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STUDENT ENTREPRENEURIAL COMPETENCES IN INDUSTRIAL ERA 4.0: EVIDENCE IN INDONESIA HIGHER EDUCATION

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Endang Noerhartati^{1*}, **Yoyok Soesatyo**², **Moedjito**³, **Nunuk Hariyati**⁴, **Citrawati Jatiningrum**⁵ -- **Student Entrepreneurial Competences in Industrial Era 4.0: Evidence in Indonesia Higher Education -- Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(6). ISSN 1567-214x**
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Abstract:

This study investigates the entrepreneurial competence of students in the industrial era 4.0, by exploring several variables which driven to the student entrepreneurial success. These variables including entrepreneurship education, social support, achievement motivation, and entrepreneurial competence as a research model development that produces theoretical and practical implications. This research analysis method uses of quantitative analysis through statistical Structural Equation Modeling (SEM). The sample used was 392 student respondents from State Universities in Surabaya. The results showed that there was a significant effect of entrepreneurship education, social support and achievement motivation on entrepreneurial competence in the industrial era 4.0 although there was no influence of social support on entrepreneurial competence through entrepreneurship education. Additional evidence shows that achievement motivation has the greatest positive influence on the entrepreneurial competence of students in the industrial era 4.0. The results of the study become a contribution and reference references for the policy direction of the importance of entrepreneurship

education, as well as to encourage entrepreneurial educators and practitioners in increasing knowledge that can increase the achievement of student entrepreneurial competence in future.

INTRODUCTION

Entrepreneurial competence is one of the essential provisions for students to build jobs after graduating from college. These entrepreneurial competences hoped that they would be able to reduce the unemployment rate. Of course, this ability does not grow suddenly but needs to behave prepared in a planned and systematic manner. That is why the role of entrepreneurship education taught in higher education is very important in creating an entrepreneur. While in phenomena of rapid changes towards technological advances in the industrial era 4.0 students must have the ability to adapt to the demands of business and industry expertise. Among them have competence, are based on digital technology and have mastery of new literacy, namely: data literacy, technological literacy, and communication literacy today (Stancioiu, 2017). It means that education content has to line with and commensurate with the demands of the growing needs of the community. Entrepreneurial competence in the industrial era 4.0 must also have the ability to use digital technology, data literacy, communication and information technology today (Schwab, 2016). Entrepreneurial competence is one of the essential provisions for students to build jobs after graduating from college. These entrepreneurial competences hoped that they would be able to reduce the unemployment rate. Of course, this ability does not grow suddenly but needs to behave prepared in a planned and systematic manner. That is why the role of entrepreneurship education taught in higher education is very important in creating an entrepreneur. While in phenomena of rapid changes towards technological advances in the industrial era 4.0 students must have the ability to adapt to the demands of business and industry expertise. Among them have competence, are based on digital technology and have mastery of new literacy, there are data literacy, technological literacy, and communication literacy today (Nambisan, 2017). It means that education content has to line with and commensurate with the demands of the growing needs of the community. Entrepreneurial competence in the industrial era 4.0 must also have the ability to use digital technology, data literacy, communication and information technology today (Schwab, 2016). The rapidly changes in the era of technological affect the human relations. Changes that are quite rapid with the presence of technological developments then would changes of the patterns of human relations in all aspects, like social life, social form, economic, legal, political and cultural aspects as well as security. Therefore, the phase of change is then known as the Industrial Revolution 4.0, a general phase of automation and data exchange in factory technology, robotics and artificial intelligence.

Indriyani (2017) found that entrepreneurship education in universities has fostered entrepreneurial motivation. The entrepreneurial spirit and

knowledge contribute to the formation of entrepreneurial attitudes. The attitude formed encourages entrepreneurial intentions to start a business significantly (Widayat & Ni'matuzahroh, 2017). The entrepreneurship education model has integrated with the entrepreneurial ecosystem while it is the results in more start-ups (Wahid et al. 2019). Tran & Von Korflesch (2018) also gives empirically evidence that entrepreneurship education has related with social entrepreneurship intentions. Besides that, the knowledge competence of students and lecturers has proven significant in entrepreneurship education (Shnyreva & Panfilova, 2019). Other factors that are part of entrepreneurial activities has applied in families, communities, and educational institutions, which in turn become those that support the success of entrepreneurship education in higher education. It comes under a form of social support that can develop into emotional support, appreciation, instrumentation, and social networks (Wahid et al., 2018).

According to the discussion and several previously evidence documented that the entrepreneurial competence has a relationship with several variables. This paper proposes to investigate the supporting of entrepreneurship competence in Industrial Era 4.0 on higher education students by combining several determinant factors. Based on these reviews, researchers also interesting to take a deeper dive on the development and impact of entrepreneurship education, social support, and achievement motivation on entrepreneurial competence in the industrial era 4.0 State higher education or universities in Surabaya.

LITERATURE REVIEW

1. *Industrial Revolution 4.0*

The development of information and technology that is increasingly fast cannot be avoided and is an important part of education and learning. Learning innovation 4.0 emphasizes mastery of learning methods, their application in the classroom, and their development in learning, all of which must take advantage of all existing potential, including mastery of technology and its application in learning through various methods, methods, and tricks, including: multimedia, internet, and creativity in finding new methods (Joenaity, 2019). Technological advances and the fast growing development of digital technology have changed the nature and scope of entrepreneurial activity (Nambisan, 2017; Davidsson & Recker, 2018).

Based on the description of the characteristics of Industrial Revolution 4.0, it can be emphasized that the indicators that can be used to measure entrepreneurship education are (1) Understanding knowledge of business / entrepreneurial opportunities, (2) Understanding knowledge of entrepreneurial planning, (3) Understanding entrepreneurial skills, (4) Understanding product and process planning product development, (5) Understanding the entrepreneurial concept of the industrial era 4.0, (6) Understanding the basics

of marketing, finance, organization, production, (7) Increasing entrepreneurial character. (Joenady, 2019 & Eriyatno et al. 2019)

2. *Social Support*

The social environment is the application of the concept of social norms (social norms) and subjective norms (Subjective Norms) to the theory of planned behavior, because in principle it has the same concept, namely the role of elements in the social environment community that correlates with one's behavior. In this case, subjective norms are defined as perceptions of what friends, family and society expect to carry out the suggested behavior Hockerts (2017). These supports make people believe that they have adequate and more feasible competency to pursue their career as entrepreneurs Liñán & Santos (2007). This perceived support has a significant impact on entrepreneurship as a career choice. In the condition of social entrepreneurship received social support or social connection from other people that have diverse backgrounds, it might improve their firm performance (Stam et al. 2014). Social support in the process of developing a business will be maximized in students developing business opportunities and can for (Marta et al. 2019; Kimura & Masykur: 2017). Indicators to measure social supports in this study are a form of attention ster self-confidence through the love given by parents., appreciation, and help are a form of social support, be it from parents, family, friends, and friends.

3. *Achievement Motivation*

Achievement motivation is an effort to achieve success and choose appropriate activities, arises when the role of confirmation influences the teaching and learning process, which occurs when students who learn can see that their efforts are bringing good results, as an impetus to achieve an achievement, also in achieving achievement. there is a need and desire for achievement. People who have high achievement motivation want to do better than others or will do a job better than before. An achievement is closely related to the expectations (expectation) formed through the learning process from the environment. Indicators that can be used to measure achievement motivation are as follows: (1) Performance boost; (2) Attitude to risk; (3) Self-confidence; (4) Responsibility; (5) Have high ambition, (6) Like to compete in a healthy manner, (7) to grow students' entrepreneurial spirit, and (8) Like to work hard. (Naude, 2008; Scheffer & Heckhausen, 2018)

4. *Entrepreneurial Competence*

Entrepreneurial competence is related to the ability to change something into something better. Thus an entrepreneur must remain based on his ability to implement management functions so that the business that is carried out can be successful. Entrepreneurial competence is an attitude, spirit and entrepreneurial ability to create something new, which is the ability to realize the aspirations of an independent life with a strong personality, entrepreneurial mentality. Competitive human resources in industry 4.0 can be achieved if the education

curriculum is designed so that the output is able to master new literacy (Aoun, 2017). There are: (1) Data literacy, namely the ability to read, analyze and utilize big data information in digital world; (2) technological literacy, namely understanding how machines work, technology applications (coding, artificial intelligence and engineering principles); and (3) Human literacy, humanities, communication and design. (Neumeyer et al. 2019; Nambisan, 2017)

Potential entrepreneurial competencies of students after completing entrepreneurship education. Social support from families starts from students before doing education at higher education, where students from childhood have been given examples and see firsthand the daily activities carried out by families and communities in their environment which ultimately can underlie the desire to be entrepreneurial and so that it will be embedded in the child. that everything starts from the importance of entrepreneurship Indicators that can be used to measure entrepreneurial competence in Industrial era 4.0 are as follows: (1) Knowing what kind of business to do; (2) Ability to make clear rules / guidelines; (3) Having a way of managing a business; (4) Creativity; (5) emotional intelligence; (6) Critical thinking skills; (7) Competitive strategy / way of competing; (8) Ability to lead; (9) the ability to plan, organize, direct, drive (motivate), and control human resources and production processes; (10) Information system literacy skills; (11) Data literacy skills; (12) Digital communication technology capabilities. (Chatton, 2017: Uno, 2006: Wang et al, 2016: Fayolle & Kyro, 2008).

RESEARCH METHOD

The research design was carried out by quantitative and descriptive methods. The research was intended to test the causality between the four variables studied, namely the variable entrepreneurship education in the industrial era 4.0, social support, achievement motivation, and entrepreneurial competence. Sources of data and research data were generated from a questionnaire given to students who took entrepreneurship education at 5 public universities in Surabaya. By calculating the Slovin’s formula, the sample size is 392 students. The pilot test was conducted first to determine the effectiveness of the questionnaire as a means of communication between researchers and respondents. The pilot test was carried out by involving 20 students as a pilot project. The following are the variables and variable definitions tested in this study:

Table 1 Variables and Definition variables

Variables	Definition	Related Literature
Entrepreneurial Education	Entrepreneurship education defined as intervention purposeful by an educator as part of the learner to help them survive in the business world	Zhao et al. (2005) Isaac et al. (2007) Eriyanto, (2019) Noerhartati et al (2019)
Social Support	Social support is very important because it helps individuals to achieve	Bornstein (1998), Hockerts, 2015) Marta

	results from certain social entrepreneurs. In identifying the feasibility of social entrepreneurs also consider the support of others including their family and friends	et al. (2019) Kimura & Masykur (2017)
Achievement Motivation	Achievement motivation is an effort to achieve success and choose appropriate activities, and arises when the role of confirmation influences the teaching and learning process, which occurs when students who learn can see that their efforts are bringing good results.	(Naud, 2008, Scheffer & Heckhausen, 2018, Uno, 2006).
Entrepreneurial Competence Industrial Era 4.0	Entrepreneurial competence is an attitude, spirit and entrepreneurial ability in forming new things, which is the ability to creating aspirations for an independent life with a strong personality, entrepreneurial mentality. Related with the Industry 4.0 is an era in the industrial world that combines digitalization with cyber technology. In industry 4.0, manufacturing technology has entered the trend of automation and data exchange.	(Chatton, 2017, Uno, 2006; Wang, et al, 2016; Fayolle & Kyro, 2008)

The figure for variables used in SEM analysis is presented as follows.

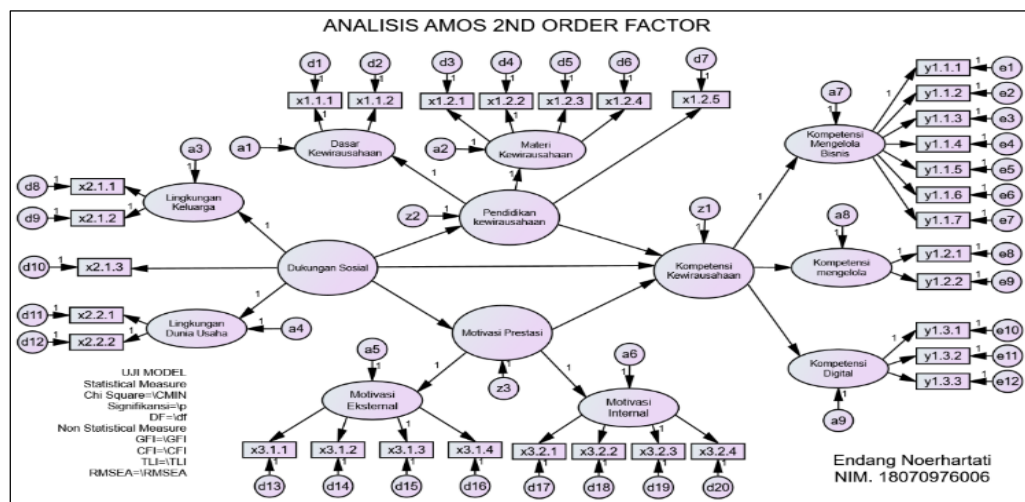


Figure 1 Variables for SEM Analysis

Analysis Method

The data analysis technique used is Structural Equation Modeling (SEM), with Moment of Structural Analysis (AMOS), which is a combination of factor analysis and path analysis. Factor analysis is to determine the validation and consistency of an instrument (measurement scale), while path analysis is used to see the relationship between variables, as well as to decide, calculate, assess, and compile a model or diagram to explain the hypothesized relationship between variables.

The variables used in SEM is presented in Figure 1, the research framework is divided into two groups of variables, there is exogenous variables consisting of entrepreneurial education (X1), social support (X2), and achievement motivation (X3), and the endogenous variable, namely entrepreneurial competence (Y1). Exogenous variables are independent variables that affect the dependent variable. In the SEM model, exogenous variables are indicated by arrows that originate from these variables towards endogenous variables. While the endogenous variable is the dependent variable caused by the independent variable (exogenous). In the SEM model, endogenous variables are indicated by a one-way arrow that points to these variables (Hair, 2014)

RESULT AND DISCUSSION

Respondents

Based on the gender of a total of 392 respondents, it was document that the frequency of male students was 194 people or 49.49% of respondents, while female students were 198 people or 50.51% of respondents. Complete data is presented in Table 2, below:

Tabel 2 Characteristics Gender of Student Respondents

Gender	Frequency	Percentage (%)
Male	194	49,49
Female	198	50,61
Total	392	100,00

This study determined as many as 4 variables with the number of observations were 392 students at 5 state higher education in Surabaya, so that the size of the sample adequacy used met the criteria in the SEM model. In addition, one of the assumptions that must be met in multivariate testing is data normality. The normality of the data can be shown by using the criterion critical ratio (CR) on skewness and kurtosis with the criteria that the value meets the interval of ± 2.58 . Univariate, it is shown that the results of the critical ratio (CR) are within the specified criteria interval so that the data is spread normally, as well as multivariate spread which is indicated by a CR

value of 1.812 and meets the data normality criteria interval. Examination of the outliers can be checked for the maximum Mahalanobis distance obtained based on the output of 48,868, so that the value does not exceed the chi-square table value. Because it has met the decision criteria, it is stated that there are no problems related to the multivariate outliers. With no indication of multivariate outliers being found, the data is sufficient to use so that all 392 respondents who were observed were not issued. The next stage of testing for multicollinearity and singularity can be determined from the very minimal (extremely small) determinant value of the covariance matrix. In this study, there were no indications of these two problems between the constituent constructs.

Measurement Test and Result of Hypothesis Test

Measuring the validity of an instrument shows the level of accuracy or validity of an instrument in measuring what should be measured (Maselena et al., 2019). Based on the results of validity testing, there are 3 indicators that result in invalid evaluations. Furthermore, reliability testing is used to verify the results of responses that have been collected from respondents whose questionnaires have been distributed to 5 state universities in Surabaya. If tested as a whole, the Cronbach's Alpha value is 0.753, which indicates that the value is greater than 0.60. It can be concluded that all remaining indicators are consistent if observed at different times on the same subject and can be relied on, so that they have good accuracy and precision when used as a measuring tool.

Table 3. Testing the Modification Model based on the Goodness-Of-Fit Criteria

Criteria	Cut off value	AMOS Result	Evaluation
χ^2 -chi square	$\leq \chi^2$ tabel (=389.3136)	1308,82 5	Not fit
Probability	$\geq 0,05$	0.000	
Cmin/DF	$\leq 2,00$	3.794	Marginal
RMSEA	$\leq 0,08$	0.085	Marginal
GFI	$\geq 0,90$	0.826	Marginal
AGFI	$\geq 0,90$	0.765	Marginal
TLI	$\geq 0,95$	0.844	Marginal
CFI	$\geq 0,95$	0.876	Marginal

Source: Result AMOS, 2020

Based on the result findings show that entrepreneurship education, social support, achievement motivation, and entrepreneurial competence have an important role for students in facing and taking advantage of opportunities that arise in the industrial era 4.0. The findings of the Structure Model are presented in Figure 2

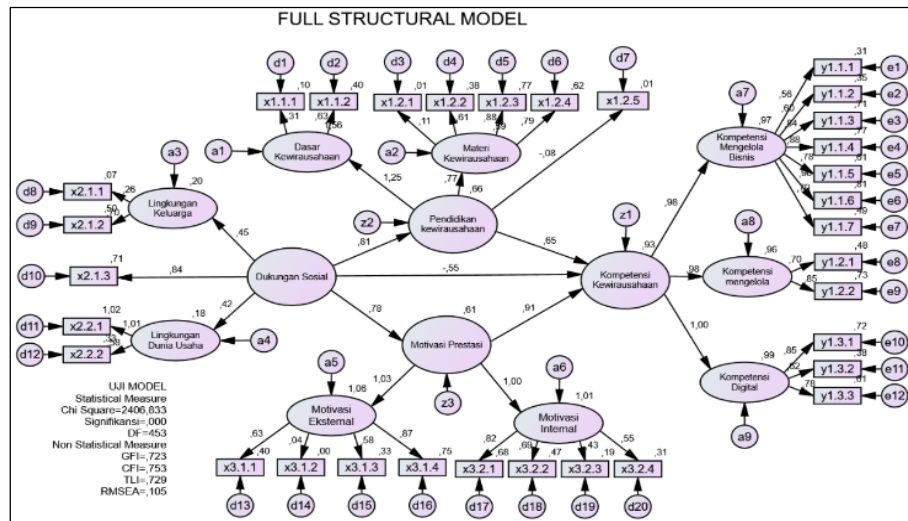


Figure 2 Result of Structure Model and Causality

The model justification that is compiled and developed is based on conceptual theory, then to show a better causal relationship the model is developed by accommodating empirical facts using observed data.

Table 4. The Result Test of Parameter Significance

Variables	Estimate	S.E.	C.R.	P
X1 <--- X2	1,111	,240	4,624	*** Significant
X3 <--- X2	1,204	,247	4,879	*** Significant
Y1 <--- X1	0,984	,190	5,173	*** Significant
Y1 <--- X2	-	,342	-	*** Significant
Y1 <--- X3	1,040	,127	8,201	*** Significant

Based on Table 4, the variable path coefficient of entrepreneurship education (EE) on entrepreneurial competence (EC) is shown to be 0.984. This means that there is a positive and significant influence of the PK variable on

entrepreneurial competence, meaning that if entrepreneurship education is developed the better it will increase the entrepreneurial competence of students by 0.984 times. In contrast to the social support (SS) variable, the social support variable path coefficient on entrepreneurial competence is -1,224. This means that there is a significant but not positive effect of the DS variable on entrepreneurial competence, meaning that if social support is getting better, it will not necessarily increase students' entrepreneurial competence, but makes it diminish and vice versa. On achievement motivation there is a positive and significant influence on EC, meaning that if the achievement motivation is getting better, it will increase the entrepreneurial competence of students by 1,040 times. Likewise, the social support variable for entrepreneurship education shows a positive and significant effect of the SS variable on EE, meaning that if social support gets better, student entrepreneurial education will also increase. The same is the case with the social support variable (DS) on achievement motivation (AM). This result consistent with Eriyatno et al. 2019 and Savitri (2019).

The role of achievement motivation (AM) in mediating the relationship between SS and EE is done by using the Sobel test. Based on the calculation of the Sobel test, the t-count is 5.558137 which is compared with the t-table or z-table at the 5% significance level of 1.96. That is, social support (DS) affects entrepreneurial competence (EE) through achievement motivation (AM). The research instrument used in describing the social support variable has adequately described the information in answering the temporary assumptions of the effect of entrepreneurship education on entrepreneurial competence. The aspect of social support developed in this study includes support from internal and external parties so that it is quite relevant if the hypothesis developed is in line with its theoretical development.

Furthermore, the role of entrepreneurship education (EE) in mediating the relationship between SS and EE is obtained that the t-count is 0.3799. That is, social support (DS) has no effect on entrepreneurial competence (EE) through entrepreneurship education (EE). In partial testing, social support has a significant effect on entrepreneurial competence, but when combined with the role of the mediating variable in entrepreneurship education, the indirect effect between social support and entrepreneurial competence is insignificant. It can be conclusively stated that in this study social support directly affects the improvement of student competence, but does not represent the same decision when it is examined indirectly through other variables. This could be due to the role of the mediating variable which raises limitations on aspects of entrepreneurship education in describing its constructs so that it has not been able to examine the information as a whole. The path coefficients on entrepreneurship education, social support, and achievement motivation for entrepreneurial competence are 0.984, -1.224, and 1.040, respectively. It can be seen that achievement motivation has the greatest positive influence on the entrepreneurial competence of students at state of higher education in Surabaya in the industrial era 4.0. That is, if the achievement motivation in a

person is built properly, it will increase the entrepreneurial competence of the student by 1,040 times

Discussion

In facing the competence of life in the industrial era 4.0, higher education are indirectly required to print and prepare human resources who are able to adapt to the challenges of the revolution, as well as create graduates who are competent, have character, are competitive, and contribute significantly to change. The implementation of entrepreneurship education in universities in Indonesia is carried out according to stages in a sustainable manner, as an entrepreneurship course that refers to competency standards. This aims to foster a culture of entrepreneurship in the university environment to encourage the growth of new entrepreneurs and encourage the use of research and development results into tools that can be used by the community and have commercial value (Wijaya, 2017; Pambudy et al 2017)

The results of the research study explain that social support has a significant effect on the development of student entrepreneurial competencies in the industrial era 4.0. This result consistent with Noerhartati et al (2019). By being in the right environment, students are motivated to become entrepreneurs because the surrounding social conditions provide encouragement and opportunities to pursue and dig up more information about the real business world. In addition, achievement motivation has a positive and significant effect on student entrepreneurial competence. Assessment of achievement motivation includes internal and external. The attitude of hard work based on respondents' perceptions states a high category, which in this case describes the high willingness of students to try entrepreneurship. The indicator of self-confidence is also the most important internal motivation factor in the sense of having a high level of sincerity to create a business. The findings on respondents' perceptions indicate that students have high confidence in entrepreneurship.

Lee & Lo, (2017) explain that motivation can strongly encourage studying the desire to reduce the difference between our real selves and others who have the same goal. So that motivation and entrepreneurial spirit are important elements in the development of entrepreneurial activities in this era (Ismail et al., 2016). To have good motivation, means to achieve better improvements are needed, especially in an environment that requires a lot of ideas and joint commitment. Staniewski & Awruk, (2019) also the achievements of successful entrepreneurs can refer to the fact of surviving in continuing to run a business and in the market. Motivation and an entrepreneurial spirit have proven to be important elements in the development of entrepreneurial activities recently (Ismail et al., 2016). Good motivation is needed as a means to achieve greater improvement, especially in an environment that requires a lot of ideas and joint commitment. According to Staniewski & Awruk, (2019) entrepreneurs who achieve success are in fact able to survive in continuing to run a business and in the market.

The influence of social support in fostering interest in entrepreneurship is very important, especially support from the closest people who have social intimacy. In social learning theory, it is described that individual attitudes which include feedback and causality between individual character traits, environmental conditions, and social behavior can create individual self-efficacy in running their business. Social support, especially families, will continue to encourage students to take entrepreneurship education, the family hopes that after graduating they will be able to create jobs according to their competencies and benefit the environment or the surrounding community.

Interest in something that is reflected through one's intention to do new things is something that is interesting to study psychologically. With the intention will encourage someone to approach and find out more about the attraction of an object. Achievement motivation can not only be absorbed by simply conveying a theory, but the more important thing to focus on is how to implement achievement motivation into each student so that the individual has a great drive to achieve success in determining his career. Therefore, if it is projected in the field of entrepreneurship, the role of learning through entrepreneurship education is expected to be compiled and designed through increasing variations in learning models and implementation (Wang et al. 2016) so that it has more appeal to students to explore this and is expected to increase the achievement of student entrepreneurial competence in the industrial era. 4.0.

Entrepreneurship education is focused on improving individual independence in entrepreneurship that is relevant to their skills. Efforts for several competencies must be implemented because entrepreneurship education is an important asset to equip students and create graduates who are ready to work according to their expertise (Noerhartati, 2018). The challenges that have become a necessity in the 4.0 era have been responded to by the government in an effort to improve the quality of human resources through education. Revitalization of entrepreneurship education is directed in the form of support which includes: 1) the learning process, which includes curriculum and character building, digital-based learning support, entrepreneurship, and evaluation assessments; 2) education unit which includes supporting facilities and infrastructure; 3) education component which includes the availability of teaching staff, competencies and capabilities, certification and training. All aspects of the necessary forms of expertise and skills in the 21st century must be integrated into the educational element through the development of entrepreneurial competencies.

CONCLUSION

The findings on this study concluded that entrepreneurship education, social support, and achievement motivation each have a significant influence on entrepreneurial competence in the industrial era 4.0. In addition, social support has a positive and significant impact on entrepreneurship education and

achievement motivation. Through achievement motivation, social support has a positive effect on entrepreneurial competence in the industrial era 4.0, but does not provide the same conclusions on entrepreneurial competence through entrepreneurship education. When identified, achievement motivation has the greatest positive influence on the entrepreneurial competence of students at state higher university Surabaya in the industrial era 4.0. That is, if the achievement motivation in a person is well built, it will increase the entrepreneurial competence of students. The results of this study have contributed to the scientific development of education management in general and in particular entrepreneurship management. In addition, to encourage entrepreneurial knowledge educators to improve learning models that can increase the achievement of student entrepreneurial competencies in the industrial era 4.0. Thus, real implementation can be achieved in the form of responsibility for the entire academic community of higher education, such as the role of students, lecturers, staff, employees, and administrative management in creating universities as centers of entrepreneurship. The results of this study have contributed to the scientific development of education management in general and in particular entrepreneurship management. In addition, to encourage entrepreneurial knowledge educators to improve learning models that can increase the achievement of student entrepreneurial competencies in the industrial era 4.0. Thus, real implementation can be achieved in the form of responsibility for the entire academic community of higher education, such as the role of students, lecturers, staff, employees, and administrative management in creating universities as centers of entrepreneurship.

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