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Human resource development in higher education institutions in the era of digitization

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Abstract

Human resource development in higher education institutions in the era of digitization is a process of enhancing and improving the skills and capabilities of human resources using modern technology. This process involves transforming traditional information into digital formats and integrating technology into educational and administrative processes. It is based on stages of implementation that include basic improvement, technological integration, comprehensive digital transformation, and the encouragement of innovation and research. International examples include renowned universities like Harvard, Stanford, MIT, and Oxford, which have adopted technology to deliver online education and enhance access and educational quality. This digitization contributes significantly to improving the learning and educational experience in higher education institutions.

✓ Keywords: Digitization. Digital Transformation, higher education institutions.

1. INTRODUCTION

In our current era, technology and digitization have become integral parts of our daily lives, significantly impacting various sectors, including higher education. In this context, human resource development in higher education institutions in the age of digitization emerges as a vital and essential concept. These new technological transformations present numerous challenges and opportunities for higher education institutions to enhance the quality of education and improve the efficiency and effectiveness of human resource management.

In this article, we will delve into human resource development in higher education institutions in the digital age and how it can be enhanced and evolved through digitization. We will begin by defining the concept of human resource development in this context and explore its key characteristics. Additionally, we will discuss the stages of implementation in higher education institutions and provide international examples that illustrate how digitization has been adopted in universities worldwide.

To start, let's define the concept of human resource development in higher education institutions in the era of digitization. Human resource development entails improving and developing the skills, abilities, and knowledge of the human workforce within educational institutions. In this context, development involves the adoption of modern technology and its effective use to enhance educational and administrative processes and increase productivity and quality.

One prominent feature of human resource development in the era of digitization is the transformation of traditional information into digital formats. This means that educational institutions digitize course content and administrative documents, facilitating easy access to and sharing of these materials online. Digitization also encompasses the integration of technology into educational processes, such as using e-learning and virtual reality to enhance the student experience.

The application of human resource development in higher education institutions unfolds through multiple stages. These stages include basic improvement, where technology is adopted to enhance fundamental processes like human resource management and information systems. Next comes technological integration, where technology is more extensively integrated into educational processes, and then comes comprehensive digital transformation, where education and administration become entirely digital. Finally, development encourages innovation and research to utilize technology for improving educational processes.

International examples of this approach include leading universities such as Harvard, Stanford, MIT, and Oxford. These universities have successfully embraced technology to deliver online

education and enhance access and educational quality. This success reflects how digitization can significantly contribute to improving the learning and teaching experience in higher education institutions.

2. Importance of human resource development in higher education institutions

Higher education institutions (HEIs) have undergone significant digital transformation in recent years, known as digital transformation (DT). This transformation is essential for institutions to remain competitive and adapt to industry demands. To survive in this rapidly changing landscape, HEIs must embrace digital transformation and rethink their business practices. While many institutions have developed digital strategies, (Alenezi, 2023) there is still a need for more vision, capacity, and dedication to successfully implement these strategies. Research on digital transformation in higher education is necessary to identify unique perspectives and characteristics. Digitization has a significant impact on human resources (HR) development in higher education. (Torill Holth & Ole Boe, 2019) Digital technology influences HR performance and skills, facilitating institutional transformation. Establishing relationships between institutions, colleges, businesses, and government is crucial. Digital leadership guides HEIs through digitization, with both transformational and transactional leadership styles necessary for success. Digital transformation also affects educational engagement, with collaborative frameworks and technology-enhanced learning activities playing a vital role. The maturity of digital leadership in HEIs is essential, requiring capabilities in vision, strategy, power distribution, staff, pedagogy, culture, and technology. However, there is a lack of robust research informing digital leadership practice and skills development. (Niță, 2023) In conclusion, digitization has profoundly impacted HR development in higher education, necessitating the adaptation of strategies and practices. Visionary leadership is crucial for navigating technology integration while maintaining student engagement and organizational goals. (J. Jameson, et al., 2022) Further research is needed to understand DT implementation in HEIs and develop strategies for the fourth industrial revolution.

In the context of higher education institutions, human resource development plays a crucial role in adapting to the digital transformation and ensuring its successful implementation. The digitalization of education has brought about significant changes in teaching and learning processes, making it essential for higher education institutions to focus on developing their human resources.

One of the main benefits of digitalization in the educational process is the creation of favorable conditions for the development of independent learning skills. Through online courses and digital tools, students are empowered to take control of their learning journey and select resources for self-

development. This shift towards self-directed learning requires teachers to enhance their psychological, technological, and public speaking talents. By improving these skills, educators can effectively utilize virtual tools and create engaging learning environments for students. (Alenezi, 2023)

Furthermore, digitalization in higher education institutions provides opportunities for students to develop important skills needed in the digital age. These skills include applying knowledge learned in online education, solving technical problems related to distance learning, and enhancing communication skills necessary for organizing educational processes in virtual institutions.

It is also crucial to increase access to electronic resources and provide training on digital technologies and electronic resources for all segments of society. Public organizations and international educational structures should work towards this goal to ensure that potential higher education seekers are equipped with the necessary digital skills.

The process of digitalizing education requires careful planning and implementation. Higher education institutions need to establish effective methods for integrating digital technologies into pedagogical approaches and create an environment that supports their successful use. This includes addressing regulatory and methodological aspects, defining the areas where digital technologies can be applied effectively, and providing necessary support for teachers and students.

Leadership plays a critical role in managing the digital transformation within higher education institutions. Effective leadership is needed to navigate continuously changing demands and opportunities associated with digitization. Leadership styles such as transformational and transactional leadership are essential in creating a conducive environment for digital transformation processes.

Moreover, leadership processes within higher education institutions directly influence student participation in digital transformation processes. The openness and accessibility of digital education are mediated through leadership processes, both in terms of management and teaching staff. Therefore, it is crucial to focus on developing leadership competencies that support digitalization efforts.

In conclusion, human resource development plays a significant role in the digital transformation of higher education institutions. (Niță, 2023) By focusing on developing educators' skills and providing students with the necessary digital competencies, institutions can effectively adapt to the demands of the digital age. Effective leadership is also crucial in managing the digital transformation process and creating a conducive environment for digitization efforts. (J. Jameson, et al., 2022) With careful planning and implementation, higher education institutions can fully leverage the potential of

digitization to enhance teaching and learning outcomes.

3. Characteristics of digitization in higher education

Digitization in higher education refers to the integration of digital technologies and online platforms into various aspects of education. Its goal is to enhance teaching, improve administrative processes, and provide students with new learning opportunities. From a sociological perspective, digitization aims to improve society by promoting work skills and stakeholder growth. It also focuses on enhancing the legitimacy of higher education institutions through technological change. (J. Jameson, et al., 2022) From a technical standpoint, digitization provides technology support for areas such as human resources management, instructional development, accessibility to educational resources, and research activities. The main objectives of digitization include curriculum development, business process optimization, administration efficiency improvement, (Alenezi, 2023) employment access enhancement, market expansion opportunities, research advancement, and internet marketing strategies. Students play a crucial role in driving the digitization process as they benefit from improved learning experiences and access to online resources. Teachers' professional development is essential to effectively utilize virtual tools and facilitate online education. Successful digitization requires a well-thought-out digital marketing strategy that involves all critical participants. (Niță, 2023) It should consider the transformational framework and allocate sufficient resources for implementation. Technical and pedagogical support should be provided to enhance teachers' digital competencies. Overcoming resistance to change and re-engineering underlying technologies are necessary to manage the complexity of the digital transformation process. In conclusion, digitization in higher education prepares students for the digital era and meets the evolving needs of the labor market.

Digitization in higher education aims to improve society, enhance work skills, promote stakeholder growth, and increase accessibility. It involves leveraging technology in areas such as human resources support, instruction, development, organization, accessibility, marketplace availability, construction processes, community engagement, and research. Technologies like digital technology, online communities, learning management systems, big data analytics, and online educational platforms play a vital role. (J. Jameson, et al., 2022) Digitization benefits students by promoting independent learning, resource selection, and problem-solving skills. (Alenezi, 2023) Successful digital transformation requires well-thought-out strategies involving all stakeholders and a comprehensive digital marketing strategy. University lecturers should seek technical and pedagogical support, while institutes of advancement can provide essential infrastructure resources.

(Susanti Saragih, Jann Hidajat Tjakraatmadja, & Andika Putra Pratama, 2023)The establishment of a digital technological center is crucial for managing various aspects of digital transformation. The process of digitization in higher education is complex and requires further exploration and integration across all dimensions. Revisiting and reorganizing technology is necessary to adapt to changing societal needs. Overall, digital transformation should be viewed as a comprehensive change that encompasses cultural contexts, individuals' roles and interactions with technology, standard operating procedures, pedagogical approaches, and administrative regulations.

4. Stages of Implementation in Higher Education Institutions

4.1. Identification and assessment of needs for digitization

Digitization is crucial for higher education institutions to thrive in the digital age. The goals of digitization include improving society, developing work skills, and enhancing legitimacy. Technological goals include providing support for human resources, (Alenezi, 2023) instruction, and research. To effectively integrate digital technology, institutions must consider the digital learning ecosystem, which includes organizational structure, culture, leadership, and talent. Leadership plays a critical role in managing the challenges of digital transformation. (Torill Holth & Ole Boe, 2019) Adapting to new labor market requirements and teaching digital competencies are important aspects of digitization. (Lina María Castro Benavides, Johnny Alexander Tamayo Arias, Martín Darío Arango Serna, John William Branch Bedoya, & Daniel Burgos, 2020)Assessing digital competencies and addressing barriers are necessary for successful implementation. Institutions must have a comprehensive understanding of managing digitization.

4.2. Planning and strategizing for digitization implementation

Planning and strategizing for the implementation of digitization in higher education institutions is crucial. The digital transformation is driven by factors such as online courses, digital technologies, and the need to optimize operational costs. (Vladislav Kaputa, Erika Loučanová, & Fernando A. Tejerina-Gaite , 2022) To successfully incorporate digital technologies, institutions should have a clear vision and specific goals. (Torill Holth & Ole Boe, 2019) A strategic plan with strong leadership and a specialized team is important. Digital partnering can enhance decision-making processes and offer condensed training courses. However, there are challenges such as infrastructural capacity and re-engineering underlying technologies.

Leadership plays a crucial role in driving digital transformation. Both transformational and transactional leadership styles can enhance digitalization processes. Leadership processes specific to management and teaching staff influence the openness and accessibility of digital transformation. It's

important to recognize that digitization is a means to achieve educational goals more efficiently. (Alenezi, 2023) Organizational development and cultural change are necessary for successful implementation.

In conclusion, effective planning and strategizing are necessary for implementing digitization in higher education institutions. (Susanti Saragih, Jann Hidajat Tjakraatmadja, & Andika Putra Pratama, 2023) This includes setting clear goals, developing strong leadership structures, addressing challenges, and recognizing the role of leadership in driving digital transformation. Embracing digitization can enhance teaching and learning processes and adapt to the demands of the digital era.

4.3. Execution and implementation of digitization initiatives

Digitization initiatives in higher education institutions (HEIs) are essential for adapting to the digital transformation of the Industrial Revolution 4.0. Digital technologies and online courses have revolutionized teaching and learning, with students using them to enhance their educational experience. (Torill Holth & Ole Boe, 2019) The implementation process involves assessing digital competency in areas such as information access and problem-solving. (Florence Martin & Kui Xie, 2022) Leadership plays a crucial role in driving digital transformation, with transactional leadership styles being particularly important in this context. Clear goals and a strategic vision are necessary for successful implementation, involving strong leadership and a specialized team. (Alenezi, 2023) Digitization requires addressing challenges, developing staff expertise, coordinating technology and organizational changes, and fostering structural changes. HEIs should invest in platforms designed for their needs, such as low-code/no-code platforms that don't require extensive IT resources. (Bing, 2023) In conclusion, leadership, strategic vision, and coordination are key factors in successful digitization implementation in HEIs. By prioritizing goals, developing expertise, and leveraging appropriate platforms, HEIs can embrace the opportunities of digital transformation.

5. International Examples of Digitization in Universities

Digitization has had a profound impact on higher education worldwide, with universities embracing digital technologies to enhance their educational and administrative processes. This essay will explore some international examples of digitization in universities and how they have transformed higher education HR development.

One notable example comes from Norway, where the government recognized the need to adapt to the changing digital landscape and initiated the design of a digitization strategy for the university and college sector. The intention was to ensure that technology was effectively integrated into all levels of education, from organizational practices to teaching and research. Institutions and

administrative agencies were encouraged to develop their own digitization strategies, aligning technology with learning outcomes.

The Norwegian Ministry of Education and Research played a crucial role in providing strategic direction for higher education's digitization efforts. Clear expectations were set, along with future projections and task distribution. A four-part goal was established as part of the national digitization strategy, aiming to create "smart" higher education institutions that are interconnected and flexible in responding to industry demands.

Looking beyond Norway, there are numerous other successful examples of digitization in universities around the world. Industries such as finance, healthcare, and manufacturing have leveraged digital technologies to improve efficiency, and universities have followed suit.

For instance, some universities have implemented online learning platforms like Blackboard or Moodle as learning management systems (LMS). These platforms provide students with access to course materials, assignments, and communication tools. Additionally, libraries have embraced digital systems like Open Athens or Google Classroom for efficient access to research resources.

Universities have also utilized digital technologies for research project planning and execution. Tools like ORCID (Open Researcher and Contributor ID) enable researchers to establish their unique digital identities while facilitating collaboration across institutions.

Furthermore, universities play a vital role in providing high-quality education for emerging industries' workforce needs. They offer specialized majors in fields such as the Internet of Things (IoT) and virtual reality, aligning their disciplinary layout with digital development. These universities serve as important bases for academic research and technological innovation, contributing directly to the growth of the digital industry. (Bing, 2023)

It is worth noting that the success of digitization in higher education goes beyond scale and quantity. The structural and quality improvements in higher education play a crucial role in driving digital development. (Torill Holth & Ole Boe, 2019) Measures such as training high-level talents and increasing investments in research and development are necessary to ensure sustained progress.

In conclusion, digitization has significantly impacted higher education HR development globally. Examples from Norway and other international universities demonstrate how digitization strategies have been implemented to integrate technology into all aspects of education. By embracing digital technologies, universities can enhance efficiency, improve learning outcomes, and contribute to the transformation of industries through a skilled workforce. The continuous advancement of digitization in higher education will undoubtedly shape the future of HR development in this sector.

6. RESULTS AND DISCUSSION

6.1. Advantages offered by digitization for human resource development in higher education institutions

Digitization has brought numerous advantages for human resource development in higher education institutions. The construction of digital-related disciplines in higher education provides specialized training that produces digitally competent employees and contractors. These individuals become crucial support for the development of digital industries. The dissemination of digitized knowledge and information through higher education plays a significant role in fostering a vibrant digital economy. By offering new companies the ability to develop and function soundly in the digital realm, higher education has become one of the key drivers of digital development.

One of the main advantages offered by digitization in higher education is the ability to create shared digital learning spaces and virtual classrooms. These digital learning environments allow for enhanced accessibility and flexibility, enabling students to learn without constraints of time or geography. Digitization also enables the delivery of learning materials and administration work through digital technology, such as monitoring absenteeism and assessing students' and teachers' performance. This not only enhances the learning experience but also improves efficiency in educational processes.

In addition to improving accessibility and efficiency, digitization in higher education contributes to human capital development. The scale of higher education institutions and the number of students impact the stock of human capital, which in turn shapes the capacity for knowledge innovation and increases potential for digital technological progress. By providing training on digital skills and competencies, higher education institutions prepare students for life in the digital age and equip them with practical skills necessary for Industry 4.0.

Moreover, digitization fosters collaboration between higher education institutions and industry partners. These partnerships allow for the transfer of knowledge, skills, and foresight required for industrial complexity. By aligning their curricula with industry needs, higher education institutions contribute to bridging the gap between academia and industry. (Bing, 2023)

However, along with these advantages come challenges that need to be addressed. The differences in structure and quality among higher education institutions can influence the level of human capital available. Factors such as composition of postgraduate and undergraduate levels, proportion of teachers with senior titles, and capacity for research and development play a crucial role in shaping the potential for technological transformation and upgrading. (Niță, 2023)

In conclusion, digitization has brought significant advantages for human resource development in higher education institutions. It enhances accessibility, efficiency, and collaboration between

academia and industry. However, addressing challenges related to the structure and quality of higher education institutions is essential to fully harness the benefits offered by digitization. By recognizing the impact of digitization on higher education and investing in the quantity and quality of education, we can ensure a positive impact on digital development.

6.2. Challenges faced by institutions when developing human resources for digital transformation

The digitization of higher education has brought about a significant transformation in the development of human resources for digital transformation. This essay will explore the challenges faced by institutions when developing human resources for digital transformation in the era of digitization.

Higher education institutions play a crucial role in providing specialized training and knowledge in digital-related disciplines. These disciplines produce digitally competent employees and contractors who become essential assets for the development of digital industries. The dissemination of digitized knowledge and information through higher education forms the foundation for a vibrant digital economy.

However, there are several challenges that institutions face when developing human resources for digital transformation. One such challenge is ensuring both the quantity and quality of education. The scale of higher education institutions and the number of students enrolled affect the stock of human capital, which shapes the capacity for knowledge innovation and promotes digital technological progress.

Furthermore, differences in the structure and quality of higher education, such as postgraduate and undergraduate levels, composition of teachers with senior titles, and research and development capabilities, influence the level of human capital available. These resources are crucial for technological transformation and upgrading, which contribute to the rapid development of digital industries.

Digital technology continues to evolve rapidly, impacting the relationship between higher education and economic development. Higher education institutions must adapt to this changing landscape by incorporating digital learning spaces and virtual classrooms into their programs. (Niță, 2023) This requires rethinking business practices throughout the value chain to effectively utilize all the opportunities created by accessible digital technologies.

To address these challenges, institutions need to develop specialized digital strategies that align with technological advances. They must also have a clear vision, sufficient capacity, and dedication to implementing these strategies successfully. (Bing, 2023)

In conclusion, developing human resources for digital transformation in higher education faces various challenges. Institutions must ensure both quantity and quality in their educational programs while adapting to rapidly evolving digital technologies. By overcoming these challenges, higher education can continue to play a vital role in driving digital development forward.

7. Conclusion

7.1. Restate the importance and relevance of human resource development in the era of digitization

In conclusion, the era of digitization has brought significant importance and relevance to human resource development in higher education. The impact of Chinese higher education on High-Quality Economy Development (HQED) has been examined from a digital perspective, revealing key findings. Firstly, the advancement of China's higher education has shown a significant contribution to HQED, confirming previous studies that highlight the role of education and human capital in economic growth. The optimization and improvement of the higher education personnel training structure have enhanced workforce skills and become a driver for the development of emerging industries, leading to economic transformation and upgrading.

Moreover, higher education plays a crucial role in promoting digital development at a national level. It goes beyond simply expanding scale and quantity, as structural and quality improvements are equally important. The massification and generalization of higher education in China have provided a foundation for digital development through increased student enrollment, the establishment of more schools, and a variety of educational disciplines. These regions have leveraged their universities' advantages in digital transformation and science and technology to open majors related to the digital economy, forming a disciplinary layout that adapts well to digital development. Universities not only provide intellectual support but also serve as important bases for academic research and technological innovation.

Furthermore, it is essential to consider the impact of fiscal expenditure level and digital governance on higher education's role in HQED. An increase in fiscal expenditure can weaken this impact by reducing market orientation and competition mechanisms. On the other hand, improved digital governance enhances the influence of higher education on HQED by enabling better administrative operations and data sharing.

These findings have practical implications for Chinese provinces seeking to implement coordinated development between higher education and the economy amidst rapid digital advancement. Local governments can leverage digital development to transform the advantages of higher education into support for HQED through various measures such as cultivating digital talents,

increasing investment in educational innovation, expanding educational scale effectively, and promoting positive interactions between higher education institutions and HQED.

In conclusion, human resource development in higher education is of utmost importance in the era of digitization. It not only contributes to economic growth and the development of emerging industries but also plays a crucial role in promoting digital development at a national level. (Jie Zhang & Zhisheng Chen, 2023) The integration of digital technologies and digital governance in higher education institutions further enhances their impact on HQED. (Svetlana Ashmarina, Anabela Mesquita, & Marek Vochozka, 2020) To fully realize the benefits of digitization, policymakers and stakeholders should prioritize investments in digital infrastructure, administrative capabilities, and the development of appropriate learning environments. (Kasia Lundy & Haven Ladd, 2022) By doing so, higher education institutions can effectively prepare students for the digital economy and improve their engagement and success both during their studies and in their future careers.

7.2. Summation points from each section highlighting key aspects discussed

Digitization has had a significant impact on higher education HR development in China. The expansion of higher education institutions and the improvement of personnel training structures have contributed to high-quality economic development. (Olga Zaborovskaia, Olga Nadezhina, & Ekaterina Avduevskaya, 2020) Higher education also plays a crucial role in promoting digital development at a national level, with universities offering disciplines that adapt to digital technology. Measures such as training high-level talents and increasing investments in R&D are essential for harnessing the full potential of higher education in driving digital development. Fiscal expenditure level and digital governance are important factors that shape the impact of higher education on economic development. An increase in fiscal expenditure proportion weakens this impact, while improved digital governance enhances it. Policymakers should consider structural adjustments to fiscal expenditure and prioritize investments in digital infrastructure and administrative capabilities.

In addition, digitization has transformed higher education by providing access to education for individuals from different backgrounds and equipping them with necessary skills. However, it is important to address potential negative effects such as the degradation of personal communication abilities. (Linda Castañeda & Neil Selwyn , 2018) Higher education institutions need to develop study programs and curricula that consider students' leadership and digital requirements, requiring a redesign of teaching and learning processes and digitally equipped institutions and teaching staff.

There is a lack of attention to digital leadership within research on higher education digitalization. Developing advanced digital leadership capacities is crucial for effectively managing

technological changes in higher education institutions. Clear definitions and theoretical frameworks for digital leadership should be established.

Digitization has also influenced higher education by framing students as entrepreneurial consumers who engage with education flexibly. While it offers increased access to education, it also promotes the idea of higher education as a product.

In summary, digitization has reshaped higher education HR development in various ways. It has contributed to economic development, promoted digital development, and impacted fiscal expenditure and digital governance. Leveraging digitization is key for effective HR development in higher education.

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