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Leadership Strategies for Managing Human and Technological Diversity in the Industrial 5.0 Era: A Systematic Review

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Abstract

The problem formulation that arises from this research is how the efforts made by leaders in the industrial era 5.0 overcome problems related to the process of managing HR diversity and technological changes in increasing business innovation in order to increase business productivity and business sustainability, so that they can survive the changes that exist. This research focuses on discussing the efforts of leaders to overcome the problems of the process of managing HR diversity and technological changes in the 5.0 era in order to increase business innovation to increase business productivity and business sustainability. The results of the data analysis used used descriptive qualitative analysis using literature studies through systematic literature review. The research method uses a quantitative descriptive method of data analysis using the structural equation model (SEM) method, where the results of data processing with the SEM method are carried out with the PLS application. From the results of the study, it is concluded that the 5.0 leadership efforts in overcoming the management of HR diversity in increasing business innovation, namely building an inclusive culture, recognizing and appreciating diverse contributions, empowering employees, building intercultural skills, supporting inclusive research and development, using technology that supports engagement and collaboration and diversity-oriented monitoring and evaluation. The results concluded that the 5.0 leadership efforts in overcoming technology management in increasing business innovation, namely a deep understanding of technology, creating an environment that supports technological innovation, focusing on employee engagement and skills, partnering with technology experts, using technology for collaboration and communication, encouraging a culture of experimentation and learning, continuous review of processes and practices and recognition and reward for innovative contributions. Along with managing the diversity of human resources and technology in increasing business innovation, it can create more creativity and make leaders have to follow the direction and be able to adapt to changes so that the company can improve its performance and can continue to run its business optimally and be able to meet consumer needs properly.

Keywords: *Leadership, Industrial Era 5.0, HR Diversity, Technology, Business Innovation.*

Introduction

Leadership is a process effort to influence and encourage individuals or groups to achieve specific goals. It involves using a variety of skills, attitudes, and behaviors to inspire, guide, and motivate others toward a desired outcome. Leadership is not limited to formal positions in an organization; it can emerge from individuals at all levels and in a variety of contexts, including business, politics, education, and community. (Strielkowski, Wadim, 2022). Leadership involves the ability to influence the thinking, behavior, and actions of others. This can be done through effective communication, setting a good example, and building strong relationships. Leadership also involves the ability to motivate others. This can be done by giving rewards, providing positive feedback, or creating a supportive and encouraging work environment. Leadership often also involves future-focused decision-making, taking into account the long-term impact of current actions and decisions. (Ndraha, Ayler Beniah and Uang, 2022)..

In the industrial era 4.0, leadership is needed to face new challenges and opportunities caused by rapid and extensive digital transformation. Industry 4.0 is characterized by the integration of advanced digital technologies, such as artificial intelligence, *Internet of Things* (IoT), big data, cloud computing, and robotics, into production and manufacturing processes. (Yin, Shi, Wang, Yuexia and Xu, 2022).. In this context, leadership needs to adapt its style and practices to optimize the potential of technology and manage its

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impact on the organization and team members, where leadership in this industrial era 4.0 needs to have a clear vision of how digital technology can be used to achieve business goals and develop appropriate strategies to implement these technologies effectively. (Santhi, Abirami Raja and Muthuswamy, 2023).. Leadership in the Industrial Age 4.0 must be agile and able to adapt quickly to continuous technological change. They must be ready to change business models, operational processes, and organizational structures in accordance with technological developments. Leaders need to act as change agents in leading digital transformation in their organizations. They should encourage the adoption of new technologies, motivate employees to participate in change, and create an innovative and technology-oriented culture. (Mourtzis, Dimitris, Angelopoulos, John and Panopoulos, 2022)..

While it is not always necessary to be an expert in technology, leaders in the Industry 4.0 Era need to have a strong understanding of the latest technology trends and developments, as well as their impact on various aspects of business. Effective leadership in the Industry 4.0 Era relies on data-driven decision-making. Leaders need to use data analysis to identify opportunities and challenges, measure performance and strategize based on evidence. Leaders in the Industrial Age 4.0 must adopt a transformational leadership style, which inspires, motivates and moves others towards a shared vision. Leadership in the Industrial Age 4.0 must prioritize digital skills development for employees and promote a culture of continuous and innovative learning. (Santos, Gilberto, 2021).

Leadership in the Industrial Age 4.0 requires leaders to think creatively, flexibly, and strategically in the face of the challenges and opportunities presented by digital transformation. Effective leaders are those who can combine expertise in technology with emotional intelligence, transformational leadership, and the ability to build strong relationships with others. This is very important so that leadership in the 4.0 era is not too rigid and also always adaptive to existing changes, so that it is able to make the right decisions, and is able to be innovative in managing the organization so that the organization always adapts to the changes experienced by industry 4.0. (Zizic, Marina Crnjac, 2022).

Industrial civilization 4.0 is known around 2010-2020, then in 2021 we are in the industrial era 5.0, where this era requires leadership that is able to bring a country's civilization to increase and be respected by the world, and respected by other countries, where technological changes and business needs can occur quickly in Era 5.0. (Mejía-Manzano, Luis Alberto, 2022).. Leadership needs to be agile and adaptive to these changes, with the ability to adjust strategies and tactics more quickly than in Industry 4.0. Effective leadership in the 5.0 Era must be open to new and diverse ideas, and involve employees in the decision-making process. This involvement allows the organization to take advantage of the diversity of knowledge and experience its members have (Akundi, Aditya, 2022).

Leadership in the 5.0 Era must understand and leverage technology wisely to improve efficiency, productivity, and innovation in the organization. This includes understanding the potential of artificial intelligence, data analytics, and other digital platforms to achieve organizational goals. In the 5.0 Era, organizations are often connected in complex global networks. Leadership must be able to manage increasingly complex dependencies and build mutually beneficial partnerships with other organizations. Leadership in the 5.0 Era needs to lead with integrity and be grounded in strong values. This includes corporate social responsibility, desirability, and the environmental impact of organizational decisions. (Alojaiman, 2023).

In Era 5.0, change is happening fast. Effective leadership should encourage a culture of continuous learning in the organization, where mistakes are seen as opportunities for learning and innovation. Leadership in Era 5.0 must encourage interdepartmental and even interorganizational collaboration. Collaborative leadership enables organizations to optimize resources and achieve common goals more effectively. Leadership in the 5.0 Era is not just about keeping up with technology trends, but also about managing the social, economic and ethical impacts of rapidly evolving technologies. Successful leaders in the 5.0 Era will have a deep understanding of the complex interactions between technology and people, as well as the ability to steer organizations through rapid and uncertain change. (Holroyd, 2022).

Leadership in the industrial era 5.0 must be able to see carefully about the drastic changes in the business

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or business environment, as well as changes in the external environment, where leadership in the 5.0 era must know well the environment in which the business is established, how the leader's efforts can apply the capabilities possessed and adapted to the increasing use of technology in order to create the application of technology interspersed with the application of organizational culture and work culture in the internal environment as well as the external environment, so that the running of the organization is not hampered, and can make leaders have integrity, and be able to increase the depth of memory so that leaders can take a policy that is adapted to real changes and adaptations to the environment. (Carayannis, Elias G and Morawska, 2022)..

In leadership in the era 5.0 not only prioritizes technological improvement, but also the diversity of human resources which is a force that can create a resilient organization that can keep up with changes and be able to adapt, and organizations can translate diversity from culture, gender or gender, educational background and competence, as well as expertise and experience, where the organization must understand how the intricacies of the culture around the business environment or organization are established so that later the changes that want to be implemented do not collide with the culture of the community, so that it does not become a conflict that makes the organization or company threatened with its existence which affects the sustainability of the business, so that it does not become a conflict that makes the organization or company threatened with its existence which affects the sustainability of the business, so that leadership is needed that is able to overcome problems related to cultural differences that exist in the human resources owned, as well as community culture that can be synchronized and can make a force that can improve quality through existing cultural aspects that can make organizations or companies adaptable and able to survive in terms of technological change. (Hu, Chengli, Yang & and Yin, 2022).

Differences in gender or sex can also affect the existence of an organization or company, where organizations that have a variety of genders will be better able to adapt to environmental differences, including technological changes, so that when dealing with this, existing human resources are no longer with the existing changes and can adapt well, so that leadership policies are needed so that organizations or companies are able to absorb human resources with different sex or gender, because it is possible that on the one hand these different genders have different educational backgrounds and competencies, so that they can complete the work and adaptation process as expected. In addition, differences in experience and expertise can support the adaptation process of the organization and be able to avoid the organization from the confusion process experienced by the organization so that it does not stutter when changes occur in this 5.0 era. (Aslam, Farhan, 2020).

The problem that makes the difference in leadership in the 5.0 era through HR diversity and technology that makes HR productivity in increasing innovation is that the existing leadership is still unable to describe and analyze changes due to HR diversity through culture, gender, education level and differences in expertise and experience synchronized with technological changes, so that many organizations and companies are still unable to withstand changes and have not been able to adapt, so they still apply the old paradigm that is unable to synchronize with conditions in the era 5.0 which makes many businesses or organizations still experience bankruptcy, because the existing leaders are unable to make the right policies, so that the condition of the company or organization is unable to keep up with the existing conditions which causes the company or organization to collapse or bankruptcy which makes the existing risks increase.

Literature Review

Industry 5.0 Leadership

Leadership in the Industrial Age 5.0 faces more complex challenges and dynamics than ever before, with the adoption of advanced technologies such as artificial intelligence increasingly surprising. Industry 5.0, in this context, can refer to a new phase in industrial evolution characterized by the deepening integration of digital, physical, biological and human technologies (Longo, Francesco. Padovano, Antonio and Umbrello, 2020). Leadership in the Industrial Age 5.0 is not only about managing technological change, but also about

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understanding its impact on people, society and our planet. Effective leaders in the Industrial Age 5.0 will be those who can combine a broad vision with inclusive, collaborative and socially responsible leadership (Blštáková, Jana, 2020). Below are some key aspects of leadership in the Industrial Age 5.0:

- Holistic Vision and Strategy, where leaders in the Industrial Age 5.0 need to have a holistic vision of industry changes and the ability to design strategies capable of dealing with them. This involves understanding the impact of the latest technologies, global economic trends, and complex market dynamics.

- Adaptability and Flexibility, where leadership in the Industrial Age 5.0 must be able to adapt and adapt quickly to rapid and uncertain change. They need to take their organizations through continuous transformation to remain relevant and competitive.

- Understanding Advanced Technologies, where leaders in the Industrial Age 5.0 must have a deep understanding of advanced technologies such as artificial intelligence, quantum computing, biotechnology, and other technologies that may fundamentally change the industrial landscape.

- Human Empowerment and Artificial Intelligence, where leadership in the Industrial Age 5.0 requires a balance between human empowerment and artificial intelligence. Leaders need to ensure that technology is used to enhance human productivity and creativity, not replace it.

- Ethics and Social Responsibility, where in the face of the ethical and social applications of rapidly evolving technologies, leadership in the Industrial Age 5.0 must act with integrity and prioritize corporate social responsibility. This includes considering the impact of technology on workers, communities, and the environment.

- Skills Development and Workforce Development, where leaders in the Industry 5.0 Era must invest in skills development to prepare the workforce for new demands. This includes training in new technologies, understanding of Industry 5.0 concepts, and developing "soft" skills such as problem-solving and creativity.

- Organizational Innovation and Flexibility, where leaders need to create a culture of innovation and doctrine within their organization, where new ideas are accepted, tested, and implemented quickly. This allows the organization to remain adaptable to rapid market and technological changes. (Rosak-Szyrocka, Joanna, 2022).

Industry 5.0 Leadership in Managing HR Diversity to Increase Business Innovation

Industry 5.0 leadership in managing HR diversity in order to increase business innovation refers to a leadership approach that understands and values diversity in the workforce (HR) as one of the keys to stimulating sustainable innovation. (Mejía-Manzano, Luis Alberto, 2022).. Here are some important principles and strategies for Industry 5.0 leadership in this context:

- Inclusivity and Openness, where Industry 5.0 leaders must create a work environment that is inclusive and open to different backgrounds, views and experiences. This allows different ideas and perspectives to flourish, encouraging creativity and innovation.

- Valuing Diversity, where leaders must actively value diversity in HR and strengthen it as an organizational asset. This can be done by recognizing and rewarding diverse contributions, and promoting diversity in teams and projects.

- Intercultural and Interdisciplinary Collaboration, where leaders should facilitate collaboration between individuals from different cultural, ethnic and disciplinary backgrounds. This can stimulate

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the exchange of innovative ideas and perspectives, and lead to more creative and holistic solutions.

- Team Empowerment, where Industry 5.0 leaders need to strengthen team empowerment by giving enough autonomy and responsibility to team members. This allows them to express their creativity and innovation without unnecessary barriers.

- Training and Skills Development, where leaders should invest time and resources in training and development to strengthen interpersonal, problem-solving, and team collaboration skills. This helps improve the effectiveness of communication and teamwork, which is an important foundation for innovation.

- Facilitate an Environment of Experimentation and Learning, where Industry 5.0 leaders must create an environment where accepted risks and failures are seen as part of the innovation process. This allows team members to experiment, learn from mistakes, and develop new and bold solutions.

- Encourage Creativity and Reward Innovation, where leaders should encourage creativity by providing time and space for team members to think outside the box. In addition, they should also recognize and reward innovative results, whether it's a new product, service or process.

- Integrating Diverse Skills and Perspectives, where leaders must ensure that HR diversity is not only recognized, but also seen in business strategy and decision-making. Combining diverse skills and perspectives can lead to more comprehensive and innovative solutions. (Tavares, Maria C., Azevedo, Graça and Marques, 2022)..

By applying these principles, Industry 5.0 leadership can create a work environment that supports continuous innovation. This helps organizations to remain competitive and relevant amidst the rapid and complex changes in an increasingly industrialized era. (Russ, 2021).

Industry 5.0 Leadership in Managing Technology to Increase Business Innovation

Industry 5.0 leadership in managing technology to enhance innovation efforts requires a progressive and adaptive approach to rapid technological change. (Poláková, Michaela, 2023). Here are some important principles and strategies that can be applied in this context:

- Clear Technology Vision and Strategy, where leaders must have a clear vision of how technology can be used to enhance innovation in their business. This involves crafting the right strategy to effectively apply technology to achieve innovation goals.

- Adoption of Relevant Technologies, where leaders need to understand and adopt relevant and current technologies to support innovation efforts within the organization. This could include technologies such as artificial intelligence, *Internet of Things* (IoT), big data analytics, and blockchain, depending on the type of business and innovation needs.

- Collaboration with Technologists, where leaders should build partnerships with technologists and innovators to gain the insights and support needed to implement new technologies. This collaboration can help accelerate the development and adoption of innovative solutions.

- Technology Skills Development, where leaders should invest in technology skills development for their employees. This can be done through training, further education, or partnerships with education and training institutions.

- Use of Data for Decision Making, where Industry 5.0 leadership must use data effectively to

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support evidence-based decision making. Careful data analysis can help identify innovation opportunities, understand market needs, and measure the impact of innovative solutions.

- Employee Empowerment in the Innovation Process, where leaders must encourage employee participation in the innovation process. This can be done by facilitating idea forums, team-based innovation projects, or incentive programs for idea proposals. (Iizuka, Michiko and Ikeda, 2021).

By applying these principles, Industry 5.0 leadership can create an environment that supports the growth of business innovation. This helps organizations to remain relevant and competitive in an ever-changing and evolving marketplace. (Borchardt, Miriam, 2022).

Framework of Thought

The framework of this research is:

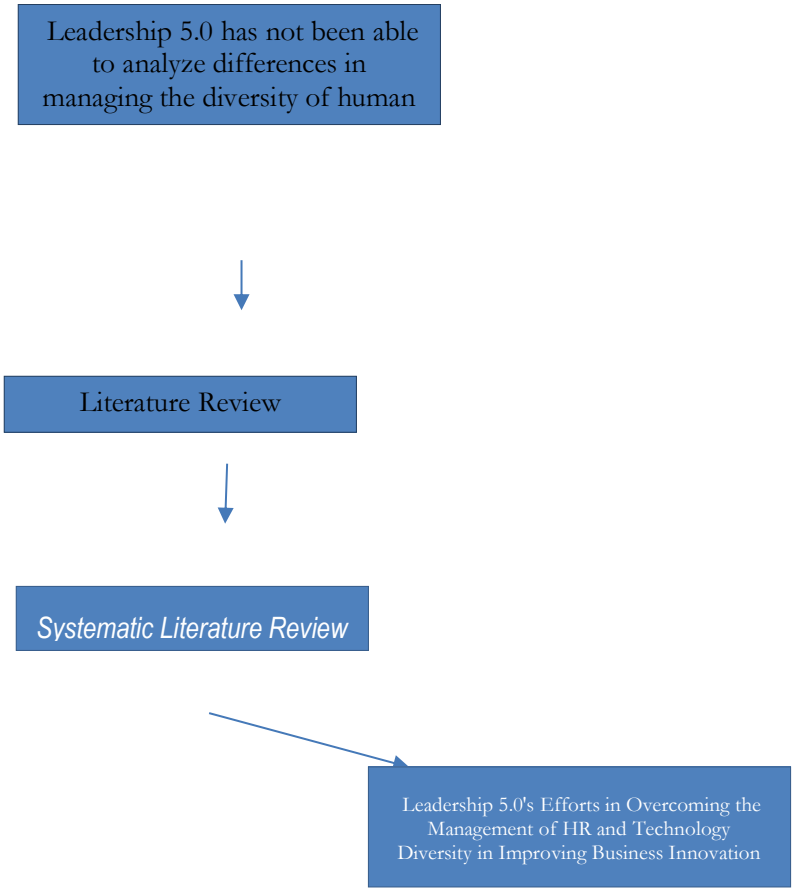

Figure 1. Framework of Thought

Methods

This research method uses a qualitative descriptive method using literature study analysis. According to (Rane, 2023) descriptive qualitative method using literature study analysis is a research approach used to describe phenomena or circumstances in detail and in depth by analyzing various relevant literature sources. data analysis is carried out through *Systematic Literature Review*, which according to (Saniuk, Sebastian, Grabowska, Sandra and Straka, 2022). (Saniuk, Sebastian, Grabowska, Sandra and Straka, 2022) *Systematic Literature Review* analysis analyzes data in a systematic and structured manner to compile, rotate, and synthesize

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all relevant literature on a particular research topic. Data collection techniques are carried out through documentation studies, where documentation studies are methods that involve collecting and analyzing data from various documents or written materials that are relevant to the research topic. The documents used can be in the form of journal articles, books, research reports, as well as historical records (Grabowska, Sandra, Saniuk, Sebastian and Gajdzik, 2022)..

Results and Discussion

Results

Leadership 5.0 Efforts in Overcoming HR Diversity Management in Improving Business Innovation

Leadership 5.0's efforts to address the diversity of HR management in enhancing innovation efforts require an inclusive, adaptive, and progressive approach. Here are some strategies that can be applied:

- Inclusive Culture Building, where 5.0 leaders must create an inclusive work culture, where every individual feels valued and supported, regardless of their background, identity or characteristics. This includes increased tolerance, appreciation of diversity, and improved intercultural collaboration.

- Recognition and Appreciation of Diverse Contributions, where leaders should actively recognize and appreciate the diverse contributions of team members. This includes rewarding and recognizing individuals or groups who have provided innovative ideas or solutions, regardless of their background.

- Employee Empowerment, where leaders must empower all team members to actively participate in the innovation process. This can be done by providing opportunities for employees to contribute with their ideas, supporting the development of their skills and competencies, and giving greater responsibility in innovative projects.

- Intercultural Skill Building, where leaders must ensure that team members have the necessary skills to communicate and collaborate with people from different cultural backgrounds. This involves training on cultural awareness, cross-cultural communication, and diversity-sensitive conflict resolution.

- Support Inclusive Research and Development, where leaders should support research and development that reflects the diversity of society and markets. This includes ensuring that team members from diverse backgrounds have equal access to resources and opportunities to contribute to the innovation process.

- Use of Technology that Supports Engagement and Collaboration, where leaders can use technology to facilitate engagement and collaboration between geographically or culturally different team members. Online collaboration platforms, digital communication tools, and knowledge management systems are some examples.

- Diversity-Oriented Monitoring and Evaluation, where leaders must regularly maintain and activate the effectiveness of their efforts in managing HR diversity and enhancing innovation. This involves continually reviewing existing policies, processes and practices, and making necessary changes to improve inclusion and creativity. (Zhanbayev, Rinat A., 2023).

Leadership 5.0 Efforts in Overcoming Technology Management in Improving Business Innovation

Leadership 5.0 efforts in addressing technology management in improving business innovation require a progressive, adaptive, and targeted approach. Here are some strategies that can be applied:

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- Deep Understanding of Technology, where 5.0 leaders must have a deep understanding of the latest technology relevant to their business. This involves keeping up with technological developments and understanding how they can be applied to advance innovation within the organization.

- Creating an Environment that Supports Technological Innovation, where leaders must create a work environment that supports technological innovation, where employees feel encouraged to experiment with new technological solutions and encourage innovative ideas.

- Focus on Employee Engagement and Skills, where leaders need to ensure that employees have the necessary skills and knowledge to adopt and use new technologies. This involves ongoing training and development in technology.

- Partnerships with Technologists, where leaders can establish partnerships with technologists and technology companies to gain the necessary insights and support in implementing new technologies and formulating innovation strategies.

- Use of Technology for Collaboration and Communication, where leaders can use technology to facilitate collaboration and communication between team members involved in the innovation process. Online collaboration platforms, digital communication tools, and project management software are some examples.

- Encourage a Culture of Trial and Learning, where leaders should encourage a culture of trial and learning in the organization, where failure is accepted as part of the innovation process. This allows employees to experiment with new technological solutions without fear of the consequences of mistakes.

- Continuous Review of Processes and Practices, where leaders should conduct a continuous review of the processes and practices of managing technology in the organization. This involves identifying areas that need to be enhanced or improved to increase the effectiveness and efficiency of technology use.

- Recognition and Reward for Innovative Contributions, where leaders should actively recognize and reward the innovative contributions of employees in managing technology and advancing business innovation. This includes providing rewards or incentives to individuals or teams that successfully develop impactful technology solutions. (Khan, Parvez Alam, Johl, Satirenjit Kaur and Johl, 2021)..

Discussion

Based on the results of the study, it states that leadership 5.0 efforts in overcoming HR diversity management in increasing business innovation, namely building an inclusive culture, recognizing and appreciating diverse contributions, empowering employees, building intercultural skills, supporting inclusive research and development, using technology that supports engagement and collaboration and diversity-oriented monitoring and evaluation. This is in line with research (Kasinathan, Padmanathan, 2022) which states that the management of HR diversity must be carried out by the leadership in order to encourage HR that can increase innovative capabilities to assist the leadership in translating the company's desire to increase productivity by considering differences in ethnicity, culture, expertise and skills that exist. The results also state that 5.0 leadership efforts in overcoming technology management in increasing business innovation, namely a deep understanding of technology, creating an environment that supports technological innovation, focusing on employee engagement and skills, partnering with technology experts, using technology for collaboration and communication, encouraging a culture of experimentation and learning, continuous review of processes and practices and recognition and reward for innovative contributions. This is in accordance with research (Ghobakhloo, Morteza, 2021) which

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states that the use of technology in the 5.0 era is inevitable, where the use of technology makes leaders have to increase innovation using technology that is useful to add product value and increase employee competence to help leaders improve product quality in order to be competitive and productive.

Conclusion

From the results of the study, it is concluded that the 5.0 leadership efforts in overcoming the management of HR diversity in increasing business innovation, namely building an inclusive culture, recognizing and appreciating diverse contributions, empowering employees, building intercultural skills, supporting inclusive research and development, using technology that supports engagement and collaboration and diversity-oriented monitoring and evaluation. The results concluded that the 5.0 leadership efforts in overcoming technology management in increasing business innovation, namely a deep understanding of technology, creating an environment that supports technological innovation, focusing on employee engagement and skills, partnering with technology experts, using technology for collaboration and communication, encouraging a culture of experimentation and learning, continuous review of processes and practices and recognition and reward for innovative contributions. Along with managing the diversity of human resources and technology in increasing business innovation, it can create more creativity and make leaders have to follow the direction and be able to adapt to changes so that the company can improve its performance and can continue to run its business optimally and be able to meet consumer needs properly.

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