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Embedding Entrepreneurs in Improving the Skills Of Entrepreneurs of Technology-Based Vocational School In Indonesia

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Abstract. This study aims to identify the characteristics of entrepreneurship/entrepreneurial potential-based technology, for in order to develop the traits of an entrepreneur-based technology in Indonesia in general and Surabaya in particular. This specification aims to: 1) determine the profile of the socio-demographic and entrepreneur of technology experts (technopreneur), technology developers and students; 5) determine the need for the skills of an entrepreneur-based technology; and 3) recommend actions that will improve the skills of technology-based entrepreneurship. This study is a small study, the type of this research is research and development with a quantitative approach, whereas the respondents as the following: taken random participants 5 technology developers, 5 entrepreneurs of technology-based, and the students 10 of the vocational school in Surabaya . A tool of descriptive statistics (i.e., count the frequency, tools and analysis cross-tabular) is used to analyze the data. Score the competence of the entrepreneur personally from the respondents was also determined. Analysis of variance (ANOVA) and analysis of T-test is further used to determine the significance of differences in average values between the nature of the Competence of the entrepreneur personal in between the groups of respondents are different. The results showed that the entrepreneurial technology-based and students are significantly different from the experts of today's technology in search of opportunities, risk-taking and self-confidence. The need for the development of entrepreneurship skill-based technopreneur. Shortcomings search of opportunity, self-confidence, risk taking, networking and negotiation and an essential characteristic of the Competence of the entrepreneur and another private between the developer and the students should be addressed by a special program and training program in the future and/or courses and programs were instituted in entrepreneurship. Components of the training and business/technical of the project can consider the traits that should be improved among developers and students; it becomes the need of the skills of the entrepreneur-based technology to the future. To develop the traits of the Competence of the Entrepreneur's Personal, competition, training and business seminars, investor forums, the exhibition and the exhibition of technology-based products and should be followed on a regular basis. These activities can be coordinated by the Ministry of Cooperatives and SMES, training centres and technology entrepreneur better it states or private. In addition, the activities of the clinic and assisting the business in coordination with the department of management and other related



1. Introduction

The growth of the Indonesian economy can be seen from the macro indicators, in the form of health, education, banking, labor, and industry in various sectors. The speed of economic recovery supported by a political agreement. The nation of Indonesia on the 5014 has not been able to become middle-income countries upper which have a lower limit of US\$ 4.086. This impact of the post-economic crisis of 1997/1998, the process of transformation to crawl slowly because the results of investment in human resources are still a low and physical investment in the form of construction of the means was abandoned (BPS. 2015).

Needed breakthroughs in particular in the education sector, one of which can be done is to add skill technopreneur or commonly called with entrepreneurs. This is considering the material on technopreneur, with the development of science is a science that can be learned and taught, so that each individual has had opportunities to perform as an entrepreneur (technopreneur). Even to be a successful entrepreneur, having talent alone is not enough, but also must have knowledge of all aspects of the business that will be practiced. An entrepreneur, must be able to the field : decisions, technical leadership, and the leadership, therefore, it needs adequate infrastructure, to be able to develop the business with the hopes of absorbing more labor in the future, so as to reduce unemployment that has become the dilemma of the nation at this time.

Skill technopreneur, when referring to a business expert, David Mc Clenland which is also quoted by Ciputra (2009) that one of the requirements of a country to achieve the level of prosperity required a minimum of as much as 5% of the amount of the population is technopreneur (entrepreneur). In addition, according to Darwanto (2015), the activities technopreneur leads to economic growth and help reduce poverty, create a middle class, and foster stability. It is in the interest of the government to implement the policy technopreneur and reap the benefits from its activities. When viewed the experience when the economic crisis of the great hit Indonesia 1998. Businesses that can survive are small and medium enterprises, they are able to survive, unlike most large companies who it turns out is more prone to crisis.

In the United States has been more advanced with the presence of institutions, Business and Industry Advisory Committee of the Organization for Economic Cooperation and Development, said in 2003, "policies to encourage technopreneurship is very important for job creation and economic growth". Government officials can provide incentives that encourage actors technopreneur to risk trying new ventures. Among these are laws to enforce property rights and to encourage a system of a competitive market.

In this study, researchers identified the characteristics of entrepreneurs that distinguish the entrepreneur with the entrepreneur potential of technology-based, to develop the traits of an entrepreneur-based technology in Indonesia. This specification aims to: 1) determine the profile of the socio-demographic and entrepreneur of technology experts, technology developers and students; 2) determine the need for the skills of an entrepreneur-based technology, and 3) recommend actions that will improve the skills of technology-based entrepreneurship. It is needed to identify the form of what is needed and right on target in order to develop technopreneur in Indonesia.

Technopreneurship is a synergy term that is formed from the words "technology" and "entrepreneurship" [7]. This involves venturing into high technology as related to technology. These developments have led to the increasing popularity of the concept of technopreneurship. The current nation of Indonesia has a difficult challenge and the narrowness of the existing jobs, then the education system-oriented technopreneur is not just an alternative, but can be considered as a necessity for every operator vocational education consider to attempt to apply it in accordance with situation and condition of each. In the long term, the implementation of the system of education-oriented technopreneur this really will lead to the mastery of science and technology as well the provision of skills for entrepreneurship by the participant students in vocational high school. This can be possible given the science and technology that is applied is that has been cultivated, occupied, and consistently developed until it can be said to be proven in the vocational and applied in the business world by vocational graduates.

This is in line with the Program of Revitalization of Vocational Education in the year 2016 Ministry of Education and Culture, which equip graduates with a range of skills that are more general,

namely life skills and a career, ability to learn and innovate, as well as proficiency utilizing information, media, and technology. Life skills and career (life and career skills) components, namely: (1) flexibility and adaptability, (2) have the initiative and can be self-regulating, (3) social interaction and inter-cultural, (4) productivity and accountability manage the project and produce the product, and (5) leadership and responsibility. Furthermore, skills in learning and innovation (learning and innovation skills) have the components: (1) think critically and resolve problems, (2) the ability to communicate and collaborate, and (3) creativity and innovation. Meanwhile, skills information media and technology (information media and technology skills) has the components (1) information literacy, (2) media literacy, and (3) literacy ICT. The debriefing skills of this kind are packaged with terms of Skills of the XXI Century (the 21st Century Skills).

The science of technopreneurship is the science one that can be Embedding/intensified in order to can be learned and taught more structured and well planned so that each individual has had opportunities to perform as an entrepreneur in the field of engineering (technopreneur). Even to be a successful entrepreneur, having talent alone is not enough, but also must have knowledge of all aspects of the business that will be practiced.

2. Methodology and Results

This research is a small (small research), the type of this research is the development /research and development (RnD), with a quantitative approach, while the respondents as follows: 5 taken randomly entrepreneurs based technology, 5 technology developers, and students of 10 vocational schools in Surabaya.

Tools of descriptive statistics (i.e., count the frequency, tools and analysis cross-tabular) is used to analyze the data. Score the competence of the entrepreneur personally from the respondents was also determined. Analysis of variance (ANOVA) and analysis of T-test is further used to determine the significance of differences in average values between the nature of the Competence of the entrepreneur personal in between the groups of respondents are different.

From the data obtained with descriptive research design is used to answer the research objectives of this study. Using a specially designed questionnaire, data related to socio-demographic, enterprise and entrepreneurship as well as Personal Entrepreneurial Competence profile of the following groups of respondents were collected: at this time, the developer of the technology, participants technopreneur, and vocational students. This questionnaire was developed by adapted from Management Systems International (MSI) and McBer and Company) (Diaz et al. (1997). Data were collected from September 2017. With the sample size for each group is as follows: the performer technology, perpetrators of technopreneurs and students a random Selection of vocational students, performed. the selection of majors of the students represented in the sample based on who is most likely to be involved in this research. vocational students the sample included 10 students from the department of skill in the Techniques of Cooling and Layout, as for the technology developers as much as 5 people, and 5 people actors technopreneur.

Participants technopreneur score is calculated after obtaining the respondents' scale ratings (i.e., 5 – Always; 4 – Usually; 3 – sometimes; 2 – Rarely and 1 – Never) to 55 brief statements. The score is calculated by adding the scores on related items and adding a constant (6) (Diaz, et. al., 1997). Last, analysis of variance (ANOVA) and T-test analysis performed in order to determine the level of significance of the difference of the average score of all between the various groups of respondents. Socio-demographic profile of current technopreneur 5 participants technopreneur when interviewed. There is a titled S3, S2, Diplomas and upper secondary school. In addition, one of the perpetrators of the technology is S1 (engineering), and the other is not complete. Half of the respondents were also full-time employees and the average number of children of respondents is five.

Table 1. Started Demografis Respond

Socio-Demographic Variable	Mode	Frequency Percentage		Me an
		(n=5)	(%)	
Age	60-69	1	20	
Gender	Male	3	60	
	Female	2	40	
Marital Status	Married	5	100	
Highest Educational Attainment	Ph.D.	1	20	
	M.S.	1	20	
	B.S.	1	20	
	High school	2	40	
Currently Employed	Yes	3	60	
Number of children	1-2	3	50	

Offender profiling technopreneur shows that the two people involved in services cooling as technopreneurs engaged in the sale of conditioners, installation, and maintenance, repair. The three claimed that technopreneurship is the same as entrepreneurship. The same number (5) argue that the former is not different from the last. 20% stated that they were not aware of technopreneurship. Half of the respondents are business (60%) have existed for not more than 5 years and requires an investment of initial capital of above IDR. 500,000. According to all respondents, the capital they obtained through their own initiative. Some of them had partners; government (service users) and private support (distributor), while only one of them rely on loans to set up business. Most of the respondents business (60%) serve the domestic market with a distribute until so far. One of the technopreneurs claimed that it caters its products to reach out Java. Techno-businesses that reported selling to other distributors (distributor of office equipment etc.), and direct customers.

Table 2. Profile of Entrepreneurial Technology Developers-Respondents

Variable	Category/ Mode	Frequency	
		(n=5)	%
Technologies	Saler	2	40
	Installation and maintenance	2	40
	Repair	1	20
Is technopreneurship Different from	Yes	5	100
Entrepreneurship?	No	3	60
Awareness of technopreneurship	Very much aware	4	80
	Not aware	1	20
Existence of business	1-5 years	2	40
	6-10years	2	40
	>10 years	1	20
Initial capital investment	< 50,000	0	0

	50,000- 500,000	1	20
	>500,000-5M	4	80
Financing means	Self-financed	5	100
Geographic Reach	Domestic	3	60
	International	2	40
Involvement in the developed of a technology	Yes	5	100
Sources of business ideas*	Technology developers	4	80
	Family members	1	20
Motivating Factors*	Commercial technology	1	20
	Technical background	4	80
Attendance in business training/ seminars	Yes	3	60
	No	2	40
Future Plan	Market expansion	5	100

*multiple responses were given

All of the respondents was involved in developing the technology. However, not all technology was commercialized into business. Those who previously engaged in developing technology that is more likely to utilize personally developed the new technology. However, they got support from science background which is owned/occupied period study. in the development of their own technology. Source-the source of business ideas is quoted 100% is the developer of the technology, who share information related to product development, market opportunities, and potential applications, and family members only 20%. Some people also mention that their children, who have some knowledge in business management, also shared with the additional knowledge of handling and operating the business. Frequently cited motivating factors behind them starting a business include 1) have a commercial technology (20%), and 2) have a technical background (80%). One added that he considers earning additional income as a motivation. Not all have been exposed to any seminar or training related to business management. The respondents (40%) stated that they did not attend the training or seminars about business management. The remaining 60% indicated that they had attended seminars sponsored by government agencies such as the Ministry of SMES and other private institutions. As for their future plans, all practicing technopreneur more concerned with the expansion of the market.

Table 3. Score between the current technopreneurs, technology developers, and students

Variable	Category/ Mode	Frequency (n=5)	%
Technologies	Saler	2	40
	Instullatoin and Mantainance	2	40
	Repair	1	20
Techopreneur	Yes	5	100
Different from Entrepreneurship	No Very Much	3	60
Awareness of Technopreneur	Aware	4	80
	No Aware	1	20
Exiantence Of Business	1-5 year	2	40
	6-10 year	2	40
	> 10 year	1	20
Initial Cpaital Invesment	< 50.000	0	0
	50.000-500.000	1	20
	> 500.000-5M	4	80
Financing Means	Self-financed	5	100
Geographic Reach	Domestic	3	60
	International	2	40
Inverment in the Development of Technology	Yes	5	100
Sources of Business Ideas	Technology developers	4	80
	Family	1	20
Motivating Factors	Comersial Technic	1	20
	Technical background	4	80
Attendance in Business Trainings/ Seminars	Yes	3	60
	No	2	40
Future Plan	Market expansion	5	100

* Multiple responses given

Analysis ANOVA conducted to determine whether there is a difference in the average scores of the Traits of the entire group. ANOVA run, all of the student-respondents were considered to be composed of one group, there is., From the first time it is run, the current technopreneurs, technology developers and groups of Students who differ significantly in terms of Any Chance ($\alpha = .000$) and confidence ($\alpha = .009$). In addition, there is a difference at 5% level of significance between the three groups in the aspect of Risk-taking ($\alpha = .024$) and Systematic Planning and Monitoring ($\alpha = .031$). On the other hand, separate into 2 groups under the student group that is running both also produce very significant differences in average scores across the four groups in the aspect of Opportunity ($\alpha = .001$). There are more significant differences (5% level of significance) among the 3 groups in terms of Risk-taking ($\alpha = .030$), Systematic Planning and Monitoring ($\alpha = .015$) and confidence ($\alpha = .016$). These findings imply that there is a need to further investigate between-group differences in the characteristics of opportunity search, risk-taking, systematic planning and monitoring, and self-confidence as this is the area where there seem to be substantial differences across groups. the results of the more in-depth analysis presented in the next section.

Table 4. Significant characteristics identified by ANOVA analysis.

PEC trait	Significance (3 groups)	Significance (4 groups)
Opportunity Seeking	.000***	.001***
Risk-Taking	.024**	.030**
Systematic Planning and Monitoring	.031**	.015**
Self-Confidence	.009***	0.016**

** significant at 5% level

*** significant at 1% level

After identifying the traits in which there is a significant difference across groups, T-test analysis between the person and each of the 3 other groups (i.e., Participants technopreneurs and Technology Developers; the Perpetrators of technopreneurs and students; and the Developer of the Technologists and Students) is done. This is to determine the specific where there is a significant difference between the technopreneur, who is considered to have important traits for technopreneurial success, and the potential technopreneur groups.

1. The perpetrators of technopreneurs and Technology Developers

Current technopreneurs were found to have significant differences ($\alpha = .006$) more than a technology developer in case of Any Opportunity. The former take Risks mean score was also found to be significantly different ($\alpha = .032$) than the latter group's mean score at the 5% level of significance. Any chance is related to creativity to identify new ways of doing things, new applications for existing technologies/products, new markets, etc. The technology developers' lose the Opportunity Looking for a score can be attributed to the technology developers have full - time workload and priorities is important that prevents them from becoming conscious and taking advantage of business opportunities.

Have the "employee mindset" and also as "the mindset of the researcher" and not the entrepreneurial mindset can also serve as a barrier to the technology developer-researchers seize the incredible opportunities of the business. This may also explain why they also did not rate high in the area of risk-taking. The technology developers also expressed that they are very concerned with possible losses in investment.

2. The perpetrators of Technopreneurs and Students

Based on T-test between the perpetrator of the technopreneurs and students, two groups that are very different in terms of Any Chance ($\alpha = .000$), Risk-taking ($\alpha = .007$) and Self-confidence ($\alpha = .003$) compared with the technopreneurs, students have a lower score in any Opportunity as students recognize that the opportunities, especially related to business are still not commonly encountered by them. Because they are more focused on learning, search and seize and act on business opportunities that have not been included in the list of their priorities. Risk-taking involves taking calculated risks while self-confidence means having a strong belief in one own's ability to complete a difficult task or meet a challenge. The student's age and limited work, life, networking, and risk-taking experiences that might explain them are being mean value in the two properties.

Table 5. A significant correlation between the traits of characteristics which identified with a T-test on the offender technopreneurs and the students.

PEC Trait	Mean Scores		Significance
	Current Technopreneurs	Students	
Opportunity seeking	19.8	16	.000***
Risk-taking	18.7	16.1	.007***
Self-confidence	19	16	.003***

** Significant at 5% level.

***Significant at 1% level.

3. Technology developers and Students

T-test is also conducted between the person and each sub-group within the groups of students as researchers desired to identify the "weak" traits from each sub-group. Consistent with previous results, both the technology developers and students who are found to be very significantly different from the practitioner-technopreneurs in terms of Opportunity of Any kind ($\alpha = .000$ for both groups). Both groups' Self-confidence and take Risks mean score was also found to be significantly different from that of the developer technology group average score. In the case of students, their Self-confidence and Risk-taking values are found to be very significantly different with $\alpha = .003$ and $\alpha = .008$, respectively. Last, a group of students when compared with current participants technopreneur found lower levels of persistence and systematic planning and monitoring at the 10% significance level).

Table 6. Significant traits of the characteristics identified by T-test between the developer technology and students.

PEC Trait	Mean Scores		Significance
	Current Technopreneurs	Students	
Opportunity seeking	19.8	16	.000***
Risk-taking	18.7	16.1	.007***
Self-confidence	19	16	.003***

***Significant at 1% level

From the result we can describes that students who need to improve their persistence and systematic planning and monitoring skills are quite unexpected. Perhaps, there is only the need to combine their exercise routine courses that will allow them to develop perseverance and also do more regular short- and long-term planning. All the traits identified in the T-test should be improved through specially designed activities in order to improve the business and the readiness of students to engage in technopreneurship.

3. Discussion, Conclusions, and Recommendations

It was found that quite a lot of current actors technopreneurs and technology developers was mature enough respectively. A number of them have S3. and Master's degrees in various basic and applied science. It is interesting to note that though people, especially people who previously connected, began to engage in entrepreneurship only after they retired or separated from the school. There are also just some of the technology developer-researchers are currently into entrepreneurship and this is not a technology-based business. Further, not one of the students was involved in any capacity in any business venture. These findings imply that there are tremendous opportunities for technopreneurship that is not utilized, given that most of the technology developers and students have the necessary educational background and technical expertise. These findings highlight the need to foster a culture of entrepreneurship among students in vocational high school. The view from one of the developers of the technology seem to reflect also why only a few are involved in technopreneurship - his view of entrepreneurship is that it is "the process of commercializing a technology, but should not get involved in venturing into any business." This view reflects the need to emphasize the concept of academic spin-off between the technology developers.

The results show that technology developers and students differ significantly from current technopreneurs in terms of opportunity, dare to take risks and believe in themselves. There is also an observed lack of networking and negotiation skills among the technology developers and students, and even among the current technopreneurs. Furthermore, in terms of persistence and systematic planning and monitoring. There is also an observed lack of networking and negotiation skills among the technology developers and students as well as among the current technopreneurs.

The lack of opportunities, self-confident, risk-taking, networking and negotiations and other important traits between the technology developers and students should be addressed and the project and the future of the branch training program and/or institutionalized courses and programs on entrepreneurship. Training and business/ technical assistance component of the project can be seen to emphasize the traits that should be improved between the technology developers and students.

To develop constituents' traits, business plan competitions, training and seminars, investor forums, exhibitions and fairs in the agri-based technology-based companies and products that should be routinely carried out and was followed by the students and participants technopreneur. Such activities can be coordinated by the government and private when need to create a one-stop center for technology commercialization. In addition, business clinics and mentoring activities have coordination with the related government.

It will also do well to have a separate training, which can then be spun-off to the formal students, undergraduate and postgraduate so that the specific needs of each group can be emphasized. Through training and courses, scientists and students will be exposed to opportunities in agribusiness technology, the basics of technology commercialization, the development of entrepreneurial competencies, and the basics of entrepreneurship – cash management, marketing, management system, etc. This will greatly enhance technopreneurship knowledge and skills of technology developers and students. There should be exercises in the training and courses that should be developed in the future will come.

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