THE EFFECT OF SCIENCE AND TECHNOLOGY AND QUALITY OF HUMAN RESOURCES ON THE PROCESSING OF HIGH ECONOMIC VALUE WATER HYACINTH IN LAKE TEMPE, WAJO REGENCY

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ABSTRACT
This study aims to analyze the influence of science and technology and the quality of human resources in the processing of high economic value water hyacinth in Lake Tempe, Wajo Regency. This research is a type of quantitative research with primary data collection. The sample used is the community around Lake Tempe with the age of 20-39 years, as many as 100 respondents. Data analysis is carried out through stages: collecting data through a questionnaire, and visiting the field directly in order to provide a clear picture of the problem under study. Testing the hypothesis of this study using multiple linear regression data analysis. Data were analyzed using SPSS 23 software. This study states that: (1) science and technology on water hyacinth is of high economic value, with increasing science and technology, economic value is increasing. (2) The quality of human resources has a positive and significant effect on water hyacinth with high economic value, with the increase in the quality of human resources, the economic value is increasing. (3) Simultaneously science and technology and human resources quality have a positive influence on high economic value, partially science and technology and human resources quality have positive effect on high economic value. (4) science and technology variable is more dominant influence on water hyacinth with high economic value.

Keywords: Science and Technology, HR human resources Quality, Water Hyacinth with High Economic Value

INTRODUCTION
The progress of a nation and state is determined by the development of education. Science, Technology and Art (IPTEKS) is a branch of science that must be mastered in realizing quality human resources. History shows that the progress of a nation is determined by the mastery of science, technology and art. Mastery of Science, Technology and Art is not possible to happen instantly but requires consistent and ongoing effort. One of the missions of the development of science and technology is to realize an intelligent and creative Indonesian society in a knowledge-based civilization society. The rapid development of science and technology has brought changes in all sectors of human life. Therefore, mastery of science and technology is a must for the Indonesian people in realizing quality human beings.

Science, technology and art of these three terms are very closely related and very needed in human life. Without science there will be no technology, without science technology is difficult to develop rapidly, both science and technology require a touch of art in its development. Science is used to know "what", while technology to know "how". Science as a body of knowledge, and technology as an art that interacts with science.
Technology is applied from science and gives birth to new knowledge. Humans are created with the most perfect form and form among other creatures, the advantages possessed by humans, especially in developing thinking and reason, cause humans to be able to develop their intellect so that the rapid development of science and technology. Humans in everyday life will not be separated from science, technology and art, because what is used by humans, such as clothes, household appliances, electronic devices are the result of the development of science that gave birth to technology that is in contact with the values of beauty (art). Thus, humans are born, live and grew up in synergy with the development of science, technology and art.

Science and technology provides practical benefits but science and technology will not be maximized without an increase in human resources, in the era of the second phase of long-term development (PJPTK) there has been a strong commitment from the State officials and the people of Indonesia to consistently improve the quality of Indonesian human resources. With all this shows that the quality of human resources is very much needed. However good the development program, but development goals and objectives may not be realized if the humans who carry out development are not of good quality. Discussion of human resources is a very important issue in human life, the good and bad of human life is very much determined by the quality of human resources, therefore the development of human resources is a major problem for the survival and development of an organization, because with resources that all organizations can be developed as optimal as possible for improving the quality of life in the present and the future.

Water hyacinth processing cannot be of high economic value without being supported by science and technology and human resources. Water hyacinth (Eichhornia crassipes) is one type of aquatic plants whose life floats on the surface of the water. Water hyacinths float in water and sometimes take root in the soil. Water hyacinth plants do not have stems but can reach 0.4-0.8 meters high. This plant has a single leaf that is oval in shape with the base of the leaf stalks bulging, smooth, and green. The flowers are classified as compound flowers, while the roots are fibrous root types (Nuryana, 2016). Water hyacinth is a type of aquatic weed that reproduces very quickly, both vegetatively and generatively. Water hyacinth (eichhornia crassipes) is an aquatic plant that has a high proliferation rate and floats freely on the surface of fresh water or can be anchored in mud. It grows on mats up to 2 meters thick which can reduce light and oxygen, change water chemistry, affect flora and fauna and cause a significant increase in water loss due to evapotranspiration. This also causes practical problems for sea transportation, fisheries, hydropower and irrigation schemes. It is now considered a serious threat to biodiversity (Oso, 1988).

The water hyacinth plant was first imported to Indonesia at the Bogor Botanical Gardens in 1894. Initially it was an ornamental plant that was loved because its purple flowers were very attractive as pool decoration such as Lotus (Aniek S. Harahap, et al, 2003; Aji Prasetyaningrum, 2010).

Now water hyacinth is a weed and damages the aquatic environment. Research says that in two months it can grow up to one square meter. To overcome the growth and spread of water hyacinth which is relatively massive, various methods are used so that these plants can be utilized as economic value products. These steps include utilizing water hyacinth as a raw material for making multiplex, bags, paper, compost, biogas, household furniture (meubelair), and various handicraft products. The rapid growth of water hyacinth can cause problems, especially in the aquatic environment. In the Wajo district, many water hyacinth plants are found in Tempe Lake. This weed grows rapidly and covers the lake area, causing lake siltation. This condition can result in reduced water reserves in the tempe lake area, which has the potential to cause drought and threaten the preservation of nature in the environment. In addition, the massive growth of water hyacinth also complicates fishing nets. Therefore,
strategic efforts need to be made to overcome the problems caused by water hyacinth weeds, one of which is by processing water hyacinth into a product of high economic value.

**LITERATURE REVIEW**

**Science and Technology (IPTEKS)**

Science and Technology (IPTEKS) is a branch of science that must be mastered in realizing quality human resources. History shows that the progress of a nation is determined by the mastery of science, technology and art. The mastery of Science, Technology and Art is not possible instantly but requires consistent and continuous effort. One of the missions of the development of science and technology is to realize an intelligent and creative Indonesian society in a knowledge-based civilization society.

Science Knowledge is knowledge of something that is spontaneous without knowing the ins and outs of it. The characteristic of knowledge is that there is no open denial of business on the basis of observation and examination. While science is knowledge that is methodical, systematic, and logical. Methodist means that the knowledge is obtained using detailed work methods, and predetermined; it can be deductive or inductive.

Systematic means that knowledge is an independent whole of things that are interconnected so that it can be accounted for. Logical means that propositions (statements) with one another have a rational relationship so that rational decisions can be drawn as well. This science, according to science expert Popper (1959), has the characteristic of being debatable (critizable and refutable) on the basis of observation and examination; the intention is open to be refuted even though it may persist. Knowledge is a systematic exploration to gain knowledge about all phenomena in the universe and systematic accumulation of that knowledge (Noor, 2011).

In the literature of technology there are various opinions which state that technology is the transformation (change of form) from nature, technology is the reality / reality obtained from the world of ideas, technology in the subjective sense is the whole equipment and procedures are perfected, to the statement that technology is everything, and everything is technology. Technology is the application of science to meet human needs and solve various problems for the sake of human welfare (Noor, 2011).

Art is something that can be seen from various perspectives relating to the work of copyright produced by the element of taste (Felix, 2012). Through an understanding of the arts, we can enjoy a work of art. Art philosophy is part of modern aesthetics whose studies explore the beauty that is presented in works of art (Hadiatno, 2016).

**Quality of Human Resources**

The quality of human resources must always be improved through training, development and fair compensation including various employee welfare facilities. The quality of human resources is the most important factor in the success of an organization, the higher the quality of human resources the better job performance will be generated. Good employee work performance will greatly facilitate a company or organization to achieve the desired goals (Afrizal, 2014: 5). Enough human resources have the ability to create and produce ideas, have creativity, take initiative, have the ability to solve problems, have insight into the future, skills and expertise are manifestations of potential and quality human beings, which must be possessed by the organization in order to realize the organizational goals that have been set.

According to Matutina, 2001: 205, the quality of human resources refers to: Knowledge is the ability possessed by employees who are more oriented to intelligence and power of thought and mastery of broad knowledge possessed by employees. Skills ability and operational technical mastery in certain fields owned by employees. Abilities are abilities that
are formed from a number of competencies possessed by an employee that includes loyalty, discipline, cooperation and responsibility.

**High Economic Value of Water hyacinth**

Water hyacinth (Eichornia crassipes) is a floating aquatic plant because it has thick leaves and bubbles (Rorong & Suryanto 2010) that reproduce very fast so that they are considered as plants that can damage the aquatic environment (Stefhani et al. 2013). Another negative assumption about water hyacinth is that the plant can be one of the causes of flooding. Water hyacinth is also often considered to be a nuisance plant, an eyesore and has no economic value or does not work (Mirawati 2007). In fact, the use of water hyacinth can produce a type of craft that has economic value, good, decent and can meet the needs of life (Hidayatullah 2011). Therefore, strategic efforts need to be made to overcome the problems caused by water hyacinth weeds, one of which is by processing water hyacinth into a product of high economic value.

The economic value is identified as a measurement of the maximum amount of other goods and services. Formally, this concept is called the willingness to pay for a person for goods and services produced by natural resources and the environment (Fauzi, 2004).

**RESEARCH METHODS**

The research method is a scientific way to obtain data with specific purposes and uses. The scientific way means that research activities are based on scientific characteristics, namely rational, empirical and systematic. Rational means that research activities are carried out in ways that make sense, so that they are affordable by human reasoning. Empirical means the ways that can be observed by the human senses, so that others can observe and know the methods used (Sugiyono, 2015). Sugiyono (2015:11) explain the quantitative method is: "Quantitative methods can be interpreted as a research method based on the philosophy of positivism, used to examine a population or a particular sample, data collection using research instruments, data analysis is quantitative / statistical, with the aim to testing the hypothesis that has been set ".

**Research Site and Time**

This research includes preparation, preliminary survey, data collection and information, the area which is the object of research is Lake Tempe which is located at S = 04 ° 06'11.6 "and E = 120 ° 0.1'12.3" with height place 19 meters above sea level (m asl) in Tempe District, Wajo Regency. Field studies and observations began on August 20, 2019. The instrument used in this study was the Global Position System (GPS) of stationery and cameras. The materials used in this study were questionnaires, notebooks and water hyacinth.

**Population and Sample**

In general, population is defined as all group members who have clearly defined characteristics, be they groups of people, objects, or events. Population according to Sugiyono (2006) is a generalization area consisting of: objects / subjects that have certain qualities and characteristics determined by researchers to be studied and then drawn conclusions. The population for the analysis of the influence of science and technology and the quality of human resources on water hyacinth with high economic value, is the population around Lake Tempe.

The ideal research, on the other hand, is carried out on the entire population, but because of the limited time, cost, and energy of the author, the research will be conducted on a sample of the population. Sugiyono (2006) says that: The sample is part of the sum of the characteristics possessed by the population. For the purposes of analysis, the sampling consists of one subdistrict, Tempe sub-district, Wajo district.
Types and Sources of Data

The type of data used in this study is quantitative data, that is data in the form of numerical figures that can be obtained from questionnaire calculations that will be carried out and related to the problem to be examined. Qualitative data, namely data not in the form of numbers relating to the problem to be investigated and obtained from the results of the interview.

The data source for this research comes from Primary data, that is data obtained from subjects through interviews or questionnaires given to respondents. Secondary Data: i.e. data obtained from other parties, not directly obtained from the object of research., This data can be obtained from magazines, books, and others.

Method of collecting data

Primary data used in this study were obtained directly from filling out the questionnaire (questionnaire) as well as interviews aimed at respondents, including responses or views about water hyacinth processing. Water hyacinth is one of the potentials in Wajo Regency that can be utilized. Researchers will distribute questionnaires or conduct interviews directly to the communities around Lake Tempe. Using the Likert scale is a psychometric scale commonly used in research in the form of surveys. The questionnaire and interview material contained questions that were considered to be related to the research variables. Data collection uses a combination of closed questions and open questions, which are given to respondents directly so that the objectivity of the data collected can be obtained.

Analysis Method

1. Validity test

According to Imam Ghozali (2006) "The validity test is used to measure the validity or validity of a questionnaire. A questionnaire is said to be valid if the questions on the questionnaire are able to reveal something that will be measured by the questionnaire ". To determine the valid and failed statement items, it is necessary to calculate the Corrected item-total correlation value on each statement item and the statement is said to be valid when the Corrected item-total correlation value is greater than 0.3.

2. Reliability Test

Based on the internal consistency reliability of an instrument declared reliable if the alpha coefficient is more than 0.06 (Malhotra, 2010: 49). Based on the theory above, the researcher will test the validity of the questionnaire. From the results of this validity test is calculated using the product moment person correlation method by correlating the answer scores obtained from each question item to the total score. The correlation results are very significant when the p value <0.05 (significant at the 5% level). This shows that the research instrument is valid and can measure variables according to the stated research objectives.

3. Multiple Linear Regression

The analysis used is multiple linear regression data analysis (Gomez, 1995) performed with SPSS software. This analysis is used to see the effect of science and technology and the quality of human resources in the processing of high economic value water hyacinth in Lake Tempe, Wajo Regency, the multiple linear regression formula is stated as follows:

\[ Y = a + b_1X_1 + b_2X_2 \]

where:

- \( Y \) = High Economic Value of Water Hyacinth
- \( X_1 \) = Science and Technology (IPTEKS)
- \( X_2 \) = Quality of Human Resources
a = Constant 
b = Regression Coefficient

RESULTS
Multiple Linear Regression Analysis Test

Table 1 Test Analysis Coefficients

| Model                     | Standardized Coefficients |
|---------------------------|---------------------------|
| SCIENCE AND TECHNOLOGY    | 0.468                     |
| QUALITY OF HUMAN RESOURCES| 0.377                     |

Based on table 1 of the results of data processing, the regression equation is obtained as follows:

\[ Y = 0.468X_1 + 0.377X_2 + e \]

From the regression equation, a constant value of 2,921 was obtained. SCIENCE and TECHNOLOGY (X1) variable is 0.468 and HR Quality (X2) is 0.377.

Test Coefficient of Determination (R^2)

| Model Summary |
|----------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|---|----------|-------------------|---------------------------|
| 1     | .793^a | .629 | .621 | 2.22555 |

a. Predictors: (Constant), quality of human resources, Science of technology of water hyacinth.

Based on calculations using the SPSS program, a correlation coefficient (R) of 0.793 is obtained which indicates that the relationship between the independent and dependent variables is strong because it has a positive R value and approaches 0.80. Then the coefficient of determination (R square) of 0.629 which shows that the percentage contribution of the influence of the independent variable on the dependent variable is 62.9%, this means that every change in high economic value, can be explained by the variables X1 and X2 which is equal to 62.9% and the rest 37.1% is explained by other factors not examined in this study. Meanwhile, for value e = \( \sqrt{(1-0.629)}\)=0,609. Thus, obtained the structure model path diagram as follows:
Figure 1 Path Diagram

Based on the diagram above we can find out the influence of variables X1 and X2 on Y. The meaning of the diagram above can be explained as follows:

1. Analysis of the effect of X1 (IPTEKS) on Y: it is known that the direct effect given X1 (IPTEKS) on Y (Water Hyacinth with High Economic Value) is 0.468.
2. Analysis of the effect of X2 (HR Quality) on Y: it is known the direct effect given X2 (HR Quality) on Y (Water Hyacinth with High Economic Value) of 0.377

DISCUSSION
The effect of science and technology on high economic value
The science and technology variables include 3 indicators, namely: Science, Technology, and Art. So, the average score of the SCIENCE OF TECHNOLOGY variable is 395. With the smallest score on the technology indicator valued at 384. And the highest indicator value is science with a score of 408. The results of data analysis show that SCIENCE OF TECHNOLOGY provides a positive and significant effect on water hyacinths with high economic value. This can be seen in the coefficients table with a significant level of 0.00 < 0.05. From the results of the research in the field shows that the dimensions of science and technology (X1) is 0.468 or 46.8%. This is in accordance with the opinion of the community that the way to process water hyacinth must be frequently socialized, so that people better understand the process of water hyacinth processing into various types of handicraft or renewable energy products. Then utilizing tools in the form of appropriate technology, with the help of technology can facilitate the community in processing water hyacinth and maximize the number of products produced, the processing of water hyacinth is right, can produce products of economic value and quality.

The effect of HR quality on high economic value
The HR Quality Variable includes 3 indicators: Knowledge, Skills, and Abilities. So, the average score of the HR Quality variable is 433. The indicator with the highest value is the ability with a score of 440, while the indicator with the lowest value is the knowledge with a score of 329. The results of data analysis show that HR quality gives a positive and significant influence on water hyacinth with economic value high. This can be seen in the coefficients table with a significant level of 0.00 < 0.05. From the results of the research in the field shows that the dimension of HR Quality (X2) is worth 0.377 or 37.7%. This is in accordance with the opinion of the community that the ability to affect the processing of water hyacinth, the ability to include cooperation can accelerate the process of water hyacinth processing into products so
as to make time efficient. With human resources capable of processing water hyacinth can control the growth of water hyacinth quickly and massively, because the excessive amount of water hyacinth can hinder fishermen's access to the lake and accelerate the silting process. In addition, by processing water hyacinth into a product, it can open new jobs, increase the income of the community around Lake Tempe and produce environmentally friendly products.

The effect of science and technology and quality of human resources on water hyacinth with high economic value

Hypothesis test results consisting of the F test and T test the results obtained are as follows: From the F Test results obtained in this study that the F count is greater than the F table with a figure of 82.171> F table 3.09, with a significant level of 0.00. This can be explained that the dimensions of science and technology, and the quality of human resources together have a positive effect on High Economic Value. From the T test results, the calculated T value is greater than the T table with a significance level of 0.00 in each dimension, it can be explained that the dimensions of science and technology and the quality of human resources have a partially positive effect on High Economic Value. Science and technology variable is more influential than HR Quality variables on High Economic Value, science and technology with number 4.945> T table 1.660 while HR quality with number 3.987> T table 1660. Partially Science and technology and HR Quality influences High Economic Value. From the results of the test table for the determination coefficient of Adjusted R Square value of 0.621, the value of this variable can be explained that the dependent variable or High Economic Value (Y) can be explained by the dimensions of Science and technology (X1), HR Quality (X2), with a value of 0.621 or 62% and the remaining 38% is explained in other variables not examined in this study.

CONCLUSIONS AND SUGGESTION

Based on the results of research that has been done about the effect of science and technology and the quality of human resources in the processing of water hyacinth with high economic value in Lake Tempe, Wajo Regency. then it can be concluded as follows:

Science and technology have a positive and significant influence on water hyacinth with high economic value, with the increase in science and technology, the economic value is increasing. The quality of human resources has a positive and significant effect on water hyacinth with high economic value, with the increase in the quality of human resources, the economic value is increasing Simultaneously science and technology and the quality of human resources have a positive influence on high economic value, partially science and technology and the quality of human resources have a positive effect on high economic value. Science and technology variable is more dominant influence on water hyacinth with high economic value.

To increase science and technology can be obtained through the process of academic education, develop and implement science and technology early in formal education and other institutions. To improve the quality of human resources can be obtained through the mastery of knowledge in each individual, honing their skills or talents and building solid teamwork. Improving the science and technology and quality of human resources, in the community of Wajo Regency especially around Lake Tempe, in order to process water hyacinth in the right way so as to produce quality products. Further researchers are expected to carry out deeper research related to the management of water hyacinth and its impact on water biota, so that the use of water hyacinth economically does not damage the balance of the ecosystem.
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