

Research Article

Digital Human: Human Capital Development Formulation to Achieve Excellence Industrial Competitiveness

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Abstract: The concept of Human Resources has evolved and developed rapidly. At the beginning of its development, the concept of HR was known as the welfare office or the welfare industry, then it developed into labor management, then into personnel management, then into human resource management and the last stage of development was known as human capital or people management. At this stage it should be time for the concept of HR to change, starting from its definition, strategy, challenges and also the concept of HR in the digitalization era, but unfortunately the development of comprehensive literature at this stage is still lacking. The rapid development of technology in the Industrial 4.0 era has had an impact on the shift in the role of humans as strategic elements in an organization. The transfer of technology marked by the use of Artificial Intelligence (AI) has led to the shift of most of human work to machines. The development of the Internet of Things (IoT) has had an impact on the automation of most jobs. The concept of Big Data with a large volume, speed and variety of data has shifted the role of humans in obtaining, processing and analysing data for managerial decisions. In addition, there is a tendency in the future for companies to turn into a Smart Industry which has an impact on the lack of recruitment and applying high selectivity in the selection of their employees. This phenomenon will continue to grow to a point where humans themselves begin to doubt the existence of humans as a critical and important resource in an organization. Companies are starting to ask "is it still important for people to be retained in their organizations?". Even if some people must be preserved, who should be retained in the organization. This situation becomes a big problem for the continuity of human importance in the industrial world. A concrete solution must be sought to solve the problem of the loss of the role of humans "in their own homes". This study aims to formulate a digital human-based human capital development model by synergizing the roles and responsibilities of educational institutions, government and industry in preparing humans who are able to survive, meet the requirements and exist in the growing "Smart Industry". The research is directed to formulate a digital human model with the research phase starting with a systematic literature review following a structured manuscript.

Keywords: Human Capital, Digital Human, Smart Industry, HR Strategy and Competitiveness.

1.1 RESEARCH BACKGROUND

In the industrial era 4.0, the production process will be digitized and the internet will dominate all industries, companies, and the business world. Automation will be applied to most business activities. These changes will have a significant impact on the colony called humans. Losing a job will even result in a shift in roles from vital elements to being unimportant and not strategic anymore. Currently, the literature related to digital-based HR development is still lacking. Therefore, a comprehensive study is important to do to provide a concept, model or strategy that can be implemented to overcome these problems.

The concept of HR has experienced rapid development, where the latest development is known as human capital. However, this development is not over because the development of technology is happening so fast. HR concepts and strategies need to be defined and reformulated, considering HR challenges are getting bigger and more complex. The digital human designed in this study is a model that represents the latest developments in the evolution of Human Resource Management.

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industry. Smart Industries apply various technology products, such as Cloud, Internet of Things, Artificial Intelligence, Big Data and others to increase industrial productivity and competitiveness. But on the other hand, this change causes a shift in the role of humans and even the loss of jobs for most people. Therefore, this research is very urgent to be carried out to find theories and models that can finally be widely used as concrete solutions to these problems. This study also tries to fill the gap in knowledge that still rarely formulates a human digital model and can be a novelty or research novelty.

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1.2 Research problems

Industrial societies that are actively involved in the process of producing goods or services are currently facing one big problem, namely competition with machines. The existence of humans as a vital element in industry has begun to be questioned. The role of humans has largely been and will be replaced by

machines that can work automatically without any interaction with humans. The research problems can be formulated as follows: (1) How is the formulation of the HR development model in the digitalization era? (2). What is the HR development strategy in achieving competitive advantage in the digitalization era?

1.3 Research Objectives

The specific purpose of this research is to formulate the concept of Digital Human in order to maintain the existence of strategic human functions in organizations. In addition, this research also formulates a strategy for developing human capital in the industrial era 4.0.

2. LITERATURE REVIEW

2.1.1 Human Capital

The term human capital is not a new term because the idea of investing in human capital was first developed by Smith in mid 1776 who discussed it in the book *Wealth of Nations*. Then Marshall in the early 1890s suggested that the concept put forward by Smith, had no empirical use because of the lack of clarity on the measurement methods used in research. Karl Marx in 1883 in his view realized the importance of human capital, but failed to show its importance for economic growth. Becker and Murphy said that human capital consists of knowledge, skills, health, and values. Now the concept has developed to include competencies, capabilities, expertise, abilities, potentials, know-how, motivation, attitude, religions, creativity, innovation, physical attributes, strength, collective power of human assets, and collective knowledge (Becker, 2009).

Surendrakumar said the concept of human capital is relatively more important in labor surplus countries. Surplus human resources can be converted into human resources with the input of effective education, health and moral values. (Bagde, 2008). Furthermore, Berger argues that human capital theory assumes that knowledge brings greater cognitive skills to individuals, thereby encouraging their productivity and efficiency to develop activities (Berger, 2014). Then Neeliah sees from a national perspective, human capital is defined as a set of knowledge, abilities and skills, which are used in activities, processes and services that contribute to stimulating economic growth (Neeliah & Seetanah, 2016).

2.1.2 Digital Human

Generations of humans have lived in several phases. According to Skinner's view, the first phase is when we become human with a natural and physical environment without a touch of technology, transact without money, communicate without media, and travel without means of transportation. The second phase is when humans become civilized, with a better social order, transacting using a tool, namely money. The third phase of humans becomes commercial, when humans create banks and other financial institutions. In the fourth Phase we have

transformed ourselves into Digital Humans (Skinner, 2018).

Digital humans in the industrial era 4.0 are humans who have super potential who are able to take advantage of the latest technology in daily activities. Digital human has a super brain (super brain) that can think quickly and accurately, has a high level of connectivity (Connecting) so that it can connect with all digital media devices and can also interact with anyone, anywhere and anytime (Availability). (Hills, 2010). The concept of digital human is still very limited to be discussed and there is still little discussion and debate among academics and practitioners. So this is very important in order to add scientific literature and novelty in the context of developing science.

2.1.3 Smart Industry

Helmer said that the Smart Industry (Smart Industry) is an industry that is connected with products, machines and people, and the use of new production technologies. Optimization of production through the application of technologies such as 3D printing that makes the industry more efficient, cheaper and improves quality. Machines, robots, and other components that are more intelligent in the production process communicate with each other and this optimizes cooperation among all devices, not only within the company but also between various companies in the value chain. Smart industry enables new businesses to be created from large and diverse information flows based on new affective technologies such as big data, Internet of Things, adaptive robots, nanotechnology and miniaturization, and new sensor technologies (Spagnoletto *et al.*, 2019).

The Smart Industry platform consists of three main components, namely (1) manufacturing technologies: Smart Product, Flexible Manufacturing, Advance Manufacturing. (2) Centric Network: Servitization, and Digital Factory, and (3) Digitalization: Connected Factory, Sustainable Factory and Smart Working. Quoted from TNO Innovation for Life.

2.1.4 Human Capital Strategy

The digital revolution is a human revolution mainly triggered by the industrial revolution 4.0 which ultimately has an impact on people who are engaged in business. The HR Director plays an important role in helping to take the organization into a future that has the potential to be more inclusive, more focused, competitive and have a more positive impact on employees and consumers. Therefore, the Human Capital department must have the right strategy in developing human resources towards a competitive company.

The World Economic Forum/WEF (Spagnoletto *et al.*, 2019) identified six main imperatives that business leaders need to implement in the field of human

resources, namely: (1) Developing new leadership capabilities for 4IR, (2) Managing technology integration in workplace, (3) Improving employee experience, (4) Building an agile and depersonalized learning culture, (5) Establishing metrics for assessing human resources, (6) Instilling diversity and inclusion.

2.1.5 Competitive Advantage

Industry 4.0 includes intelligent interconnectivity between automation, digitization and data analytics driving the latest transformative change. Mid-market manufacturers investing in digital acceleration will better position their organizations to manage competition and disruptions. Organizations need to be ready to run a connected and automated enterprise, otherwise it won't take long for your company to die quickly. (Adnan and Aiyub, 2021)

It was said by Spagnoletto *et al.*, (2019) and explained again that Industry 4.0 is synonymous with smart technology. Its key components are cyberphysical systems, artificial intelligence (AI) and machine learning, advanced data analytics, collaborative robots, virtual reality, sensors, and additive manufacturing (think 3-D printing). This Internet of Things (IoT) "smart device smart connectivity" will be an important component in smart factories, but it is the underlying data systems that will be the main driver of the maturity of the Industry 4.0 strategy.

2.1.6 Novelty of Research

The concept of HR has evolved and developed rapidly, starting with the terms welfare industry, labor management, personnel department, HR management and human capital. Various literatures have been developed according to its development period. The development of technology 4.0 will have an impact on changes in the definition, strategy, challenges and concepts of HR in the digital era. At this stage of development, researchers give the term digital human (digital human). There is still very little literature that discusses how to formulate the concept of digital human and how to design a digital human strategy in increasing competitive advantage. This study tries to fill the gap from the existing literature in the context of developing science, especially in the field of Human Resources.

3. RESEARCH METHOD

This research is a qualitative research through literature study to produce concepts and models that can contribute theoretically and practically.

1. The approach used,

This study uses a Grounded Theory approach which aims to generate or find a theory related to a particular situation. The essence of the grounded theory approach is the development of a theory that is closely related to the context of the event being studied.

2. The process of collecting and analyzing information,

The data was collected by searching the media, both print media and electronic media. Data objects are scientific papers in the form of scientific articles, books, magazines, videos and so on. The data collected is in the form of words, pictures and not numbers. Researchers analyzed the very rich data in its original form. Data from detailed observations, complete descriptions, carefully reviewing documents. Data is also collected through Focus Group Discussions, group interviews, photo talks, responses to pictures, and so on. The data collected is about the latest issues regarding the concept of digital human (digital human), namely the latest developments related to the concept and application of digital human in organizations, both industry and government. After the data is available, the researcher will process it descriptively, which is to describe the existing arguments and conclude them into new concepts and knowledge. The results of in-depth data analysis are then concluded by comparing with various other scientific works and writings, both journals and books.

3. Interpretation

The data or information that has been collected is then analyzed and interpreted through group discussions, then it is written down in a script for more in-depth interpretation.

4. Conclusion of research

The interpreted data is then drawn conclusions and made in the form of a research report.

4. RESEARCH RESULTS

4.2 Digital Human Capital Model

The increasing progress and use of technology and substantial changes in various business and community activities have given rise to various concepts related to digital, such as “digitalization”, “digital transformation”, or “digital disruption”. This concept is currently the most prominent term and is discussed in various scientific meetings as well as the current literature. The digital human capital model is the concept of developing human resources based on digital capabilities in carrying out their duties and functions to achieve organizational goals. Digital human development begins with the digital human process, which is a process that begins with finding humans who have digital abilities.

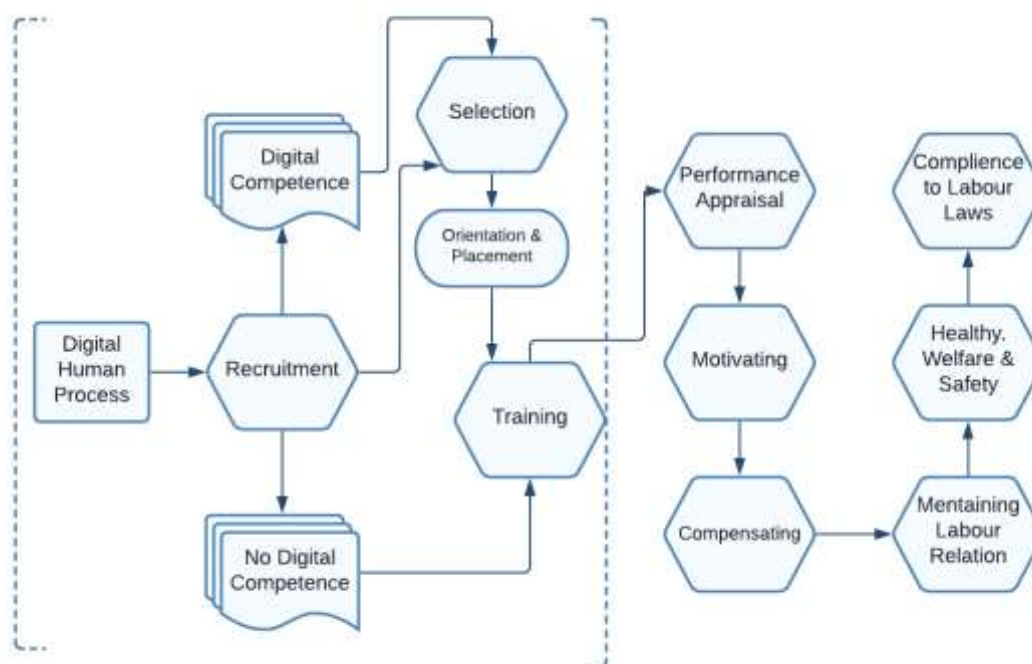


Figure 1. General Model of Digital Human Process

Based on Figure 1, it can be explained that the digital human process consists of a series of stages, which are as follows:

1. Recruitment: It aims to attract applicants who match certain Job criteria. At the recruitment stage, it is necessary to include requirements regarding the digital capabilities of prospective applicants. If

digital skills are not required, then during training they must be trained to master digital competencies

2. Selection: Next level of filtering. Aims to select the most suitable candidate in terms of qualifications, skills and potential for a particular job.
3. Orientation and placement: introduce candidates to the field of work to be carried out and place

- candidates in the field of work that are in accordance with competence.
4. Training and Development: The processes that work on employees to improve their skills and abilities.
5. Performance appraisal is a regular review of the employee's job performance and contribution to the company. Companies use performance appraisals to determine which employees contribute the most to the company's growth, review progress, and reward outstanding employees.
6. Motivating is an organizational effort to motivate employees to be willing to put all their abilities into achieving organizational goals.
7. This process involves determining salaries and wages, incentives, and benefits to employees in return for employee contributions to the organization.

8. Labor relations, is a Public Relations activity to maintain the relationship between the leadership and the labor unions within the company and to help resolve the problems that arise between the two.
9. Occupational Health and Safety (K3) is all science and its application to prevent work accidents, occupational diseases (PAK), fires, explosions and environmental pollution.
10. Employment Law Compliance is mandatory rules and regulations that must be complied with by the company. It is a set of rules and conditions established for work.

4.3 Digital Human Model

To achieve competitive advantage, organizations can design digital human models. The digital human model to achieve organizational goals through utilizing digital capabilities can be shown in Figure 2 below:

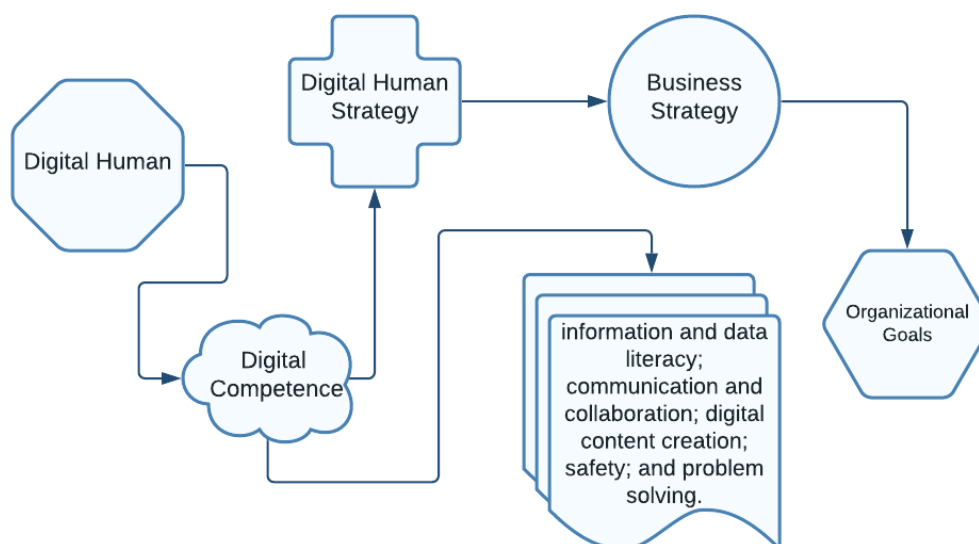


Figure 2. Human Digital Model and Competitive Advantage

Based on Figure 2, it can be explained that digital human consists of humans who have digital competence. Digital competencies can consist of:

1. Information and data literacy: To articulate information needs, to find and retrieve digital data, information and content. To assess the relevance of the source and its content. To store, manage and organize data, information and digital content.
2. Communication and collaboration: To interact, communicate and collaborate through digital technology while remaining aware of cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital identity and reputation.
3. Digital content creation: To create and edit digital content To improve and integrate information and

content into the existing knowledge pool while understanding how copyright and licensing are applied. To know how to give understandable instructions to a computer system.

4. Security: To protect the device, content, personal data and privacy in the digital environment. To protect physical and psychological health, and to be aware of digital technologies for social well-being and social inclusion. To be aware of the environmental impact of digital technology and its use.
5. Problem solving: To identify needs and problems, and to resolve conceptual problems and problem situations in a digital environment. To use digital tools to innovate processes and products. To stay up-to-date with the digital evolution.

To achieve competitive advantage, especially to achieve organizational goals, organizations can formulate business strategies through the use of human resources who have digital competence.

5. Conclusion

Organizations or industries that can survive and be able to compete in the era of digital technology are industries that respond to technological changes and have digitally capable human resources. Besides, it is time for every organization to redesign its human resource processes and redefine its business concepts and strategies.

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