INNOVATION IN THE DEVELOPMENT OF STTAL HUMAN RESOURCES TO FACE THE 4.0 INDUSTRIAL REVOLUTION

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ABSTRACT

In the era of the Industrial Revolution 4.0. this is where technology and technology have been very advanced demanding competent human resources who have high morale and discipline in carrying out their roles and functions for both the individual and the objectives of the organization. In the role and contribution of STTAL in the Industrial Revolution 4.0, the current conditions, where the quality of human resources both students, lecturers, and Antap STTAL are considered unable to answer the challenges in the cyber field so that strategic decision-making and steps are needed to be able to accompany the development of science and technology while carrying out missions STTAL is to hold a higher education program to produce human resources with Indonesian character and personality, quality and relevant science and technology based, with defense needs in the military, maritime and maritime fields. With SWOT analysis, a matrix will be obtained which shows the strengths and weaknesses as well as opportunities and threats which will later be used as a reference to make the right and appropriate strategies.

Keywords: SWOT Analysis, STTAL HR Quality, Industrial Revolution 4.0

1. INTRODUCTION.

The development of science and technology has changed the world as the Industrial Revolution moves. Starting from the Industrial Revolution 1.0 which was marked by the mechanism of agriculture, then the Industrial Revolution 2.0 with the use of conveyor belts, the Industrial Revolution 3 had the characteristics of robots and automation, so now the Industrial Revolution 4.0 or better known as the Cyber Physical System has changed the world through three fields of science which are independent namely Physics, Digital, and Biology with robotic work systems, Internet of Things (IoT) and Big Data technology.

In response to this, the Indonesian government has launched the Making Indonesia 4.0 strategy which has become a guideline for all state ministries and institutions. The TNI which is a tool of the State has an interest in anticipating quickly and precisely about global developments related to Industry 4.0. At present all TNI defense equipment are now digitally operated and controlled digitally which of course military power is an important element because technological developments have changed the entire military strategy order.

Besides the modification of defense equipment, the role of the TNI in the era of the Industrial Revolution 4.0 was very dependent on the good and bad development of its human resources. This means that the human resources within the TNI organization must be proportionately given the best education and training, even as perfect as possible. In this context, defense equipment (the main tool of the weapons system) is not insignificant, but the man behind the gun remains the most important element in creating a professional army. (Octavian, 2014)

The Naval College of Technology or (STTAL) is one of four educational implementing units within the Navy that has been established since 1966. The task is to organize development education programs in the field of marine defense technology. Naval Technology College, or abbreviated as STTAL, is an implementing and fostering element of the central implementing agency that is directly under the STTAL Commander. STTAL currently has study programs include Bachelor and Diploma III in Mechanical Engineering, Bachelor of Electrical Engineering and D-III in Electronic Engineering and Informatics Engineering, S-1 Study Program Industrial Management Engineering, S-1 Hydrographic Study Program, and D-III Hydro-Oceanography, and S-2 Study Program System Analysis and Operations Research.

In the role and contribution of STTAL in the Industrial Revolution 4.0, the current conditions, where the quality of human resources both students, lecturers, and members STTAL are considered unable to answer the challenges in the cyber field so that strategic decision-making and steps are needed to be able to accompany the development of science and technology while carrying out missions STTAL is to hold a higher education program to produce human resources with Indonesian character and personality, quality and relevant science and technology based, with defense needs in the military, maritime and maritime fields.

From similar research written by (Mustika, 2013) entitled Analysis of Quality Improvement Strategies for Human Resources in Poverty Alleviation Efforts in Nusa Penida Subdistrict, which analyzes the most appropriate strategies to improve the Quality of Human Resources in Poverty Alleviation Efforts in Nusa Penida District. The results of this study obtained the right strategy, namely that the target that must be prioritized is to increase economic growth by utilizing human resources who are experts in agriculture to support the development of the agricultural sector and maximize superior commodities that are easy and fast to develop.

Based on the description of the background stated above, the problem statement in this study is how the strategy used to improve the quality of STTAL's human resources in the face of the 4.0 Industrial Revolution. The problem statement can be divided into three main problems which are research questions, including what can be identified as influential factors in making decisions to improve the quality of STTAL HR? and what strategic priorities are used to improve the quality of STTAL's HR in the face of the 4.0 Industrial Revolution?. The assumptions in this paper are that each of the factors that become the object of research can certainly have four components of strengths, weaknesses, opportunities, and threats.

2. MATERIAL/METHODOLOGY.

2.1. STTAL's Vision and Mission.

Becoming the center of the development of defense science and technology in the military, maritime and maritime affairs sectors that is reliable in realizing the independence of the main system/weapons.

Organizing higher education programs to produce human resources with Indonesian character and personality, quality and relevant science and technology based, with defense needs in the military, maritime and maritime fields. Carry out research and development on defense science and technology in the maritime and maritime affairs sector in an effort to realize the independence of the main weapon system tools. Carry out community service activities through empowering maritime defense potential.

2.2. Development Strategy.

Etymologically is a derivative of the Greek word, strategies. Strategos can be translated as "military commander" at the time of Athens' democracy. While in terms of terminology many experts have put forward the definition of strategy with a different perspective - but basically all of them have the same meaning or meaning, namely achieving goals effectively and efficiently.

Strategy management can be defined as art and science to formulate, implement, and evaluate cross-functional decisions that enable organizations to achieve their goals. Historically, the main benefits of strategic management have helped organizations formulate better strategies using a more systematic, logical and rational approach to strategy choice (Istiqomah, 2017).

(Wheelen and Hunger, 2010) say that management strategies are a series of managerial decisions and actions that determine performance in the long run. Management development strategies include environmental observations, strategy formulation (strategic planning or long-term planning), strategy implementation, and evaluation and control. Management development strategies emphasize observing and evaluating environmental opportunities and threats by looking at strengths and weaknesses.

2.3. Human Resources (HR).

HR is the most important factor that cannot be separated from an organization, both institutions and companies (Vardarlıer, 2016) (Blaga and Jozsef, 2014).

HR is also the key that determines the development of the company (Javed et al., 2017). In essence, human resources in the form of humans are employed as a driver, thinkers, and planners to achieve the goals of the organization.

HR is an advanced part of science, development, and technology. Therefore, in the current era where technology and civilization are already very advanced, it requires competent human resources who have high morale and role-playing roles for both individuals and organizational goals. Therefore, the progress of a country depends on its human resource capabilities (Prihantoro, 2012).

2.4. SWOT analysis.

SWOT analysis is a strategic planning method used to evaluate the strengths, weaknesses, opportunities, and threats in a project or business speculation (Rangkuti, 2012) (Tasos Hovardas, 2015) (Gurel and TAT, 2017). This process involves determining the specific goals of business or project speculation and identifying internal and external factors that support and that are not in achieving that goal.

SWOT analysis can be applied by analyzing and sorting out things that affect the four factors, then applying them in the SWOT matrix image (Osita, R. and Justina, 2014), where the application is how strengths are able to take advantage of opportunities that exist, how to overcome weaknesses that prevent existing advantages of opportunities, then how strengths are able to deal with existing threats, and finally how to overcome weaknesses that are able to make threats become real or create a new threat (Irawan, 2017).

In the SWOT analysis (Rangkuti, 2012), several key questions are as follows:

1) The strength which is a positive internal aspect that can be controlled and can be strengthened in planning.

2) Weakness, which is a negative internal aspect that can be controlled and can be corrected in planning.

3) The opportunity which is a positive external condition that cannot be controlled and can be taken advantage of.

4) The threat which is a negative external condition that cannot be controlled and the impact may be minimized.

(Ommani, 2011) in determining strategies based on potential factual conditions and problems as described above, the technique used is to look for cross strategies from the four SWOT factors above, namely:

1) S-O Strategy: A strategy designed to take advantage of all strengths and optimize opportunities.

2) S-T Strategy: A strategy designed to utilize all strengths in overcoming existing threats.

3) W-O Strategy: Strategies to utilize opportunities optimally to overcome weaknesses.

4) W-T Strategy: Strategy to overcome weaknesses and eliminate threats that arise.

Table 1. SWOT matrix

IFAS EFAS	Strength (S)	Weakness (W)
Opportunity (O) Positive external conditions cannot be controlled and can be taken advantage of.	**SO strategy** Utilizing Internal power to profit from external opportunities.	**WO Strategy** Improve internal weaknesses by taking advantage of external opportunities.
Threat (T) Negative external conditions that cannot be controlled and may be minimized.	**ST strategy** Use strength to avoid or reduce the impact of external threats.	**WT Strategy** Defensive tactics directed at reducing internal weaknesses and avoiding external threats. strength to avoid or reduce the impact of external threats.

3. RESULTS AND DISCUSSION.

3.1. Research methods.

In this study using primary and secondary data sources. The primary data of the research comes from data collected by the author from the first source or the object of the research. While the secondary data research comes from data that has been collected previously by other researchers, agencies or other sources that have been tested/valid. This secondary data is obtained from literature, articles, journals, and sites on the internet regarding research conducted.

The research subjects are institutions or organizations that are directly involved in the research, namely STTAL, while the objects in this study are those that are the target of the research which includes students, lecturers and Antap in the STTAL environment.

Based on the problems that exist in the research, this research method uses the SWOT method. In the SWOT analysis, there are several stages including identifying internal and external factors, then compiling a matrix of internal factors and external factors. From the results of the factors that exist and are compiled in a SWOT matrix to develop alternative strategies that help to match

strengths and opportunities (SO strategies), strengths and threats (ST strategies), opportunities and weaknesses (WO strategies) and weaknesses and threats (WT strategy) with the following lines of thought:
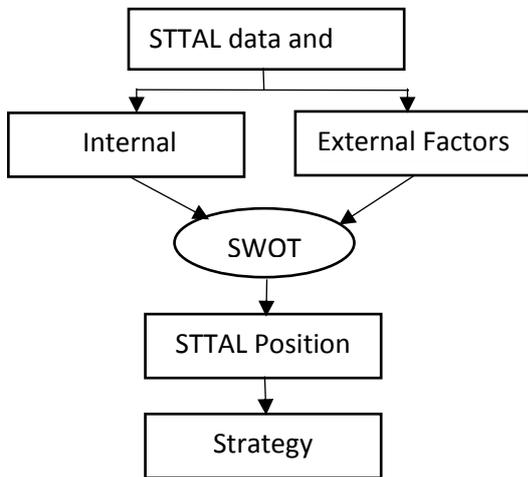

Fig. 1 Flow of Thought

3.2. Existing conditions of STTAL HR quality.

The current development of STTAL HR quality aims to obtain the same perception in mindset, attitude patterns and action patterns for function bearers in implementing education at STTAL on an ongoing basis with efforts that must be in accordance with STTAL's vision and mission. The target of STTAL HR development is mastering the technology of ocean and maritime departure in the era of industrial revolution 4.0. is as follows:

1) The realization of the stability of mental struggle, soldier discipline and the personality of a complete and strong soldier based on Sapta Marga, Sumpah Praskar and Tri Sila TNI AL.

2) The realization of human resources with Indonesian character and personality, quality and relevant science and technology based,

with defense needs in the military, maritime and maritime fields.

3) The implementation of research and development on defense science and technology in the maritime and maritime affairs sector in an effort to realize the independence of the main weapon system tools (Alutsista).

4) Implementation of community service activities through empowering maritime defense potential.

The following will describe the existing conditions and potential (strengths, weaknesses, opportunities, and threats) of the quality of STTAL HR based on the research subject:

Table 2. Internal Factor Analysis

Internal Factor Analysis	
Strength	**Weakness**
1. Loyalty and potential/multitasking skills from lecturers, students, and students.	1. Lack of ratio of lecturers in S3 graduates.
2. The only technology-based service college.	2. Lack of networks, supporting facilities and infrastructure.
3. Accreditation from the Ministry of Research, Technology and Higher Education.	3. Don't have a structured HR development system
4. Have a budget for the smooth running of the organization.	4. Lack of scientific research, innovation, community service, and international journal publications.
5. Work guidelines, operational guidelines, technical guidelines, and appropriate curriculum.	5. The quality of human resources is not optimal about the development of cyber science and technology.

Table 3. External Factor Analysis

External Factor Analysis	
Opportunities	**Threat**
1. Better organizational change. 2. The recruitment of students has high standardization. 3. There is cooperation / MOU with outside parties. 4. The success of graduates in careers. 5. Flexibility to follow the development of science and technology.	1. Disciplinary violations. 2. Lack of legal awareness. 3. The placement of graduates is not optimal. 4. High stress levels due to environmental influences. 5. Technological developments that are faster if not anticipated will be left behind.

3.3. Discussion.

Based on the analysis above, the main strategies that must be implemented to develop STTAL HR can be applied. The four strategies can be seen in Table 4:

Table 4. SWOT Matrix STTAL HR Development

IFAS	STRENGHT (S)	WEAKNESS (W)
	1. Loyalty and potential/multitasking skills from lecturers, students, and students. 2. The only technology-based service college. 3. Accreditation from the Ministry of Research, Technology and Higher Education. 4. Have a budget for the smooth running of the organization. 5. Work guidelines, operational guidelines, technical guidelines, and appropriate curriculum.	1. Lack of ratio of lecturers in S3 graduates. 2. Lack of literature, networks, supporting facilities and infrastructure. 3. Don't have a structured HR development system 4. Lack of scientific research, innovation, community service, and international journal publications. 5. The quality of human resources is not optimal about the development of cyber science and technology.
EFAS		
OPPORTUNITY (O)	**STRATEGI (SO)**	**STRATEGI WO**
1. S3 graduates' lack of ratio of lecturers. 2. Lack of literature, networks, supporting facilities and infrastructure. 3. Don't have a structured HR development system 4. Lack of scientific research, innovation, community service, and international journal	1. With the potential or expertise possessed, then both students, lecturers and Antap STTAL have the opportunity to develop themselves through education in accordance with their profession and expertise. (S-1, S-5, O-1, O-4) 2. With the availability of a clear curriculum, work guidelines and	1. Optimizing literature, networks, supporting facilities and infrastructure by implementing procurement as needed. (W-2, O-2) 2. Providing opportunities for permanent lecturers to take S3 education in accordance with their qualifications and optimize existing lecturers. (W-1, W-3, O-1) 3. Increase and enhance scientific

publications. 5. The quality of human resources is not optimal about the development of cyber science and technology.	operational guidelines / technical guidance for Antap and students, it can improve the career guidance system and have controlled supervision and control. (S-5, O-1) 3. With technology-based students can carry out learning tasks well so they can produce outstanding graduates. (S-2, O-4) 4. Increase the value of campus accreditation for better organizational improvement. (S-3, O-1) 5. Manage budget support properly in the form of cooperation in education with related parties. (S-4, O-1, O-5)	research, innovation, community service, and international journal publications while promoting STTAL in the international world. (W-4, O-1, O-5) 4. Developing the potential and skills in order to improve the quality of human resources of students, lecturers and Antap STTAL mastery of the IQF-based cyber field through cooperation / MOU with outside parties so that the quality of human resources is always able to answer the challenges of science and technology development and the industrial revolution. (W-5, O-1, O-3, O-4, O-5)
THREAT (T) 1. Disciplinary violations. 2. Lack of legal awareness. 3. The placement of graduates is not optimal. 4. High stress levels due to environmental influences. 5. Technological developments that are faster if not anticipated will be left behind.	**STRATEGY ST** 1. Prevent the occurrence of disciplinary violations caused by campus environment factors such as being away from family, the need for cooperation from all students, lecturers, and Antap to respect each other's rights and obligations by adhering to work guidelines and also increasing legal awareness due to these actions. (S-1, S-3, T-1, T-2) 2. Managing the budget and Wasdal pattern well such as the existence of urikes, samapta, public lectures, counseling, recreation, and sports together so as to reduce stress levels in the face of lectures. (S-4, T-4) 3. Using networks, facilities, and infrastructure to develop various potentials (S-5, T-5)	**WT STRATEGY** 1. Having a breakthrough for designing community service programs so that they are right on target. (W-4, T-5) 2. Routinely providing legal counseling, so there are no disciplinary violations (W-3, T-1) 3. Improving the welfare of lecturers, especially lecturers, in teaching motivation. (W-1, T-4) 4. Knowing the interests of talents and skills of students so that the placement of graduates can run optimally in accordance with their expertise and interests. (W-2, W-3, T-5)

With the results above, four strategies were obtained, namely SO, WO, ST, and WT. To answer the challenges in the era of industrial revolution 4.0. where STTAL must be ready to educate TNI AL/TNI HR who control the ocean and maritime technology and in accordance with current STTAL conditions with several weaknesses that must be overcome by utilizing existing opportunities, then the innovation and transformation strategy that can be used as a reference is the following strategy:

1) Optimizing literature, networks, supporting facilities and infrastructure by implementing procurement as needed.

2) Providing opportunities for permanent lecturers to take S3 education in accordance with qualifications and optimize learning with existing lecturers.

3) Increase and enhance scientific research, innovation, community service, and international journal publications while promoting STTAL in the international world.

4) Developing potential and skills in order to improve the quality of the human resources of students, lecturers and Antap STTAL mastery of the KKNI-based Cyber Physical System through cooperation / MOU with outside parties so that the quality of human resources is always able to answer the challenges of science and technology development and the industrial revolution.

4. CONCLUSION.

Based on the SWOT analysis for the development of STTAL HR that has been carried out, it can be concluded that the target of the STTAL strategy is a reference indicator of the achievement of strategic plans compiled based on Vision, Mission, STTAL Objectives and the challenges of industrial revolution 4.0. current and future faced by STTAL on the basis of consideration of the condition of resources, facilities, and infrastructure as well as the STTAL infrastructure itself. The target of the STTAL strategy is a tool used to compile strategic factors that are based on strengths, weaknesses, opportunities, and threats.

For further research, it is expected that there will be weighing on each factor, adding respondents to be more varied and also developed further to establish interval models or limits how far the priority weights of the criteria are lowered and increased so as to cause changes in the order of priority strategies.

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