

# THE ROLE OF HUMAN RESOURCE CAPABILITIES OF RESEARCH INSTITUTIONS TO SUPPORT THE DEFENSE INDUSTRY

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## **ABSTRACT:**

The importance of increasing the human resource capabilities of research institutions to support the independence of the defense industry. This research aims to formulate the efforts needed to develop human resources in mastering defense equipment technology, so that Indonesia is expected to be able to anticipate the possibility of war in the future. The research method used is descriptive qualitative through primary data, interviews and field observations. The research results state that the most important asset a research institution has is Human Resources. On that basis, quality Human Resources policies and strategies are based on the suitability of the vision and mission in order to overcome threats as well as the aim of improving the quality of Human Resources. Thus, existing policies must be supported by a strong foundation. For this reason, comprehensive efforts are needed to improve the quality of Human Resources in developing the defense industry. In particular, within the framework of supporting the empowerment and independence of the defense industry so that it has competitiveness and plays an important role in international relations. The emerging roles, functions and tasks of human resources at research institutions are in line with other components, elements and support that have not yet been organized and arranged. In particular, the concentration of Human Resources in the defense industry sector is a very important, strategic and serious concern in the context of moving towards a strong and independent defense industry.

**Keywords:** Optimization, Human Resources, Defense Industry, Research institutions.

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## **1. INTRODUCTION**

The defense industry is an economic sector that focuses on the development, production, and sale of equipment, technology, and services used in national defense and the security of a country (Susdarwono, Setiawan, & Yonimah Nurul Husna, 2020).

This industry has an important role in maintaining the sovereignty, security and integrity of a country (Wiramanggala, Khaerudin, & Sudiarso, 2022). An important component of the defense industry is Weapons and Military Equipment. The defense industry includes the production of weapons such as fighter aircraft, warships, tanks, firearms, missiles and air defense systems. Apart from that, companies in this industry also develop military equipment such as uniforms, equipment, communications equipment, and others (Sudarwono, 2020).

In general, the defense industry has a very important role in ensuring the security and sovereignty of the Indonesian nation, but its management must be carried out wisely and transparently to ensure optimal benefits for the country (Aida, 2021). As with the defense industry in other countries, there are various potential issues that

need attention, including the use of weapons in armed conflict and the need for transparency in the management of defense funds. In addition, it is important to ensure that large defense budgets do not come at the expense of financing other important sectors such as education, health and social development. So it is necessary to increase the capabilities of the defense industry through increasing the capabilities of research human resources (Rusdiana, Ali, Thamrin, & Widodo, 2021).

Research and development human resources have a key role in encouraging innovation, increasing economic competitiveness, and solving social and environmental problems which of course can contribute to scientific and technological progress (Aliami & Sri, 2018). Where technology is an important factor in the sustainable development of a country. Therefore, investment in developing human resources, research and development, is very important for the growth and progress of a country, especially the defense industry (Karim & Silmy, 2014). Human Resources in the Field of Research and Development refers to individuals or teams involved in research and development activities in various fields, including science, technology and innovation (Baladraf, Sembodo, Hasanah, & A, 2018). In the case of the defense industry, the qualifications and expertise of Human Resources in the Research and Development Sector in the defense industry must have special qualifications and expertise appropriate to their field, such as military engineering, defense technology, computer science, electronics, or materials science. They also need to understand applicable defense regulations and policies. Due to the very sensitive nature of the defense industry, Human Resources in the Field of Research and Development must understand and adhere strictly to security and ethics. They must comply with security regulations and maintain the confidentiality of information (Febriyantoro & Arisandi, 2018).

Technological Innovation, Human Resources in the Field of Research and Development is responsible for developing the latest military technology, including weapons systems, military equipment and communications technology (Pradiani, 2018

). This innovation helps the defense industry to stay ahead and compete at the global level. Superior Product Development, Human Resources in the Research and Development Sector helps develop superior products in the defense industry, such as advanced fighter aircraft, warships and air defense systems. These products can be sold to other countries or used to strengthen national defense (Purnomo, Nanto, & Muhtarom, 2018).

Involvement in Strategic Research, Human Resources in the Research and Development Sector are also involved in strategic research related to national defense, including understanding potential threats, intelligence analysis, and developing defense strategies (Taiminen & Karjaluoto, 2014). Development of Special Skills, As technology develops, Human Resources in the Research and Development Sector need to develop special skills in areas such as cyber security, the latest military technology, and integrated defense systems (Parlinda & Wahyuddin., 2012).

## **2. METHODS OF RESEARCH**

### **2.1 Defense Industry**

Law of the Republic of Indonesia Number 16 of 2012 concerning the Defense Industry has an important role in regulating and developing the defense industry in Indonesia. Several reasons why the defense industry and Law Number 16 of 2012 are important are because the defense industry is the backbone of a country's national security. With a strong defense industry, a country can produce the military equipment needed to protect its sovereignty and national security. This Act creates the legal framework necessary to regulate and develop this industry (Delima, 2016).

Next are economic reasons where the defense industry can make a significant contribution to a country's economy (Al-Fadhat & Faris, 2019). It creates jobs, encourages growth in the manufacturing sector, and can increase exports of defense technology, which can generate large export revenues. Then also through the development of more sophisticated and safer military equipment and technology, the defense industry contributes to the safety of military personnel in carrying out defense tasks (Egam, Sihole, & Gunawan, 2017).

## **2.2 Research and Development Institute**

Research and Development Institutes play an important role in supporting the defense industry in various ways. Research and Development Institutes can conduct research to develop new technologies that can be used in the defense industry. This includes the development of military technology, such as advanced weapons systems, electronic devices, military vehicles. Research and Development Institutes may conduct trials and evaluations of military products and technologies to ensure that they meet required safety and performance standards. It helps in the development and refinement of defense products (Hidayat & Safril, 2015).

Research and Development Institutes can provide training to defense industry personnel. This includes technical training, security training, and other related training necessary to produce high-quality products and technologies. The Research and Development Institute can conduct studies on national and international defense needs. This helps the defense industry to identify market opportunities and develop relevant products. The Research and Development Institute can provide technical consultancy to the defense industry (Muradi, 2012). They can assist in technical problem solving, product design, and implementation of new technology. The Research and Development Institute can monitor developments in the global defense industry and report them to the government and domestic industry. This helps in keeping the defense industry competitive and up-to-date with global trends. Research and Development Institutes can collaborate with the defense industry to conduct joint research and product development (Supriyatno & Makmur., 2014). It enables the exchange of knowledge and resources necessary to achieve common goals.

Research and Development Institutes can help the defense industry to comply with applicable security standards and regulations. This is important to ensure that the resulting products and technologies meet legal and safety requirements (Yusgiantoro, 2014). The Research and Development Institute can carry out monitoring and analysis regarding security threats and potential risks affecting the defense industry. This helps in planning more effective defense strategies.

## **2.3 Human Resources of Research and Development Institutions**

Quality human resources in Research and Development Institutions are very important to support the defense industry (Indrawan & Widiyanto, 2016). Superior Human Resources have the ability to produce new technological innovations in the defense industry, can carry out research and development to create more sophisticated and effective weapons, equipment and military systems. Competent Human Resources can help improve the performance of military products and systems, can design improvements or modifications necessary to increase the efficiency, accuracy, durability and functionality of military equipment.

Human Resources can be involved in the development of the latest weapons and systems capable of responding to modern threats and must remain informed about the latest developments in military technology. Human Resources Well-trained Human Resources can have efficient project management capabilities, can manage research and development projects well, ensuring timely and efficient use of resources.

## **2.4 Research methods**

The method used in this research is qualitative, where according to Bogdan and Taylor it is stated that qualitative is a research procedure that produces descriptive data in the form of written or spoken words from the people and actors being observed (Moleong & Lexy, 2007). There are 2 types of data sources for this research, namely primary data and secondary data. Primary data is data taken from the first source in the field obtained through interviews with informants met in the field, while secondary data is data obtained in the form of decision letters and documents relating to the implementation of legal policies.

Law of the Republic of Indonesia Number 16 of 2012 concerning the defense industry, as well as data and information related to this research problem.

To obtain the data needed in this research, researchers used several procedures, namely interviews, observation and literature study. Data testing in this research was carried out using triangulation techniques, namely through: check, re- check and crosscheck the data obtained from theory, methodology and researcher perceptions. The data analysis technique in this research was carried out in interactive form on 3 (three) main components, namely;

data reduction, data presentation and drawing conclusions. This research was conducted over a period of 12 months.

## 2.5 Thinking Framework

Optimization in this research is improving the quality of human resources in research and development institutions in order to support the capabilities of the defense industry. So, based on the researcher's understanding, the researcher mapped this framework of thought in the following picture.

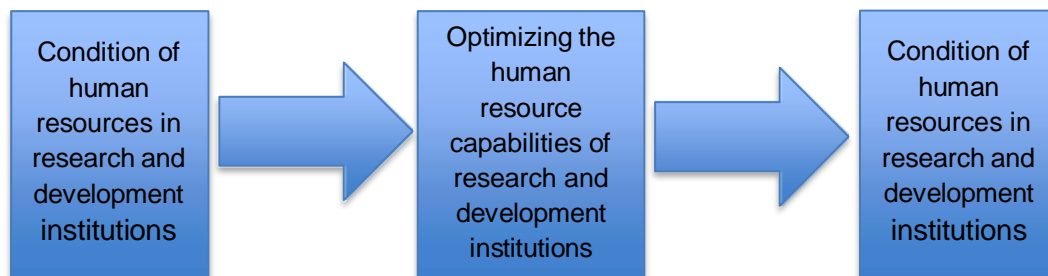


Figure 1. Thinking Framework

## 3. RESULT AND DISCUSSIONS

### 3.1 Collaboration of research and development institutions with the defense industry

Collaboration between research and development institutions and the defense industry has many benefits. By working together, research and development institutions can provide their knowledge and expertise in developing the technology and innovation needed by the defense industry. On the other hand, the defense industry can provide resources and facilities necessary to test and apply research results. This collaboration can increase the efficiency and effectiveness of defense technology development. Research and development institutions can conduct in-depth research and explore new concepts, while the defense industry can apply these discoveries in the design and production of more advanced defense systems and modern.

Apart from that, this collaboration can also accelerate the development of defense technology. By working together, research and development institutions can share their knowledge and resources with the defense industry, enabling faster and more efficient technology development. Collaboration between research and development institutions and the defense industry can also increase the competitiveness of the defense industry on a national and international scale. By combining expertise and resources, this collaboration can produce products and technologies that are more innovative and competitive in the global marketplace.

In order to achieve successful collaboration, it is important to have a clear and mutually beneficial framework between research and development institutions and the defense industry. Good collaboration requires open communication, a deep understanding of each party's needs and challenges, and a commitment to working together in the long term. With strong collaboration between research and development institutions and the defense industry, it is hoped that significant progress can be achieved in the development of defense technology that can improve national security and defense.

Collaboration between research and development institutions and the defense industry has an important urgency, especially in Defense Technology Development, where collaboration between research and development institutions and the defense industry enables the development of more advanced defense technology. Research institutions can provide knowledge and expertise in scientific and technological fields, while the defense industry can apply these discoveries and innovations in the development of more sophisticated defense systems. Collaboration can improve National Security, where this collaboration can help improve national security by producing a system more effective and efficient defense. Through joint research and development, research institutions and the defense industry can create better solutions to face complex and evolving security threats.

Collaboration can also increase industrial competitiveness, where collaboration between research and development institutions and the defense industry can also increase the competitiveness of the defense industry at national and international levels. By combining knowledge and resources from both parties, innovations can be created that can improve the quality and efficiency of the defense products produced. More Effective Use of Resources can occur because this collaboration allows for more effective use of resources. Research institutions can provide research infrastructure and scientific expertise, while the defense industry can provide access to the data and field testing needed to test and apply research results.

Increasing National Capabilities, where this collaboration can also help increase national capabilities in the defense sector. By combining knowledge and experience from research institutions and the defense industry, synergies can be created that strengthen the country's defense capabilities. Through close collaboration between research and development institutions and the defense industry, innovation and better technological development in the defense sector can be created. This will have a positive impact on national security and the competitiveness of the defense industry at national and international levels.

### **3.2 Increasing the resource capabilities of research and development institutions**

Increasing human resource capabilities has several important reasons, including:

- a. Increasing productivity, namely by increasing employee abilities, they can work more efficiently and effectively. They will have the knowledge and skills necessary to complete tasks better, resulting in increased productivity in the workplace.
- b. Improving Quality, through efforts to improve Human Resources capabilities, the quality of the products or services produced will also increase. Employees who have more knowledge and skills either will be able to provide better results to customers or consumers.
- c. Encouraging Innovation, by increasing Human Resources capabilities can also encourage innovation in the workplace. Employees who have better knowledge and skills will be better able to think creatively, generate new ideas, and implement innovative solutions.
- d. Increasing Employee Satisfaction, where when employees feel that they are developing and getting opportunities to improve their abilities, they will feel more satisfied with their work. This can increase employee retention and create a more positive work environment.
- e. Increasing Competitiveness, where in a competitive business world, companies that have quality employees and have superior abilities will have a competitive advantage. Increasing HR capabilities can help companies stay relevant and competitive in an ever-changing market.
- f. Reducing costs, namely by increasing human resource capabilities, companies can reduce external training costs or the cost of replacing employees who do not have adequate capabilities. Investments in improving Human Resources capabilities can produce higher returns on investment in the long term.

By paying attention to the importance of increasing human resource capabilities, companies can take the necessary steps to train, develop and motivate employees. This will help create a productive, innovative and competitive work environment.

Increasing the resource capabilities of research and development institutions is an important step in strengthening the quality and effectiveness of these institutions.

The following are several steps that can be taken to increase the resource capabilities of research and development institutions in order to support the independence of the defense industry, namely:

- a. Education and Training, namely by providing education and training to researchers and developers to improve their knowledge and skills in the field of research and development. This can be done through internal training programs or through collaboration with other educational and training institutions.
- b. Collaboration with Industry, by building partnerships with industry to gain a better understanding of the needs and challenges faced in technology development. This collaboration can involve the exchange of knowledge, resources and facilities between research and development institutions and industry.

- c. Access to Resources, through efforts to ensure that research and development institutions have adequate access to the necessary resources, such as modern research and laboratory equipment, the latest scientific literature and journals, as well as sufficient research funding.
- d. Network Development, through steps to build collaborative networks with other research and development institutions, both at home and abroad. This can facilitate the exchange of knowledge, experience and resources between these institutions.
- e. Use of Technology, by utilizing information and communication technology to increase efficiency and effectiveness in the research and development process. This includes the use of sophisticated software and data management systems to support research and development activities.
- f. Recognition and Incentives, by providing recognition and incentives to researchers and developers who succeed in achieving significant results in research and development. This could be in the form of awards, promotions or additional financial support.

By taking these steps, it is hoped that the resource capabilities of research and development institutions can be increased, so that they are able to produce quality research and development and have a positive impact on the development of defense science and technology in Indonesia.

### **3.3 Strategy for increasing research and development human resource capabilities**

Increasing human resource capabilities in the field of research and development is a key aspect for advancing innovation and competitiveness an organization or country. The following are several strategies that can be implemented to improve Human Resources capabilities in the field of research and development, including:

- a. Education and Training, by offering special education and training programs in the field of research and development. This can involve technical training, research methodology, and soft skills development. Support researchers in obtaining advanced degrees or certifications relevant to research and development needs.
- b. Empowering Work Teams, by building multidisciplinary teams consisting of individuals with diverse expertise to stimulate innovation and facilitate effective and collaborative team work to ensure good exchange of ideas and knowledge among team members.
- c. Financial Resources, by ensuring an adequate budget to support research and development activities as well as providing internal research funds or scholarships to encourage creativity and exploration of new ideas.
- d. Infrastructure and Technology, by ensuring the availability of adequate research facilities and infrastructure as well as updating the latest software and equipment to support technological innovation.
- e. External Collaboration, by building partnerships with research institutions, universities and related industries as well as involving researchers in scientific networks and conferences to facilitate the exchange of information and experience.
- f. Mentorship, by providing a mentorship program where experienced researchers can guide more junior researchers and facilitating regular meetings to exchange experiences and insights.
- g. Clear Performance Assessment, by establishing clear and measurable performance assessment criteria for researchers and research and development teams and providing incentives or rewards for extraordinary achievements and contributions.
- h. Innovation Culture, by cultivating an atmosphere that supports experimentation and failure as part of learning and encourages creative ideas and innovative solutions from the entire team.
- i. Continuous Evaluation and Improvement, by conducting regular evaluations of R&D activities to identify areas that need improvement and taking continuous improvement actions based on feedback and evaluation results.
- j. Industrial Trend Monitoring, by establishing a monitoring system to identify the latest trends and developments in the research and development industry and ensuring Human Resources remain relevant to the latest developments through training and regular knowledge updates and implementing this strategy holistically can help improve Human Resources capabilities in the field of research and development,



supporting innovation, and generating a greater contribution to the growth and development of the organization.

#### 4. CONCLUSIONS

Based on the explanation starting from the background, problem and quantitative data analysis, it can be concluded as follows:

- a. The need for collaboration between research and development institutions and the defense industry. Through close collaboration between research and development institutions and the defense industry, innovation and better technological development in the defense sector can be created.
- b. The need to improve the human resource capabilities of research and development institutions, so that they are able to produce quality research and development and have a positive impact on the development of defense science and technology in Indonesia.
- c. Increasing human resource capabilities in the field of research and development is a key aspect for advancing innovation and competitiveness of an organization or country. It is important to ensure Human Resources remain relevant with the latest developments through training and regular knowledge updates.
- d. which are very useful for developing human resources for research and development institutions to increase the independence of the defense industry.

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