y because  $p < 0.05$  is 0.000  $< 0.05$  and variable M1 has a significant effect on Y because  $p < 0.05$  is 0.000  $< 0.05$ . Model 2 obtained information that after the interaction of mediating variables, the results obtained can be declared significant, which means mediating the relationship between X and Y because  $p < 0.05$  is  $p$  equal to 0.041. Therefore, it can be concluded that model 2 is better to be used in explaining the phenomenon of Y when compared to model 1 and the entrepreneurial orientation is suitable for mediating variables.

## IV. DISCUSSION

### 1) *Effect of ICT Self-Efficacy on Technopreneurship Intention*

Research findings indicate that ICT self-efficacy has a positive and significant effect on technopreneurship intention. Based on research (Hoque, Zainudin, & Siddiqui, 2017) that ICT self-efficacy influences technopreneurship intention. People with high levels of technopreneurial self-efficacy may also have strong work intentions for technopreneurial careers (Oakey, 2003). This is directly proportional to this study that ICT self-efficacy influences and has a positive relationship on technopreneurship intention, meaning that the higher the level of ICT self-efficacy, the higher the level of technopreneurship intention of students. Confidence in self potential can make students' intentions to choose technopreneur more open and believe that intention is the best predictor for the emergence of behavior.

Students with higher ICT self-efficacy tendencies to have better online information processing strategies so that they have a greater chance of success being technopreneur in computer and internet related tasks as capital (Papastergiou, 2010). Trust in ICT self-efficacy capabilities has a strong influence on its intention to build a new business (technopreneur) because with a high level of ICT self-efficacy encourages individuals to seek knowledge and ways to achieve goals. As a result, ICT self-efficacy becomes a key element of effective technopreneurial behavior by opening up attitudes and views on successful life for the future.

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The potential possessed in identifying several important types of ICT self-efficacy can be applied in developing an educational study plan. In particular, higher education institutions can use development models that are appropriate for programs related to ICT to attend trainings that can help students develop technology for entrepreneurship. Thus, higher education institutions can develop competitive ICT courses to help improve students' abilities and further develop technopreneur. As a result, developing technopreneurs can help transform the country from a conventional economy to an innovative, high-tech and knowledge-based economy. It can also help countries to deal with rapid changes in the era of the industrial revolution 4.0 (Koe, 2016).

## 2) *The Effect of Entrepreneurial Orientation Mediation between ICT Self-Efficacy on Technopreneurship*

Intention The research findings show that ICT self-efficacy has a positive and significant effect on technopreneurship intention and entrepreneurial orientation mediating the relationship between the two. Entrepreneurial orientation is positively related to technopreneurship intention, which means that the higher the level of entrepreneurial orientation, the higher the level of student technopreneurship intention. The basis of entrepreneurial orientation comes from Miller who emphasizes the dimensions of innovation, proactivity, and risk taking. Over the years, entrepreneurial orientation has been recognized as the first level construct that determines performance (Reijonen, et al, 2015; Gupta & Gupta, 2015). Based on this, the results of the study (Koe, 2016) revealed that it was important to assess its relationship with the entrepreneurial mindset, specifically identifying important components in developing entrepreneurial behavior through education, training and organizational intervention.

Entrepreneurial orientation can be considered as an entrepreneurial competency that can be learned through proper entrepreneurship education and using entrepreneurial orientation as a construct that affects technopreneurship intention (Koe, 2016). Entrepreneurship education is aimed at encouraging entrepreneurial behavior and mindset among individuals, nurturing individual entrepreneurs and creating new businesses (Keat, et al, 2011), so that entrepreneurship education is important in developing student entrepreneurship competencies.

The results of the study Kumar, 2012 have shown that young entrepreneurs with better entrepreneurial orientation will have better productivity and performance in business operations. This is because students have a planned orientation so that they will make every effort to achieve their business goals. According to entrepreneurial experts, the most important aspect of the entrepreneurial learning method is to instill an entrepreneurial orientation because this attitude can encourage a person to have the intention to be entrepreneurial and ultimately engage in entrepreneurial activities. Therefore, the outcome of technopreneurial learning is to develop entrepreneurial orientation of students to become technopreneur by increasing technopreneurship intention

Previous studies support this relationship such as (Sahban & Syahchari, 2019; Krabel, 2013; Bolton & Lane, 2012; Janssen & Yperen, 2004; Seibert & Crant, 2001) the higher the level of entrepreneurial orientation, the greater the desire of students to become entrepreneurs. This is precisely shown by some researchers that the desire to become an entrepreneur depends on the ability to take risks and the ability to be innovative and proactive towards business involvement (Remeikiene, 2013). Several factors are closely related to entrepreneurial orientation such as innovation, creativity, risk taking, proactivity.

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## V. CONCLUSION

Based on the results of data processing and analysis, it can be concluded that the level of ICT self-efficacy, entrepreneurial orientation, and technopreneurship intention are in the very high category. These findings indicate that the ICT self-efficacy hypothesis has a positive and significant effect on technopreneurship intention proved correct and entrepreneurial orientation is able to strengthen the relationship between the two. This shows that the level of ICT self-efficacy and entrepreneurial orientation will affect students' technopreneurship intentions better, so the ability of Science and Technology (Science and Technology) based on digital or technology must always be improved.

Based on the research findings, the authors provide recommendations, namely 1) for students, the need to hone the mindset and soft skills in entrepreneurship and participate in various activities or training to develop entrepreneurial knowledge, skills, and attitudes. 2) for tertiary institutions, using a contextual learning approach in entrepreneurial learning. Forming an institution that specifically functions to develop entrepreneurship for all students. 3) for the government, reviewing the development of activities related to entrepreneurial so that it can be adjusted accordingly and students are more eager to follow it. 4) for further researchers, researchers should add more variables that have not been studied in this study so that further research can solve the problem of technopreneurship intention or broaden respondents from various majors because this study is still limited to two majors in one university. It is necessary to do research on technopreneurship intention on entrepreneurial behavior with research subjects of college alumni.

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