

Entrepreneurship: Solution Industrial Revolution 4.0

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Abstract. The computerized era of manufacturing was considered the era of the industrial revolution 4.0. This phenomenon will change the way we deal with a mix of the online world and the world of industrial production where smart technology and real-time data will be used to increase productivity and reduce costs. In some researchers there is an impact on leading entirely to technology while for others there is a labor market disruption. The purpose of this research is to see how strategically carried out in the education sector in Indonesia is intensely handling the provision of knowledge about entrepreneurship in vocational high schools so that their attitudes, behavior and knowledge about entrepreneurship are formed. This study is a survey research and descriptive analysis of the presentation of data so as to provide information. Conclusion of this study is to see and the magnitude of new entrepreneurship opportunities through a number of strategic steps that must be undertaken so that more and more opportunities are expected to achieve optimal results.

Keywords: Industrial revolution 4.0, Entrepreneurship, Employment Crisis

1. Introduction

Used of technology in society today cannot be avoided, it has also greatly changed the way of life of a person from eating, sleeping, shopping, socializing, learning, playing, and most importantly, relating to the way a person works. Impact with technological change and its potential to effect work or more precisely on employment. There will be fear and reduced employment due to changes in the use of technology used in almost all human lives. This can be seen in periods marked by radical technological changes, namely the Industrial Revolution from the First, Second and Third stages (James Avis, 2018).

During the Industrial Revolution, first mark the use of water energy and steam energy for production machines. The Second Industrial Revolution uses electrical energy to make production machinery in general in the industry. Whereas in the third Industrial Revolution was marked by the use of electronic equipment as well as information technology by using industrial equipment automation and in the fourth Industrial revolution or known as Industrial Revolution 4.0, marked by the awakening of the digital revolution that had occurred since the middle of the last century. Another characteristic of the

period is the combination of technology so that there are almost no boundaries or obstacles between the physical, digital and biological fields. Industrial Revolution 4.0 is a form of computerization of manufacturing which is a sign of the fourth industrial revolution. This phenomenon will change the way we deal with a mix of the online world and the world of industrial production where high technology with the use of real-time data that is used to increase productivity and reduce efficiency is more effective in all respects, said Chancellor Angela Angela Merkel at the World Economic Forum in January 2015 (<http://vovworld.vn>) In addition to the positive impact gained by the existence of Industrial Revolution 4.0, the negative impact now occurs, one of which is the reduction in employment on the other hand graduates from the education world continue to occur so that the term educated unemployment and high competition occur. this is a serious problem that must be found the best solution so that the development of the world in the era of Industrial Revolution 4.0 gives great forgiveness to the Indonesian people.

For Indonesia this is a big challenge and is very valuable, for it to answer and solve existing problems, must change these problems into an opportunity to change for the better even superior in the future. By stepping to empower the abundant young generation also the use of technological advances that are now happening. For this reason, the Indonesian people need to prepare a generation of innovators to process the abundant diversity of natural resources into valuable goods / services, and create millions of new jobs. Especially for learning at the Vocational High School level, they must develop XXI Century skills to produce graduates who are "innovative, inventive, self-motivated and self-directed, creative problem solvers to confront the increasingly complex complex global problems" (Fadel, 2010 in Finita Dewi , 2015). At present, the condition of the Indonesian people when viewed from the number of unemployed, data from the National Statistics Agency (BPS) in August 2018, obtained a total of 131.01 million labor force in Indonesia, an increase of 2.95 million compared to August 2017, while when viewed from the background for graduates, vocational school graduates, as the biggest contributor to the number of unemployed people in Indonesia, which is as much as 11.24%, which is still not absorbed by the world of work and is included in the Open Unemployment Rate. this is a decrease compared to 2017 of 11.41%, compared to other levels of education from elementary school to university level.

The role of the education sector becomes very important and has a great opportunity to innovate and find a breakthrough to improve / improve the quality of Human Resources that will be able to compete both at home and abroad. One of the breakthroughs that can be made in the education sector and requires more serious handling is the provision of knowledge about entrepreneurship or commonly referred to as entrepreneurs in special vocational secondary education students, especially at the vocational level, this can also reduce unemployment. With the knowledge of entrepreneurship, graduates can be expected from the vocational education sector in particular not only as employees but also as new entrepreneurs who indirectly open jobs.

The science of entrepreneurship is a science that can be intensified to be learned and taught more structured and well planned, so that every individual has the opportunity to appear as an entrepreneur in the field of engineering (technopreneur). Even to become a successful entrepreneur, having talent is not enough, but also must have knowledge of all aspects of the business that he will pursue.

Description above there are 2 (two) major challenges that must be answered by the Indonesian people, namely: (1) the high unemployment rate, and (2) readiness to enter the Industrial Revolution 4.0 era, then there is no effective method, except increasing power nation's competitiveness in the sector of increasing human resources. This is to answer the low competitiveness of the workforce, which is caused by the low management capacity and also the low ability in the field of science and technology, which has implications for the low quality of human resources. For this reason, changes are needed

which is to improve human resources, namely in the field of education, which is one of the efforts to prepare quality human resources (Nurfaizal, 2014).

Context of increasing human resources, entrepreneurial education has been considered as one of the important factors to grow and develop passion, soul and entrepreneurial behavior among the younger generation. Regarding the influence of entrepreneurial education, an understanding of how to develop and encourage potential young entrepreneurs is needed while they are in school. Their attitudes, behavior and knowledge about entrepreneurs will shape their tendency to open new businesses in the future. In addition, the interests and desires of entrepreneurship of the younger generation are a source of future entrepreneurship. One of the solutions is to answer the world development in the era of Industrial Revolution 4.0. In entrepreneurship / entrepreneurship, the most need to be developed is the achievement motive. Tight competition demands strong will, and the ability to race against excellence.

Entrepreneurship, achievement, hard, excellence. In addition, the motives for affiliation also need to be considered, because entrepreneurs must be good at improving managerial skills, moving others as well as possible, which is based on relationships between people, managerial, and science and technology well-being.

Line with the existence of the Vocational Education Revitalization Program in 2016 the Ministry of Education and Culture, which provides graduates with a variety of more general skills, namely life skills and career, skills in learning and innovation, and skills in utilizing information, media and technology. Life and career skills (life and career skills) have components, namely: (1) flexibility and adaptability, (2) having initiative and being able to self-regulation, (3) social and inter-cultural interactions, (4) productivity and accountability in managing projects and producing products, and (5) leadership and responsibility. Furthermore, skills in learning and innovation have components: (1) critical thinking and problem solving, (2) skills to communicate and collaborate, and (3) creativity and innovation. Meanwhile, information and technology media skills (information media and technology skills) have components (1) information literacy, (2) media literacy, and (3) ICT literacy. The provision of such skills is packaged as 21st Century Skills (Ministry of Education and Culture, 2016).

Framework of life and career skills, the science of entrepreneurship is one of the sciences that can be intensified to be learned and taught more structured and well planned, so that each individual has the opportunity to appear as an entrepreneur in the field of engineering (technopreneur) Even to become a successful entrepreneur, having talent is not enough, but also must have knowledge of all aspects of the business that he will pursue. Sharmila Sandirasegarane (2016) in her research, most secondary schools focus on general academics with little emphasis on direct application of technical skills. vocational education training (VET) provides these practical skills, both when integrated into traditional curricula or through a separate vocational school system. However, the VET standard program does not provide practical basics in business or entrepreneurship, which are increasingly seen as valuable for improving livelihoods. In this study from the description above the problem that can be drawn is how strategic steps taken in the special education sector at the vocational level in Indonesia are intensely handling the provision of knowledge of technopreneur ?, to answer the challenges in the era of Industrial Revolution 4.0.

2. Methodology

This research is a survey research and uses descriptive analysis of the presentation of data so as to provide information. The research subjects were in order to support the topics discussed, researchers conducted a survey of the implementation of entrepreneurial / technopreneur programs in Vocational Schools in Surabaya and as a comparison survey researchers at Vocational Schools were used as a comparison. In formulating strategic steps on the application of technopreneurship in Vocational High Schools there are several required following data sets for the above requirements: 1) Primary data,

which includes (a) readiness of educational infrastructure (teachers, educational facilities and infrastructure); and (b) respondents' perceptions (management and teachers) of technopreneurship education programs at Vocational Schools; 2) Secondary data, which includes policy policies related to the implementation of technopreneurship education in vocational schools, learning materials for entrepreneurship learning materials and plans for developing vocational education systems.

3. Results and discussion

research that will be conducted, researchers have conducted a preliminary survey of the application of techopreneur in vocational high schools in Surabaya and Higher Education in Malang and in Surabaya, while the results of the preliminary survey can be seen in table 1 and table 2 below.

There are differences in regulations between state vocational schools and privately managed vocational schools also in vocational schools to get an overview of the implementation of entrepreneurial programs so far, which stands out is the limitation of rules found in public vocational schools is not allowed to accept and make cooperation / employment contracts with institutions outside of school, so that the work either in the form of goods or services cannot develop properly and cannot be assessed for their quality / standardization, also in selling their products limited to state vocational schools. Whereas if it is seen that the activities are not much different between state and private vocational schools, the only thing that distinguishes them is the ongoing activities, for private vocational schools can take place throughout the year while state vocational schools only when the program is disbursed, thus giving students limited training time at state vocational schools.

Topic	VOCATIONAL HIGH SCHOOLS Negeri 1 Surabaya	VOCATIONAL HIGH SCHOOLS Katholik St. Louis Surabaya
Techopreneur	Mini Market, waste recycling, software house, sound system / band	Mini market, production of manufacturing, electrical installation, software house, machine shop, engineering consulting company
Market sagment	Intern, especially for public mini markets and outlets only in schools	Free, even tend to get orders from outside the school and company
Legality	None - form a business center	Having an official business permit - so that you can get orders from outside with a system of work contracts with outside parties
Activity time	Year round	Year round
Strength and weekness	<ul style="list-style-type: none"> ✓ The function of learning media is limited. ✓ Not developing well with a restricted market. ✓ The results are utilized only on the manager 	<ul style="list-style-type: none"> ✓ The function of the learning media is wide open. ✓ Can provide additional income to the school. ✓ Can do work contract with parties to} 3

Table 1. Survey Results for Vocational High Schools

It is almost the same as in Vocational Schools, in state Vocational Schools in Malang, but in PENS-Surabaya there is a big difference with forming business entities in the form of cooperatives in the form of entrepreneurship programs in real terms. This is also the same as what happened at Universitas Petra Surabaya, only the difference is in the form of business that is truly real, so almost there are companies in the university who are capable and have extensive authority to accept and look for work outside, so that all can be managed independently by institutions and provide income that can ultimately benefit the university.

Topik	POLINEMA- Malang	PENS - Surabaya	Univ K. Petra Surabaya
Techpreneur	<ul style="list-style-type: none"> ✓ Canteen, Automotive light service, software house - no legal entity. ✓ Wages of the perpetrators do not exist because of the value of learning / training. 	<ul style="list-style-type: none"> ✓ Cooperatives that have Tenants / Business Units: Soft shop services, manufacturing / production equipment, consultants, trainings, mechatronics, telocommunication, tech games etc. ✓ Operasi Cooperatives carry out real production and services with staff / alumni who are paid according to employment rules. . 	Cafeteria, lodging for students and hotels, consulting services, manufacturing, training etc.
Market sagment	Intern, specifically the Public canteen is only located on campus	Free, even tend to get orders from outside and the company	Large, manage yourself and receive orders from outside

Table 2.a. Table of Research Survey Results Introduction to Higher Education

Topik	POLINEMA- Malang	PENS - Surabaya	Univ K. Petra Surabaya
Legality	<ul style="list-style-type: none"> ✓ TThere is an entrepreneur / Business Center incubator ✓ There is no legal entity] 	<ul style="list-style-type: none"> ✓ Having a legal entity: cooperative ✓ Having an official business permit - so that you can get orders from outside with a system of work contracts with outside parties 	<ul style="list-style-type: none"> ✓ There is an entrepreneur / Business Center incubator with units There is no legal entity if the contract is handled by the University directly]
Activity time	Year round	Year round	Year round
Strength and weekness	<ul style="list-style-type: none"> ✓ The function of learning media is limited. Not developing well with a restricted market. ✓ The results are utilized only on the manager. ✓ Only can be done while still a student. ✓ Continuing guidance is given to students but it is done informally and personally 	<ul style="list-style-type: none"> ✓ Teaching Study and business incubators function widely open learning media. ✓ Can provide significant additional income to the institution. ✓ Can do work contracts with third parties. 	<ul style="list-style-type: none"> ✓ Graduate Training Events. ✓ Increase the promotion of institutions as well as obtaining institutions. ✓ Train prospective entrepreneurs Can do work contracts with new third parties.

Tabel 2.b, Table of Research Survey Results Introduction to Higher Education

Currently in the 2013 curriculum, the revisions that are implemented in eye-class training and entrepreneurship vocational schools have included in the program of expertise. This is a step forward in the application of entrepreneurs in Vocational High Schools.

So as to formulate a strategic rare implementation of entrepreneurs / technopreneurship in Vocational Schools, as follows:

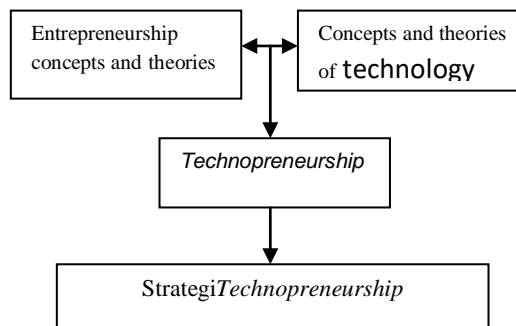


Figure 1. Strategic Thinking Framework for Technopreneurship Implementation

However, until now there are still some obstacles in the development of technopreneurship education. Among these are: 1) Lack of budget for presenting incubators as one of the vital infrastructures that must exist in the development of technopreneurship; 2) Lack of support from companies that are willing as partners in starting new businesses.

Teachers or lecturers who provide technopreneurship lectures are indeed many who do not have an entrepreneurial background, so it is necessary to provide lectures to the lecturers in the form of TOT (training of trainers) as well as cooperation with research institutions, employers and others.

4. Conclusions and Suggestions

Based on the results of the discussion above, conclusions can be drawn: Technopreneurship education has been developed and applied in vocational schools in Indonesia, both public and private need to be enriched with technological aspects, so that it becomes technopreneurship. Most of the Vocational Schools do not yet have adequate technopreneurship education facilities and infrastructure, both in the form of limited teaching quality and quantity and the incompetence of business incubators. Strategies to accelerate the adoption of technopreneurship education, national policies regarding technopreneurship are needed, especially those relating to the standards of technopreneurship curriculum content to increase the competence of teaching staff, establishment and strengthening of business incubators, and financing the development of technopreneurship. So that the Indonesian people were able to play an active role and be able to challenge the era of Industrial Revolution 4.0.

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