



MANAGEMENT STRATEGY TNI HUMAN RESOURCES IN FACE CHALLENGES OF THE REVOLUTIONARY ERA INDUSTRY 4.0

Strategi Manajemen Sumber Daya Manusia TNI dalam Menghadapi Tantangan Era Revolusi Industri 4.0

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Abstrak. Era Revolusi Industri 4.0 telah menghadirkan tantangan baru bagi organisasi militer seperti Tentara Nasional Indonesia (TNI). Kemajuan teknologi seperti kecerdasan buatan (artificial intelligence), otomatisasi, dan penggunaan drone menuntut pengembangan kompetensi sumber daya manusia (SDM) yang lebih dinamis dan adaptif terhadap perubahan cepat di lingkungan strategis. Penelitian ini bertujuan untuk menganalisis strategi manajemen sumber daya manusia TNI dalam menghadapi tantangan tersebut. Metode penelitian yang digunakan adalah deskriptif kualitatif. Hasil penelitian menunjukkan bahwa meskipun TNI telah berupaya mengadopsi teknologi canggih, pengembangan lebih lanjut masih diperlukan, khususnya dalam pelatihan personel dan manajemen perubahan organisasi. Kolaborasi dengan sektor industri dan lembaga akademik juga menjadi faktor penting dalam memastikan kesiapan operasional TNI di era digital ini.

Kata kunci: Manajemen Sumber Daya Manusia, Revolusi Industri 4.0, Kecerdasan Buatan, TNI.

Abstract

Revolutionary Era Industry 4.0 has present challenge new for organization military like TNI. Progress technology like intelligence artificial intelligence , automation , and drones demand development competence source Power more human (HR) dynamic and adaptive to change fast in environment strategic . Research This aiming For analyzing the TNI human resource management strategy in order to face challenge The method used in study This is descriptive qualitative .



Research results show that even though the TNI has made an effort to adopt sophisticated technology, required development more carry on in training personnel and management change. Collaboration with industry and institutions academics also become factor important in ensure readiness operational in this era.

Keywords : Management Human Resources, Revolution Industry 4.0, Intelligence Made by TNI.

Introduction

Revolution Industry 4.0 has bring very big impact big to various sector life, including in sector defense and security national. Revolution This marked by integration technology advanced like intelligence Artificial Intelligence (AI), Internet of Things (IoT), automation, and big data, which are significant change method Work industry, including sector defense (Ministry of Industry, 2018; Schwab, 2017). Development technology This has create opportunities and challenges new for military around the world, no except for Indonesian National Army (TNI). In the context of TNI, the Revolution Industry 4.0 demands adjustment and transformation significant in management strategy Human Resources (HR), which is bone back success operational and strategic organization military.

Technology like intelligence artificial, automation, and use device autonomous like drones now become integral part of modern defense strategy (Nah Liang Tuang, 2018). Technologies the offer greater efficiency and accuracy tall in operation military, but on the other hand, demands HR capability to can operate and utilize it in a way maximum. In case This, TNI human resources are needed equipped with competence new that is not only related with ability physical and technical, but also digital, technological, and managerial skills.

Shift focus on technology This demand change in paradigm TNI HR management. Personnel military now expected No only Ready in a way physical and mental, but also



has ability relevant technical with demands developing technology (Armstrong, 2006) . Therefore that , it is necessary There is an effective and efficient HR management strategy so that the TNI can adapt with fast to change This is a strategy that does not only prepare personnel For task conventional , but also develop digital and technical competencies needed in the era of the Revolution Industry 4.0 (Johnston & Farley, 2013).

along with rapid development technology in the era of revolution Industry 4.0, HR management becomes the more important and complex . Challenges major problems faced by organizations military , including the TNI, is How ensure their human resources No only Ready in a way physically and mentally , but also technical For utilise technology that continues developing (Brown & Green, 2021). HR readiness in adopt and implement technology new such as AI and IoT in context military is factor key For maintain superiority competitive in the sector defense .

Importance HR management in this digital era can seen from various literature that shows that success transformation technology in various sector very depends on the ability of human resources to adapt and take advantage of technology new (Truscott, 2020). This is also applies in context military , where digital competence , skills technical , as well as flexibility become prerequisite main for personnel military in operate tasks them in the future .

A number of challenges faced by the TNI in the era of the Revolution Industry 4.0 includes digital divide among personnel , lack of infrastructure adequate technology , as well limited access to training based on technology sophisticated (Minister of Defense Regulation No. 12, 2021). Although There is effort For introduce technology new to the TNI, still Lots obstacles that must be overcome overcome , including internal problems in management change and resistance to digital transformation (Grand Design Binpers TNI, 2024). Therefore That , requires more strategy comprehensive in human resource management for face challenges in the era of revolution Industry 4.0.



Study This aiming For analyze relevant HR management strategies for the TNI in face challenges brought by the Revolution Industry 4.0. Research this also aims For identify steps strategic that can taken by the TNI for increase readiness personnel in adopt technology new and ensure effectiveness operational in the future . It is hoped that the findings from study This can give contribution significant in development TNI HR policy in the digital era.

Literature review

Revolution Industry 4.0 brings impact significant in various sectors , including military , which plays a role in defense and security a country. Revolution This marked with development technology advanced like intelligence artificial intelligence (AI), Internet of Things (IoT), and automation , which have change method work and operations in the sector military (Schwab, 2017). Therefore that , management source Power human resources (HR) in context military become challenge important , especially for institution like The Indonesian National Army (TNI) must capable adapt with change technology this .

Development technology in the era of revolution Industry 4.0 requires skills new in various aspect operational and managerial military . Based on studies previous , planning strategic source Power effective human being is key success in face change this . I Made Suryawan and Eko Sakapurnama (2024) stated that the TNI needs strengthen HR competency through planning strategic in order to be able to identify current human resource needs this and in the future . This is in line with view that ability military No only lies in the use technology sophisticated , but also on competent and responsive HR management to change .

study by I Gusti Ngurah Somya Wasana (2023) examined importance human resource management in face challenges of the digital era. In his studies , he find that the digital era is increasing demands to HR competencies , especially in matter skills

technology like data analysis and development Application . Research This highlight the need skills traditional like communication and retrieval decision still relevant , but must combined with skills technology For face modern challenges (Wasana, 2023).

Ahmad Firdaus Lingga et al. (2023) emphasize importance creativity and ability innovation in HR management in the era of rapid technology . They identify that innovation in human resource management , which includes training sustainable , reform systems , and the application of a growth mindset , are very important For creating superior and adaptive human resources to change technology (Lingga et al., 2023). Findings This strengthen view that the TNI needs adopt a proactive HR management strategy that focuses on improving digital competence and innovation .

management theory also highlights importance approach strategic in recruitment , training , and HR development . According to Robbins and Judge (2017), HR culture strong organization is one of factor key in success HR management in the era of revolution Industry 4.0. Culture an organization oriented towards innovation and adaptation can help institution like the TNI in utilise technology new in a way effective . In addition , the culture flexible organization can increase internal and external collaboration , which is very important in human resource development in the digital era.

In context military human resources development , training digital and simulation based the more acknowledged as effective method For increase skills and readiness operational . Sitzmann (2011) in his studies conclude that training based on simulation own impact positive on retention knowledge and skills compared to with method training conventional . Simulation allow personnel military For to practice real world scenario in controlled environment , improving readiness they in face situation complex operations .

In line with theory learning adults (andragogy) proposed by Knowles (1984), training For personnel mature must relevant and engaging participation active . In the

context of the TNI, the approach This very relevant Because personnel military tend more effective in learn skills new when the material presented relevant with tasks operational they . With Thus , the training program digital based involving simulations and real world scenarios very in accordance For military human resource development .

In addition to training , evaluation and measurement The success of the HR development program is also important . Kirkpatrick (2006) developed an evaluation model training that includes four levels : reaction , learning , behavior , and results . Evaluation at each level level This allow organization For evaluate effectiveness training and identify areas that need improvements . In the context of the TNI, this model can applied For ensure that the training program implemented produce impact positive on performance operational and HR readiness .

In an attempt optimize Human Resource Management in the Revolution Era Industry 4.0, TNI also needs notice infrastructure available technologies . Some study show that digital divide among personnel military Still become challenge big , especially related with access to technology advanced like intelligence artificial and IoT (Grand Design Binpers TNI, 2024). Therefore that , improvement infrastructure technology , especially in the area remote , very important For ensure equal access to digital- based HR training and development .

In general Overall , existing literature show that the HR management strategy is adaptive , technology- oriented , and based on innovation is key success in face challenges of the Revolution era Industry 4.0. Research previous has show that collaboration between institution military , academic , and industrial can increase effectiveness of HR training and development programs . In addition , the culture organizations that support innovation and adaptation also play a role role important in success HR management in the digital era.

Methodology Study



Study This use approach descriptive qualitative For analyze management strategies source Power human (HR) in the environment The Indonesian National Army (TNI) in face challenges of the Revolution era Industry 4.0. This method chosen Because study aiming For understand phenomenon complex social , especially in context human resource management in institutions the military facing development technology like intelligence artificial intelligence (AI), automation , and the Internet of Things (IoT).

Data in study This collected through interview deep with TNI personnel from various level , observation field , and study documents that include TNI policy related to human resource management in the technology era . Interview done with leadership and personnel TNI operations involved direct in development and implementation technology sophisticated . Observation used For see how is the training program based on technology applied in practice daily . Documents analyzed including report official TNI, policy defense , as well as related HR training and development programs Revolution Industry 4.0.

Data analysis was performed with approach analysis thematic . Researcher identify patterns and themes from results interviews , observations , and documents , which are then interpreted For describes the strategy used by the TNI in human resource management in the technology era This . Data validation is performed with technique triangulation , where the results from various source verified For ensure consistency and accuracy information .

Result of study This expected can give outlook about readiness and challenges faced by TNI human resources in facing the era of revolution Industry 4.0, as well as recommend steps strategic that can taken For increase effectiveness human resource management in the TNI.

Results and Discussion

Study This aiming For analyze management strategies source Power human resources (HR) of the Indonesian National Army (TNI) in face challenges of the Revolution era Industry 4.0. The Revolution This has bring change significant in various aspect life , including sector defense , where technology like intelligence artificial intelligence (AI), Internet of Things (IoT), big data, and automation has become part not inseparable of modern defense strategy . Therefore that , the TNI needs adapt management of its human resources so that it can follow development technology In the section this , will outlined results research and discussion in a way deep .

1. Readiness of TNI human resources in Face Revolution Industry 4.0

Based on results interviews and observations , found that readiness of TNI human resources in face Revolution Industry 4.0 is still be at the stage transition . In In general , the TNI has show awareness and commitment For integrate technology advanced to in its defense strategy . However , the challenges main issues faced is limitations competence technical among TNI personnel . Some senior officer stated that the TNI has start apply training based on technology , but implementation and adoption Not yet evenly distributed throughout unit . For example , the use of drones, systems weapon automatic , and intelligence artificial has start applied in several part , but Lots personnel Still need training advanced For can operate technology the with maximum .

Researchers also found that skills digital base yet fully controlled by some big personnel . In some case , senior personnel who are accustomed to with analog technology feel difficulty adapt with more digital technology complex . This constraint especially seen in generation more personnel old , who needs time longer for learn and adapt self with development technology . On the other hand , more personnel young show more capabilities Good in adapt with technology new , but Still need training

addition For increase ability more technical specific , such as programming system or operation AI devices .

This result in line with theory human resource management which states that HR readiness in face change technology very depends on capacity training provided as well as readiness individual in adopt skills new . For that is , adaptive and responsive human resource development to change technology become very important .

2. TNI Human Resource Management Strategy in the Revolutionary Era Industry

4.0

The TNI has formulate a number of strategies for increase HR readiness in face challenge technology in the era of revolution Industry 4.0. One of the main strategies is improvement capacity training and development digital skills . TNI has Work The same with various institution education and industry technology For give training based on technology to personnel . Training programs This covers introduction AI technology , automation , and big data analysis , which are expected can increase competence personnel in manage system defense based modern technology .

Collaboration with institution academic and industrial This has started , but Still There is room For development more continued . Several training programs are organized by universities and industry Not yet integrated fully with need TNI specific . In addition , the limitations budget For training based on technology also becomes constraint in expand training program coverage This to all over TNI units .

In this regard with management changes , the TNI also implemented an adjustment program culture organizations that support innovation and adaptation technology . culture the military previously very hierarchical and conventional acknowledged as one of the factor inhibitor innovation , especially in matter development digital skills . Therefore that , the TNI is trying change pattern think its personnel For more open to change and innovation . One of the method used is with promote use technology in

activity everyday , such as implementation system digital information for administration military , digital simulation in exercise combat , as well as use device digital communications in the field .

Study this also found that There is need urge For increase cooperation between the TNI and the sector industry in matter adoption technology military latest . Although the TNI has make an effort to weave connection with various sector industry , technology transfer and knowledge Still limited . Challenge main in cooperation This is difference between need very military specific with innovation more technology general developed by the industry .

3. Main Challenges in TNI Human Resources Management in the Revolution Era Industry 4.0

Key Challenges in TNI Human Resources Management in the Revolution Era Industry 4.0

In facing the challenges of the Revolution era Industry 4.0, the Indonesian National Army (TNI) is faced with various issue complex in management source Power human resources (HR). Technology like intelligence artificial intelligence (AI), Internet of Things (IoT), automation , and big data analytics have become integral part in operational modern military . However , for utilise technology This in a way maximum , TNI human resources must own adequate and capable digital competence adapt with change very technology fast . Research This identify a number of challenge the main problems faced by the TNI in managing human resources in this era , namely gap digital competence , resistance to changes , limitations infrastructure technology , limited budget , and lack of collaboration with industry and academia .

The Gap Digital Competence

One of challenge the biggest in TNI human resource management is existence gap digital competence among personnel . Based on results research , found that more

personnel young generally own more capabilities Good in operate digital technology compared more personnel old . Generation more personnel young more used to with digital technology because they grow in the middle progress rapid technology . On the other hand , senior personnel , who hold Lots position strategic , tend to experience difficulty in follow development technology . This is cause gap competence in various levels organization , which hinders adoption technology new in the TNI environment .

The Gap This become serious problem Because senior personnel , who play a role in taking decision strategic , often not own deep understanding about technology used by more advanced personnel young . As a result , the process of taking decision related adoption technology often hampered , because more personnel old feel hesitant or not enough believe self in implement technology new . Limitations This slow down innovation in the environment military and can reduce effectiveness TNI operations in the Revolution era Industry 4.0.

The Gap competence This is also exacerbated by the limitations access to training based on technology , especially in units located in remote areas . Digital training that supports development skills technical No evenly , so that create inequality between the unit in the center with units in the area Border . Infrastructure lack of technology adequate in some the area also inhibits access personnel to training technology , which is very required For increase digital competence .

Resistance to Change

Apart from the gap competence , resistance to changes also become significant challenges in human resource management in the TNI environment . Although the TNI has make an effort change culture organization to be more open to innovation technology , still Lots personnel who feel reluctant or No comfortable with use digital technology in task everyday . Resistance This caused by various factors , such as old habits , distrust to

technology new , and concern that technology No can replace skill tactical and operational that have owned .

A number of personnel long - serving military feel that digital technology does not will capable replace experience the field they have . They tend more choose method conventional in operate task and feel not enough Certain that technology can give more solutions effective . View This often hinders TNI's efforts to do digital transformation in comprehensive . In addition , the changes rapid technology also gives rise to concern will the disappearance work certain that during This run manually , so that increase resistance to adoption technology .

For overcome resistance This , the TNI needs strengthen management programs changes that emphasize importance adoption technology as part from modernization military . A more inclusive in training technology can also help reduce resistance , with give emphasis that technology will complement , not replace , skills traditional which has There is .

Limitations Infrastructure Technology

Another challenge faced by the TNI is limitations infrastructure technology , especially in units located in remote areas or borders . In some unit , technology advanced such as drones, AI, and systems defense automatic has start applied , but many military units are still Not yet own access to adequate digital infrastructure . Some area even Not yet own stable internet access , which is element base in the era of the Revolution Industry 4.0.

Limitations infrastructure This No only influence operational military , but also hampers the training process based on technology . Without adequate infrastructure , personnel in the area remote difficult access important digital training programs For increase skills they in operate technology new . Inequality infrastructure this also raises

inequality in readiness operational in various units , where the units have access technology tend more Ready compared to units that are not .

For overcome problem this , is required investment big in development infrastructure technology all over TNI units . Increase internet network , provision device adequate technology , as well provision facility equitable digital training very important For ensure readiness all over unit in face challenge Revolution Industry 4.0.

Budget and Priorities

Budget limited defense also becomes factor inhibitor in TNI human resource development in the technological era This . Revolution Industry 4.0 requires investment big in matter infrastructure technology , training and development digital skills . However , the priority TNI budget at the moment This Still Lots focused on needs urgent operations , such as modernization defense equipment and improvements readiness combat . With Thus , the allocation budget For human resource development is often not become priority main .

As a result , the training program based on technology , which is very required For prepare TNI personnel in adopt technology new , often marginalized . Limitations budget This impact directly on the TNI's ability to innovate and utilize technology latest in operational military . If the budget For human resource development is not improved , the TNI will difficulty compete with other countries' military that has more proceed in adoption technology military .

For overcome challenge This , the TNI needs allocate budget in a way more proportional , with give larger portion big For development of human resources and technology . The government can also play role important with provide budget special addition used For human resource development based on technology .

Lack of Collaboration with Industry and Academics

Collaboration between the TNI, industry and academics is one of key success in development technology military in many developed countries . However , in Indonesia, collaboration This Still limited . Although There is effort For strengthen partnership with sector industry and academia , knowledge and technology transfer Not yet walk optimally .

One of the cause is difference interests and goals between the TNI and the sector industry . Industry more focus on profit commercial , while the TNI needs solution very technology specific and customized with need military . In addition , the involvement of academics in development technology the military is still there too limited , especially in matter relevant research and development (R&D) with TNI needs .

For overcome challenge This , the TNI needs strengthen collaboration with industry and academia through research programs together and development technology more military focus . Formation center research military involving parties from sector industry and academia can become solution For speed up adoption technology new suitable with need TNI operations .

TNI Human Resources Management in the Revolution Era Industry 4.0 faces various complex challenges , starting from gap digital competence , resistance to changes , limitations infrastructure technology , up to limitations budget and less than optimal collaboration with sector industry and academia . For overcome challenges This , the TNI needs implement more strategies comprehensive , with focus on improvement training technology , modernization infrastructure , as well as strengthen collaboration with party external . With Thus , the TNI can more Ready face future challenges and remain competitive in the middle progress technology global military .

4. Solutions and Recommendations For Overcome Challenge

Study This identify a number of challenges faced by the TNI in management source Power Human Resources (HR) in the Revolution Era Industry 4.0, as well as give

solutions and recommendations For overcome challenges said . One of the step strategic importance is training program enhancement based on technology . TNI needs expand range training this , especially in areas that have limitations infrastructure technology . Development of relevant digital training programs with need modern military becomes priority . Researchers recommend that the TNI strengthen partnership with institution education and industry technology use create module appropriate training with challenge operational future military . Technology simulation is also necessary integrated in training , because can give experience real without risk , help personnel prepare self in situation dangerous with more Good .

Change culture organizations in the TNI also become key important in reduce resistance to technology . Although adoption technology has started , resistance Still found in various layer organization . For overcome This , the TNI needs build culture more organization adaptive and open to innovation . Leadership military must become example in use technology everyday , good in activity operational and also administrative . In addition , promotions skills technology in a way area across the unit must be done , ensure that all personnel exposed relevant and engaged technology in its development . With build supportive environment innovation , resistance to change will reduce in a way significant .

Besides training and culture organization , infrastructure powerful technology become foundation important for success human resource management in this era . TNI needs speed up development infrastructure technology all over units , especially in border areas and regions remote areas . Adequate infrastructure , such as stable internet access and devices Sophisticated technology , really required For support training based on technology . Researchers recommend existence allocation budget specifically used For development this digital infrastructure . Equality access to technology all over unit

military will ensure that No There is the remaining units in development ability digital , which is very important For readiness operations evenly distributed throughout the TNI.

Budget is factor determinant in human resource management and implementation technology in the TNI. Research This recommend that the government and TNI consider allocation more budget big For Human resource development in the era of revolution Industry 4.0. Allocation balanced budget No only need focus on modernization defense equipment , but also must covers investment in training technology and development personnel digital competence . Management strategy more budget efficient need applied For ensure that every rupiah invested give impact maximum . With management more budget well , TNI can prepare personnel they with more Good For face challenge technology in the future .

Lastly , collaboration between the TNI, industry and academics is element key that has not been utilized optimally . Researchers recommend that the TNI strengthen connection with sector leading industries and universities For create center research and development technology military . This center can become means For do research together , develop technology innovative military , as well as give training to personnel related technology latest relevant with need defense . Strong collaboration with industry technology and academics will also ensure that the TNI continues get access to technology latest and research latest supporting readiness operational they .

In general Overall , solutions and recommendations This emphasize on strengthening training , change culture organization , development infrastructure technology , allocation more budget appropriate targets , and improvement collaboration with party external . With apply steps This in a way comprehensive , TNI can increase readiness personnel they in face challenges of the Revolution era Industry 4.0, ensuring that their human resources own required skills For utilise technology new optimally .

5. Implications Strategic TNI Human Resources Management

Based on results analysis , management of TNI human resources in the era of the Revolution Industry 4.0 requires adjustment big in various aspects . This era marked by rapid development technology advanced like intelligence artificial intelligence (AI), automation , and the Internet of Things (IoT), which have an impact significant on operations military . For still competitive and relevant , the TNI needs implementing adaptive HR management strategies , including training personnel , changes culture organization , as well as strengthening infrastructure technology . Steps This No only will increase ability technical personnel , but also ensure readiness more operational good in the future .

Challenge first thing to do overcome is gap digital competence among TNI personnel . Development fast technology create need will skills new , especially in matter operation system technology the military is increasingly sophisticated . Generation more personnel young generally more easy adapt with technology new , temporary senior personnel often experience difficulty in control digital skills . The gap This potential hinder effectiveness operational Because senior personnel , who are responsible answer on taking decision strategic , less control technology used by subordinates them . Therefore that , a more comprehensive training program is needed broad and structured , which includes all over levels TNI personnel , in order to reduce gap the .

Challenge both faced is resistance to changes in organization . TNI, as institution with structure strong hierarchy and culture conventional , often facing difficulty in adopt technology new . Many personnel feel comfortable with method conventional and less believe self use digital technology in task everyday . For overcome problem this , the TNI must do transformation culture more organization progressive , encouraging innovation , as well as give support to personnel to be more open to use technology . Leadership military must become example in implementation technology , so that can create culture more organization adaptive to change .

Infrastructure technology also becomes element key in TNI human resource management in this era . Although a number of unit has own access to technology advanced such as drones and systems defense AI based , many units , especially in the areas isolated , still experience limitations digital infrastructure . Unreliable internet access adequate and lacking device relevant technology hamper the training process digital based . For ensure readiness operations that are evenly distributed throughout unit , TNI needs speed up development infrastructure technology , especially in areas that are still left behind . This is will increase ability all over personnel in access training technology and improve readiness operational in a way comprehensive .

Collaboration between the TNI, industry and academics also become component important in face challenge Revolution Industry 4.0. Cooperation with industry technology and institutions academic can accelerate knowledge transfer and development technology more military sophisticated . Establishment center research and development involving third party This can become solution strategic in increase innovation technology military in Indonesia. In addition , through close collaboration , the TNI can Keep going get access to technology up to date as well as research latest relevant with need defense .

In general Overall , the management of TNI human resources in the era of the Revolution Industry 4.0 requires a more approach comprehensive and strategic . Adjustment in training , change culture organization , strengthening infrastructure , as well as improvement collaboration with party external become key success . With proper human resource management , the TNI does not only will increase effectiveness operational , but also capable guard security and sovereignty of the state in the midst change increasingly advanced technology fast . Implementation technology a sophisticated military , supported by competent personnel , will become factor determinant in guard superiority Indonesia's defense in the future .

Conclusion

Study This aiming For analyze management strategies source Power human resources (HR) of the Indonesian National Army (TNI) in face challenges of the Revolution era Industry 4.0. This era marked with rapid development technology like intelligence artificial intelligence (AI), Internet of Things (IoT), big data, and automation , which are transforming various aspect life , including in the sector defense . In the context of military , technology This present opportunity at a time challenge big , so the TNI must adapt human resource management to remain relevant and effective in a very modern era dynamic This .

Based on results research , found that readiness of TNI human resources in face Revolution Industry 4.0 is still be at the stage transition . In one side , TNI has start integrate technology advanced to in its strategy and operations , but on the other hand , competence technical requirements For operate technology the Not yet evenly distributed among personnel . The digital divide between senior and junior personnel become one constraint main . More personnel young show more adaptation Good to technology new , temporary more senior personnel tend to experience difficulty in follow development technology .

Challenge Another issue faced by the TNI is resistance to changes . As institution with culture very military hierarchical and conventional , the TNI often encounters obstacle in adopt approach new , especially those involving digital technology . Many personnel are still feel comfortable with ways traditional and less open to innovation technology . This is show importance management effective change For prepare TNI human resources in face challenge Revolution Industry 4.0.

In addition , the limitations infrastructure technology in the TNI environment is also one of the obstacle significant . Although a number of unit has equipped with technology advanced like drones and AI, still Lots units , especially those in the regions remote ,

which has not been own access to adequate digital infrastructure . Limitations access This hamper the process of training and development of human resources, so that No all personnel get equal opportunity in develop their digital skills .

Management in the TNI in the Revolution Era Industry 4.0 also faces challenges limited budget . Revolution Industry 4.0 requires investment big , good in procurement infrastructure technology and also in the HR training and development program . However , the priority TNI budget still focused on needs operational and modernization defense equipment , so that training based on technology often lacking get adequate attention . For face challenge This requires a management strategy more budget efficient , where human resource development and investment technology can made into priority together with modernization defense equipment .

In facing the challenges this , TNI has formulate some strategies for increase HR readiness in the technology era . One of the main strategies is through training programs based on technology . Collaboration with institution academic and industrial technology has started , but Still need expanded and improved . Existing training programs moment This covers introduction AI technology , automation , and big data, which are expected can increase competence personnel in manage system defense based on technology . However , the implementation and reach of training programs This Still limited , especially in areas with lack of infrastructure adequate .

Culture organization also becomes one of focus in the TNI human resource management strategy . The TNI is trying to change culture conventional and hierarchical military become more open to innovation and technology . Changes This expected can reduce resistance to use digital technology in operational military everyday . One of the the method used For push change This is with promote use technology in activity everyday , such as use system digital information for administration military and digital simulation in exercise combat .

In addition, research This find that collaboration with industry and institutions academic very important For increase TNI HR readiness in the Revolution era Industry 4.0. Although the TNI has make an effort to weave connection with various sector industry, technology transfer and knowledge Not yet walk optimally. Challenges main in cooperation This is difference between need very military specific and focused more industry general. Therefore that, improvement more cooperation close and strategic between the TNI, industry and academics is needed so that TNI personnel can access technology latest and take advantage of it optimally.

Recommendation main from study This is importance strengthening training programs based on technology For all over TNI personnel, especially in units located in the regions remote. Training program This must covers basic digital skills as well as more technology specific like drone operations, AI, and big data analysis. In addition, it is necessary There is investment more carry on in infrastructure technology For support training and operational processes military based on technology.

TNI also needs allocate more budget big For Human resource development in the era of revolution Industry 4.0. In addition to focusing on modernization defense equipment, development competence personnel must become priority so that the TNI can utilise technology new optimally. Researchers recommend the existence of a management strategy more budget flexible, which allows allocation of funds for training technology without sacrifice need operational military other.

Change culture organizations in the TNI also need accelerated For support adoption technology. culture innovation must promoted at all levels of the organization, with leader military play a role as example in use technology in activity operational. TNI must create supportive environment innovation, where personnel feel comfortable and supported in develop their digital skills.

Beside that , collaboration between the TNI, industry and academics must strengthened . TNI needs to be expand network cooperation with sector industry technology For ensure optimal knowledge transfer and facilitate development technology appropriate military with need TNI specific . Establishment center research and development together between the TNI, industry and academics can also become step strategic For accelerate adoption technology in the environment military .

In general overall , research This show that the TNI has potential big For managing resilient and adaptive human resources in the era of the Revolution Industry 4.0, as long as challenges faced can overcome with the right strategy . Strengthening training based on technology , change culture organization , improvement digital infrastructure , and greater collaboration close with sector industry and academia is key success in increase readiness of TNI human resources in an increasingly era integrated with technology . With proper human resource management , the TNI will capable guard sovereignty and security of the state in the midst of change rapid technology .

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