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Fourth Industrial Revolution: Competencies of Potential Leaders

Dr. Sultan Ali Suleiman Al-Mazrouei

ABSTRACT

Fourth industrial revolution would have strong impact on services and working environment so that a new philosophy should be applied to manage organization resources. Educational leaders need certain competencies to respond swiftly to new developments and their implications in their organizations. Thus, this research undertake a systematic literature review to shed light on the characteristics of fourth industrial revolution and the required competencies of educational leaders in this era. The results of literature emphasized the importance of high communication rate. Employees should be connected in a network regardless of their positions. They need to connect together with heads, hearts, and hands and have positive emotions to overcome challenges they confront. Building relationships with all stakeholders are also important. Understanding individuals' personalities is the key to change and control their attitudes and behaviours through changing their environment. The values and morale of organizations and leaders are important to maximize performance of employees. Furthermore, some researches highlighted that some practices eliminate the change process. For example, having politics and discrimination between employees, and ignoring employees' emotions will hinder the progress of organization. Hierarchical structure of organization inhibits organization transformation and progress. Therefore, there must be strategic planning along with appropriate skills, abilities and adequate resources to implement and sustain the change to meet fourth industrial revolution.

INTRODUCTION

The world is changing very quickly that brings changes in whole life fields like economic, educational and life style. Individuals should master competencies that equip them to adopt the changes. Nowadays the world is approaching fourth industrial revolution, so human beings should be prepared to meet its requirements. Educational leaders have the highest responsibility to lead the change process and therefore they need certain competencies.

Therefore, the concept of leadership has been changed to meet fourth industrial revolution requirements. Brian Bacon who is Chairman and founder of Oxford Leadership states that "Leadership in the 4th Industrial Revolution will be defined by the ability to rapidly align &

engage empowered, networked teams with clarity of purpose and fierce resolve to win (Gill et al., 1999)." If an organization does not adopt an innovative strategy that urges creative ideas, it is more likely to vanish. As John Chambers Former CEO – Cisco stated that "Probably 40% of the world's leading companies will not exist in a meaningful way ten years from now (Chambers. J, 2016)."

The approach of fourth industrial revolution would revolutionize all aspects of life. Many researches are emerging pertaining fourth industrial revolution. Hermann et al. (2016) stated that a lot of research centers and universities have prioritized their researches to fourth industrial revolution. Governments of some countries do so as well. In a meeting of economic leaders in 2017, government of Thailand emphasizes developing human resources as a priority to arm them with tools to face the emerging challenges of fourth industrial revolution represented by technological advances. It establishes a new policy and educational reforms to develop occupational expertise in accordance with labour market demands. It is transforming its agricultural activities into smart agriculture through introducing new technology (Thai News Service Group, 2017).

Likewise, in 2018 in Lisbon, leaders of Spain, Italy and Portugal met in an annual event to discuss the changing business practices and jobs and nature of work due to new innovations in technology at the COTEC Europe Summit. They stated that digital era and innovation would maximize the progress, success, and advantages. The king of Spain suggested teaching "digital skills" in schools to make society prepared for automated economy, and changes in social and working lives (European leaders discuss…, 2018). Similarly, Gitelman and Kozhevnikov (2018) argued that the new educational models should prepare managers to be flexible and deal quickly with changes. The managers "will engage in the complex processes of creating fundamentally new technologies and markets as well as of modernizing the existing industries."

Definitely, change in inevitable. Technological continuous developments require open-minded individuals to embrace them. Due to rapid developments in economic and social fields, education leaders' strategic plans and competences must align with those developments. Programmes should be held to raise leaders' awareness about the cognitive competencies required for the next era. They should grasp continuous changes and adapt to them.

Fourth industrial revolution is characterized by "complex data, problems, economic relations between people, organizations, states and cultures; as well as between the whole human sphere and the natural conditions (Białoń & Werner, 2018)." To manage and cope with those issues, certain cognitive competences are required along with artificial intelligence. Integration of machines might create practical and organizational issues. There are many challenges emerging that require solving-problems skill. "As business leaders, government officials, educators and citizens, we need to create a common set of principles and values that take us to the future that we all want together" (World Economic Forum, 2016).

Since the fourth industrial revolution depends mainly on innovation, therefore we must relate cognitive sciences to leaders. The cognitive competencies of leaders would indicate the effectiveness of a leader to be compatible and effective to lead in fourth industrial revolution along with emotional and behavioral competencies. Therefore, in this study the competencies of leaders in fourth industrial revolution are discussed. A systematic literature review is undertaken to shed a light on:

- The fourth industrial revolution.
- Competencies of fourth industrial revolution leaders.

LITERATURE REVIEW

Fourth industrial revolution was firstly introduced in 2011 in Hannover, Germany as a result of a project supported by German government to diagnose the current trends and forecast its future effects on global economy. Since then, fourth industrial revolution has become a hot debate in the world economic forum and a foundation for long-term economic strategies (Białoń & Werner, 2018).

Hermann et al. (2016) have also argued that fourth industrial revolution has recently become a highly discussed, researched topic by scholars and practitioners in German-spoken countries as they think its effect would be so huge in which it revolutionizes businesses services and products. Therefore, Białoń and Werner (2018) insist that the fourth industrial revolution depends on innovations and it is characterized by high integration between humans and machines.

Fourth industrial revolution has certain features that include self-aware intelligent machines that can solve automation challenges. In the potential factories cyber-physical systems will interact with each other through internet of things. Decisions will be made by microsystems autonomously and employees can be supported by highly sensitive robots (Neil, n.d.).

Białoń & Werner (2018) argue that technological changes along with social changes are resulting in a new era in industry. Intelligent companies are emerging to take decisions resulting in less breakdowns of devices. Fourth industrial revolution depends on virtual social networks, services are digitalized, big numbers of data, internet of things which has strong impact on services. The huge growth of information and computers processing programmes affect the management of organization resources. More cooperation can be established between organisations and research institutes can be necessary to overcome the challenges. More digital channels would gain fame and importance in enhancing communication between stakeholders. People are connected locally and globally. Technology in economy 4.0 is smart so that it can exchange information and it also has limited access to regulate themselves. Absolutely, the new features of the fourth industrial revolution are a challenge for leaders to prepare individuals to behave according to its requirements. Thus, the following section would discuss the development of industrial revolutions briefly and also the competencies of individuals (leaders/ employees) that match fourth industrial revolution era.

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Developments of Industrial Revolutions

Haijian and Fangfang (2018) stated that the roles of employees are changing continuously due to developments in technology and science. Employees have gone through four transitions in the industrial revolution. Each stage has its own characteristics pertaining employees' roles and status. However, each stage acts as a foundation for the next one. In other words, Status and roles of employees in previous stage is necessary for employees to perform their roles in the next stage.

In the first industrial revolution, employees' behaviors are strictly controlled by employers by using different ways of control such as coercive, utilitarian, and normative. They regulate employees in a hierarchical way (Nair, 2010). They dictate employees what to do and what not to do. Employers change from using manual labors to using steam engines. The employees work along with the machines based on supervisors' instructions. Employees control machines and their skills indicate the quality of products (Haijian & Fangfang, 2018).

Second industrial revolution era is characterized by using electricity that enhances mass production and third industrial revolution era involves mass computerization that has integrated all fields of life and economy. Whereas, fourth industrial revolution is characterized by smart technology. Therefore, leaders should empower the societies to master the technologies and adopt a positive attitude towards the transformation process. Cooperation between all stakeholders takes place to reinforce the integration of new innovation in the educational field. This transition process requires certain competencies to be successful. The following part would explore leaders' characteristics in the fourth industrial revolution.

Leadership in the Fourth Industrial Revolution

As there are fast changes invading the organizations, certain leadership competencies are needed to accommodate them. Leaders are required to possess the skills of creativity, flexibility and responding fast to new developments to assimilate them and identify their implications in their work fields. Further, leaders need to respond quickly to new technologies and products and update their services and own dynamic organizations.

In the fourth industrial revolution, machines will be highly connected with each other and are able to make decisions without intervention of people. So, leaders must adopt strategic planning to meet fourth industrial revolution requirements. Understanding the need for change is important along with understanding if the organisation and employees are ready for change (Neil, n.d.). Based on (Combe, 2014), there are three elements of an organization change readiness. If the culture that dominates the working environment and spreading among employees support the change process. If the leaders at all levels are committed to the change process and include it in their strategic agenda. The ability of an organization to support the change process and have the skills, abilities and adequate resources to implement and sustain the change.

Neil (n.d.) also insists that communication is a critical factor in the change process. Leaders, managers, and employees should be involved and connected together with heads, hearts,

and hands to identify their viewpoints. They are more likely to be empowered. They need to talk about what they need to change through facts and figures. Leaders need positive emotional responses from employees to overcome challenges they face during change process. Managers need to Plan, Organise, Lead and Evaluate (P.O.L.E.) the project, the process and their people.

Another factor leaders should consider is the age of generation they lead. Leaders are required to understand that fourth industrial revolution includes Gen Z (born between January 1995 and December 1999) who are going to shape workforce and they have certain characteristics. They are more concern about learning opportunities, tolerance and inclusivity, flexibility, respect and creative work (Tikoo, 2018). A research conducted by Wojtczuk-Turek (2017) investigated the practices that are account more for the productivity of employees. The results showed that work design and job characteristics and empowerment, participation, and autonomy are of high importance especially in the era of technology and innovation.

Concerning educational process, leaders should identify the needs of clients (employees, students, society) and satisfy them so that they become partners in making decisions. Representatives from educational field and society along with educational leaders and educational specialists from research institutions form discussion platforms and sit together to come up with innovative ideas that meet fourth industrial revolution requirements. Those discussion platforms form communication channels between all stakeholders in the educational field. The educational field can be segmented in various areas to identify its real problems and challenges, to find out the employees potentials, to identify what society requires from the educational process, and the most important thing is that identifying the real values and culture of the generation and ensures that they are in consistent with the fourth industrial revolution era because those values and principles would guide individuals' behaviours and thoughts. Based on the gap which is found between the actual (real situation) and the desired one, a strategy should be established. All stakeholders must work together to contribute to its success along with possessing the right culture and values.

Białoń and Werner (2018) argue that leaders should be able to observe the problems emerging from innovative technologies and even predict them or might find the right resources including further generations of artificial intelligence to solve them. They state that leaders of fourth industrial revolution should possess certain intellectual and social characteristics. They are able to analyze and synthesize information and data received from various sources. Employees should have the skill to extract the relevant information from big data. They should be able to draw conclusion based on them. For example, in Poland starts-ups Poland foundation "develops big data analysis software and sell it to companies (Beauchamp et al., 2017)".

Cooperating and working together in teams and groups are also necessary to face the challenges and provide various ideas to deal with them. Białoń & Werner (2018) insist that factories in fourth industrial revolution rely heavily on people minds, ideas, and knowledge rather than infrastructure. This is why we can say that cognitive competencies of

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individuals play an important role in this era. Fourth industrial revolution demands creative managers and leaders who possess the skills of imagination, problem solving, and feeling emotions to transform ideas into products. Leaders who can adopt new innovations and communicate them to recipients.

However, there are some practices that leaders should avoid since they inhibit the change process. Some of them are hierarchical structure and close guidance and supervision. As John Kotter claims hierarchical structure of organization inhibits organization transformation and progress. At practical level hierarchy opposes change. He states, "In a world with an ever increasing rate of change, it is impossible to thrive without timely transformations." In order for organizations to succeed and thrive, the leadership responsibilities should be dispersed through a network which makes it easy for organisations to spot on new developments and change itself to adopt them. Networked structures keep communication process easily flows.

In the fourth industrial revolution, close guidance and supervision does not exist, the hierarchical structure in organization is not desirable, so the right values and culture should be instilled within employees to guide their behaviours. The stakeholders are working in a network. Nair (2010) claims that in the fourth industrial revolution, traditional forms of control in organization become less effective.

Some countries have already prioritized fourth industrial revolution in their strategies. For example, Sirotek and Firlus (2016) argued that Norway and Germany paid great attention to fourth industrial revolution to upgrade their industries and economies and have opportunities to compete internationally. However, they investigated if organizational learning can lead to a high level of fourth industrial revolution implementation. The results showed that "good performance in the focus areas dealing with mistakes, employees and learning, resources for learning, feedback culture, overall picture, communication within the firm, management of skills and customer view is of high importance for the Implementation of Industry 4.0." They also found that an organizational culture that fosters innovation is important in fourth industrial revolution.

Poland is also another country that has a pioneering experience in technological innovation. To elevate its economy and adopt a sharp change, Poland establishes startups which concern about innovations in technological fields. "Startups mean a certain attitude and culture. Their core values are openness, cooperation, ambition, growth, risk, and dedication." Mentors is a way to gain knowledge and development. Beauchamp et al. (2017) states that "The majority of startups build technologies in the areas of: big data, analytics, internet of things (IoT), developer tools and life sciences." Along with funding innovative entrepreneurship, Poland train high quality professionals, programmers, salespeople.

Leadership should execute programmes to managers to support the change process. They should improve their skills to talk to employees to understand their reactions and handle them with care. For example, if there is a climate of mistrust, managers are required to clarify the mistakes and be honest, transparent and keep their words with employees. To accept the changes, employees gain personal rewards which are not limited to monetary,

but they might be recognition, learning a new skill, or even a new challenge for employees. Managers should work closely with employees and coach them to feel supported and encouraged. They are required to have the knowledge, skills, and confidence to manage individuals. Understanding individuals' personalities is the key to change and control their attitudes and behaviours through changing their environment (Neil, n.d.).

CONCLUSION

The success of any organization relies heavily on the prepared human resources for the fourth industrial revolution. Leaders have great responsibility to lead the change. Innovation and the ability of utilizing information from the global network are very significant to support organizational survival and changes. Organisations should be partners and exploit scientific discoveries which are suggested by research centres (Białoń & Werner, 2018).

Leaders are required to adopt a culture of change and include it in their strategic plan. A strategic thinking should be established to identify the opportunities (how is innovative thinking be prevalent in the educational field), and threats (the challenges employees face that hinder their progress).To achieve that, leaders and employees should be involved and connected together with heads, hearts, and hands to identify their viewpoints. Scientific methods are applied using facts and figures when they talk about change and taking decisions. Further, leaders need cognitive competencies to perform educational reforms to develop occupational expertise in accordance with labour market demands that meets technological advances in economy 0.4.

Fourth industrial revolution demands creative leaders who possess the skills of imagination, problem solving, and feeling emotions to transform ideas into practice. Therefore, leadership responsibilities should be dispersed through a network because networked structures keep communication process easily flows which eases adopting new developments and change. Holding special training courses (panel discussion, in-house training) to raise awareness of fourth industrial revolution and be informed about the theories and practices associated with it are significant. Positive attitude and cooperation skills are very important as well. Method of education should be reorganized to reinforce desired social competencies.

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