A Propositions and Implications in Conceptualization of Human Resource Competencies 4.0

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Abstract: The purpose of this article is to provide a new conceptualization of human resource competencies for industry 4.0 era. The authors aim to base their new conceptualization on extensive evidence from literature review, and synthesis of the review of literature. An extensive literature review of the extant conceptualizations and operationalizations of human resource competencies for industry 4.0 era is first carried out. Based on the review and synthesis of literature, a human resource competencies 4.0 with three domain areas is conceptualized, through several propositions in the paper. The human resource managers can now apply more specifically, any of the three dimensions areas of human resource competencies 4.0 and understand the conditions under which a particular dimensions area is important for employees to understand the changes caused by the industrial revolution 4.0 and adjust the competencies possessed by these changes.

1 INTRODUCTION

The industrial revolution 4.0 provides disruption, and changing challenges for the entire scope of the business world. The manufacturing process is experiencing automation and digitalization which are increasingly narrowing the role of humans in the production process (Hecklau et al., 2016). Transforming the role of human resources is a major concern both for companies and for humans themselves (Rahardjo, 2014). Human Resources (HR) who do not master digital literacy sooner or later will be eliminated. Types of jobs that can be automated include data processing, machine running, administrative tasks and others (Institute, 2017). The development of the industrial revolution marked by the use of massive technology, the Internet of Things, Big Data and Artificial Intelligence (Brijesh Sivathanu, 2018) had an impact on the disruption of the role of human resources within the company. As technology develops rapidly in every aspect of human life, every organization needs competent human resources (Kock, 2008). Competence is a collection of human resources that dynamically demonstrate intellectual capacity, quality of mental attitude and capability of a person

(Correll et al., 2004). Competence is the initial capital that must be owned by an employee to be able to carry out work in accordance with their duties and responsibilities (Lestariningsih, Mei 2018). Human resource competence is the main characteristic possessed by a person that causes him to be able to perform effectively and excel at work, which includes a combination of: knowledge, skills, attitudes, and personal characteristics needed to achieve success in a job (Spencer, 2003). Competence is defined as the ability or ability possessed by someone in carrying out their work (Boyatzis and Boyatzis, 2008).

In accordance with the development of the industrial revolution, human resources must have the capability to face job challenges that increasingly narrow the role of humans in the company. Competence is an absolute thing that must be owned by the employees and the business people that are adjusted to the demands of the times. The concept of human resource competency 4.0 is a submission of the concept of competency based on the development of the industrial revolution which has reached the stage of the industrial revolution 4.0, so that employee competencies must be adjusted to the demands of the development of the industrial

revolution 4.0. Human resource competency 4.0 is the submission of the concept of competency that is compiled based on the synthesis of literature review and future management encouragement and the development of competencies for businesses to deal with Industry 4.0. Therefore the dimensions of competencies are adjusted to develop and build appropriate competencies for the future.

In this article, we try to conceptualize human resource competencies 4.0 on the practice of human resource management concepts. The concept of human resource competence that is developing at this time, has a very general dimension that consists of skills, knowledge and abilities that have not been focused on the needs of the industrial world that is highly developed and requires flexible and adaptative human resources who have competencies in accordance with the development of the revolution industry. Therefore we provide a new conceptualization of human resource competency constructs, which are more forward-looking, such as integrating the practice of human resource management concepts with knowledge, expertise and other specific capabilities that are manifested by human resources within the company. We first conduct an extensive literature review of the concept of human resource management and its derivatives. We then carry out analysis of theoretical content and synthesis of relevant literature to take key the theoretical factors that underlie the construct to derive three dimensional areas.

Based on these three dimensions, we provide a new conceptualization of the construction of human resource competencies. The new definition has clear boundaries that are depicted, are more contemporary and apply broadly, these three dimensions include:
(1) Core competencies
(2) Managerial competencies;
(3) Core value competencies;

This research has several important managerial implications for the company / industry and human resource department managers, in terms of looking at the readiness of employees to face any changes that come both from within and outside the company, and in carrying out special training based on the needs of the required competencies, as well in terms of considering individual characteristics and competencies possessed by prospective employees during the recruitment and selection process.

2 LITERATURE REVIEW

2.1 The Human Resource Management Concept

Human resources have a very important role in achieving company goals. In a very dynamic and competitive business world, human resources are increasingly showing their role in achieving company goals. The resources of the company are basically limited, so the company is demanded to be able to empower and optimize its use to maintain the company's survival. Of the various resources owned by human resources, the company occupies a strategic position among other resources in the company. Human resource management is currently moving along with the times when external shaking conditions are an important factor that must be considered in achieving company goals. The change in paradigm for human resource management is absolutely happening along with the changes faced. Humans are the most valuable resources in the company that must be managed professionally by focusing on the functions of human resource management namely the formation function, maintenance function, motivation function and development function (Suhariadi, 2013). Furthermore, the challenges faced by the business world today are influenced by the development of globalization and the industrial revolution, which makes the competition in the business world more stringent, and makes aspects of the quality and competence of human resources are very important. At the company level, competency management for human resources is dependent on human resource management. Human resource management in order to adjust competence in accordance with the challenges of the globalization era and the development of the industrial revolution is absolutely necessary, and this is the responsibility of the human resources division within a company or a business (Adeniji, 2012).

2.2 Human Resource Competencies

Discussing human resource competencies means discussing the characteristics of human resources in this case is the qualified employees who can support work operations and organizational growth. The development of an increasingly broad competence of human resources ensures that human resource management plays an important role in organizational success. Characteristics of individuals who have the skills, knowledge and abilities that are

used in a manner consistent with achieving the desired goals are definitions of human resource competencies (Azmy, 2015). Personality or personal characteristics, ways of thinking and behavior of people at work is a unit that forms employee competencies in addition to knowledge and skills that can be observed, measured and evaluated (SUDARSO, 2015). Companies and professionals in the HR field must be able to respond to internal and external changes in business, by having human resource competencies. Values, knowledge, and abilities of employees are definitions of competence (Ulrich et al., 2007). Employees with the right competencies will contribute to the achievement of company goals (Lubis, 2019).

2.3 Human Resource Competencies 4.0: *Review of Literature*

The basic concept of competence is one's understanding, expertise and professional identity. Competence is a determinant of employee commitment to the company, employee performance and employee satisfaction (Alamsyah Lotunani, 2014). The first step in formulating the concept of human resource competencies 4.0 is to determine a review of the competencies from previous studies. The three most recent competency concepts proposed by The RBL Group and the Ross School of Business at the University of Michigan formulate the Human Resource Competency Study (HRCS) into 3 dimensions: relationships, Systems & Processes and Organization Capabilities (Mike Ulrich, 2015). Changes that absolutely occur from within and outside the company, caused by the challenges of globalization and the development of the industrial revolution requires companies to adapt. The first industrial revolution began in the 17th century, followed by the second industrial revolution in the early 20th century marked by mass production activities. The third industrial revolution was marked by digitalization and the introduction of the internet that made it easy for people and business processes (Zeng, 2016). Today the business world is made easier by the existence of robotics technology, artificial intelligence, internet of things, big data, automation in all fields, all of which are summarized in the concept of the industrial revolution 4.0 (Nagy et al., 2016).

The industrial revolution can be an opportunity as well as a challenge for the business world. If you return to the concept of human resource management which states that human resources have an important role in achieving company goals, so

that companies can survive the challenges of the industrial revolution 4.0, human resources are needed to be able to respond the changes that arise and can be flexible in dealing with these changes. Human resources must have the competencies required to be able to face the challenges of the industrial revolution 4.0. Furthermore, after the competency dimension proposed by The RBL Group and the Ross School of Business at the University of Michigan, we will look at the competency dimension proposed by (Hecklau et al., 2016), which divides competencies into four dimensions namely technical competencies, methodological competencies, social competencies and personal competencies. Finally, we also include the division of competency dimensions proposed by Unesco which divides competencies into three dimensions, namely core competencies, managerial competencies and core value competencies. These three competency concepts with their dimensions and indicators form the basis of the formulation of the concept of human resource competencies 4.0.

The second stage is to formulate the challenges faced by companies and human resources in facing the industrial revolution 4.0 and determine the competencies needed to face these challenges. The various challenges and competencies needed in the face of the industrial revolution 4.0 are presented in Table 1 below.

Table 1.

No.	Challenge type	Required Competencies
1.	The use of information technology and the increasingly high use of coding and networking in the business world (Tjandrawinata, 2016)	The ability to understand information technology and networks accepts all forms of digitization and automation and is able to learn coding as a form of communication language between humans and computers.
2.	Changes and uncertainties in the business world make workers have to work amid these uncertainties (YAHYA, 2018)	Work while maintaining the quality of work and being able to work in a professional manner regardless of changes and uncertainties.
3.	The 4.0 industrial revolution caused changes in consumer behavior so companies must be able to innovate to	Employees must be creative to produce innovations that are able to support companies to innovate products and services to adapt to

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No.	Challenge type	Required Competencies
	match consumer tastes for products and services	consumer tastes
4.	To be able to survive in the midst of globalization and the industrial revolution, companies must collaborate with other companies in order to overcome the disruption of supply chain management and business processes, because there is cooperation to complement the limitations of the company (Vieira et al., 2013)	Synergy and cooperation between companies to complement each other's limitations must be supported by human resources who are also able to carry out good collaboration between employees in the company, as well as between employees of other companies. Mutual communication skills are needed so that the collaboration process can run well
No.	Challenge type	Required Competencies
5	The borderless world causes every country in the world to conduct business activities without interruption of distance and time (Kohnová, 2018)	Interactions that occur between companies in every country in the world must be supported by employees who can accept cultural diversity and master foreign languages
6	High uncertainty faced by the company (Nurazwa Ahmad, 2019)	The uncertainty faced by companies requires the expertise of employees to think critically and analytically in order to be able to solve complex problems
7.	Technology trends are developing in business (Mohamed, 2018)	The ability to increase knowledge in line with developments and changes in the world of technology associated with the field of work involved
8.	Smart process, Smart product, and smart after sales service are a must in business success in Industry 4.0 (Uygun, 2018)	Smart process, Smart product, and smart after sales service can be realized with the support of human resources who can work productively and focus on achieving goals.
9.	Digital transformation is a must for companies (Maksumic, 2017)	Demands for digitalization for companies must be supported by employees who are able to share

No.	Challenge type	Required Competencies
		knowledge related to changes implemented in the company and are able to improve work results in a sustainable manner
10.	The transition from only the use of hard skills to a combination of hard skills, soft skills and work-related knowledge. (Ermolaeva, 2016)	Employees must have Confidence in attitudes and expectations to make standard actions in the workplace that use resources carefully, attentively and in connection with social justice.
No.	Challenge type	Required Competencies
11.	New Working conditions regards to interface and control tasks (Sorko S. R., 2016)	Changing working conditions result in increased control of work that requires quality and useful decision making capabilities
12	Resistance To change for company and employee (Trstenjak, 2018)	Resistance to change is the biggest obstacle for the company in the midst of very dynamic conditions of change and very competitive competition. Leadership skills are absolutely necessary as a driver for the success of change, so that employees are able to motivate employees to want to adapt to be flexible, adaptative and accept changes

3 CONCEPTUAL FRAMEWORK TOWARDS A NEW CONCEPTUALIZATION DATA

Based on a review of the human resource competencies and human resource competencies literature 4.0, we formulated a new conceptualization for the concept of human resource competencies 4.0, due to the limited scope for the concept of human resource competencies. With a complete literature review, we formulated three construct domains which are dimensions of human resource competencies 4.0. The three construct domains address issues that fill and form gaps for the concept of human resource competencies that are

adapted to the development of the industrial revolution. For example the important thing in the domain area left behind from the construct domain of human resource competencies is having the ability to master ICT, networking and coding skills. Now we will discuss three domain areas from the construct of human resource competencies from the literature review. These aspects have been derived from various studies in the literature on human resource management, the concept of human resource competencies, the concept of industry 4.0 and other related matters. We therefore place and discuss three propositions to provide new and expanded conceptualizations of concepts:

P1: The dimension of human resource competencies 4.0 is core value competency which is a competency that must be possessed in order to achieve company goals which is the core principles and rules which are a reference in acting for members of the organization.

The industrial revolution 4.0 will bring changes to the work model of employees who will certainly utilize Information, Communication and Technology (ICT) to the fullest, use work-related software to support work efficiency and effectiveness, and have the coding skills that are indispensable in working in an era industrial revolution 4.0. Further propositions in this study relate to the core competencies that employees must possess that will support the achievement of company goals. Core competencies are the main competencies grouped in aspects of attitudes, skills and knowledge that employees must have in carrying out their duties and responsibilities at work. Core competencies must describe a balanced quality between the achievement of Hard skills and Soft skills, then the second proposition in this study is:

P2: Human resource competencies 4.0 requires core competencies related to a combination of hard skills and soft skills that can improve aspects of adaptability and quality of work.

Considering the challenges faced by companies that are of enormous changes coming from internal and external companies, globalization and the development of the industrial revolution as well as competitive conditions that have reached the hypercompetitive stage, therefore there is a need for managerial competencies that guide the company to succeed in facing these challenges. Employees must have managerial competence which is an individual competency concept that is more focused on the goal of improving management performance within the scope of the company carried out by employees, which is a combination of activities, knowledge,

skills or attitudes as well as personal characteristics possessed by employees. The concept of managerial competence is more focused on the approach to behavior and managerial personality that companies need to support the stability and sustainability of the company amidst the changes caused by globalization, the development of the industrial revolution and hypercompetitive competition (Boyatzis and Boyatzis, 2008).

P3: Companies need managerial competence for the success of achieving company goals, so the managerial competence is a dimension of human resource competencies 4.0. *New definition of Human Resource Competencies 4.0*

Based on the three domain areas positioned above from human resource competencies 4.0, we define human resource competencies 4.0 as:

Employees' capabilities or capabilities that are adapted to the development of the 4.0 industrial revolution with a combination of expertise in the fields of ICT, hard skills and soft skills that are formulated based on future management encouragement and competency development for businesses to deal with Industry 4.0.

The construct of human resource competencies 4.0 has the following three domain fields. We illustrate this construct and its domain area in Figure 1.

1. Core Value Competencies
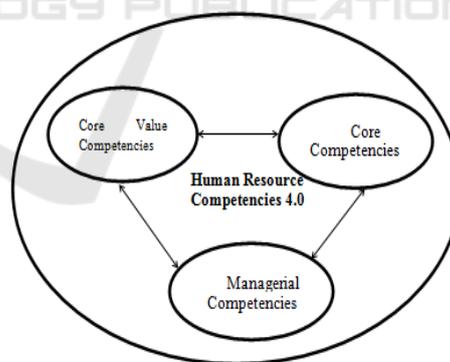2. Core Competencies
3. Managerial Competencies

Figure 1: Domain of human resource competencies 4.0 and its three domain areas.

4 MANAGERIAL IMPLICATIONS CONCLUSIONS

Human resource competence is becoming increasingly important in the ongoing changes driven by globalization and the development of the industrial revolution. This is because human

resource competence is an amalgamation of the abilities, knowledge, and expertise that exists in employees that can support the achievement of company goals. The concept of human resource competency 4.0 is a submission from the development of the concept of resource competency based on the challenges faced by companies in the era of the industrial revolution 4.0. Three main dimensions consisting of several indicators in the concept of human resource competencies 4.0 can be used as a reference by companies, HRD managers in preparing recruitment and selection planning, as well as training and developing employees in the company in order to have competencies that are in accordance with the needs and demands of work in the revolutionary era industry 4.0. This study has several significant managerial implications (see Table I to see a direct comparison between traditional conceptualizations of new orientations of human resource competencies).

First, new conceptualizations for companies and HR managers, three specific domain areas that are the focus for managing and controlling employees. Each of these three domain areas can be a useful diagnostic tool for managers to develop strategic human resource planning for companies, especially in the context of recruitment and selection for prospective employees.

Second, the three domain areas can separately act as diagnostic tools that are useful in identifying the specific training needs of employees. Based on the diagnosis of the usefulness of each domain area, design and implement improvements in accordance with the demands of the industrial revolution era 4.0. For example, if the results of performance appraisal from employees indicate that employee performance has decreased performance oriented to one of the three domain areas, HRD managers can nurse customized training programs. This approach is more effective than identifying general training inputs, or recommending the same in training programs for all employees.

Table 1. Comparison of traditional and new definitions of human resurce competencies, its domain areas, and its implications

Old vs new conceptualization	Domain areas	Implications
Competence is a basic characteristic that a person has or a combination of characteristics possessed by someone who can show superior performance (Spencer, 2003)	• Skill • Knowledge • Ability	Superior Performance
Employees' capabilities or capabilities that are adapted to the development of the 4.0 industrial revolution with a combination of expertise in the fields of ICT, hard skills and soft skills that are formulated based on future management encouragement and competency development for businesses to deal with Industry 4.0. (New definition proposed in this paper)	• Core Value Competencies • Core Competencies • Managerial Competencies	• New constructs • The three different domain areas can be followed up by management • Employee Readiness to change • Focus on understanding flexible competency hierarchies in accordance with the development of the industrial revolution, and creating employee commitment

Finally, the three domain areas will be useful for the new workforce that will enter the workforce, namely Generation Z or final year students. Three domain areas in the concept of human resource competencies 4.0 will be a more comprehensive representation of their readiness to enter the world of work, where indicators in these three domain areas can be used as a reference in their success in entering the world of work. This study contributes by conceptualizing the conceptualization of the old domain vs. the new implication of the extent to which Generation Z in completing and developing the competencies that they must have for success in

the world of work is affected by the development of the industrial revolution.

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