

The Effect of Digitalization and Virtual Leadership on Organizational Innovation During the COVID-19 Pandemic Crisis: A Case Study in Indonesia

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Received: June 15, 2021 Revised: August 29, 2021 Accepted: September 06, 2021

Abstract

In the last decade, the effect of digitalization was the most cited issue in economic discourse, especially since technological advances, automation, and artificial intelligence are the key to the future discussions. Unemployment is one of the most important and continuous debates, especially in times of crisis due to the COVID-19 pandemic. Therefore, this study aims to analyze the influence of leadership style in innovation organizations to deal with the crisis. In this study, a non-probability purposive sampling method was used. A total of 377 respondents were from LinkedIn social media in Indonesia, with the criteria of employees who have worked for at least 6 years. The structural equation model was analyzed with Amos 25.0. The results show that virtual, servant, and transformational leadership influence employee creativity. Moreover, employee creativity strongly influences organizational innovation; therefore, a new model was found to meet the challenges during the COVID-19 pandemic crisis, which is leadership. Therefore, these results are useful for managers to overcome challenges during the COVID-19 pandemic crisis to manage employee creativity for a better innovative organization and make science a reference for finding solutions to the global wave of unemployment in the revolution 5.0 era.

Keywords: Organizational Behavior, Virtual Leadership, Transformational Leadership, Trust, Emotional Intelligence, Communication

JEL Classification Code: M10, M12, M29

1. Introduction

Welcoming the new post-COVID19 pandemic era requires updated skills to face the challenges and changes to come (Sudha & Singh, 2021), such as variation in competencies framework and HR policies about the post-pandemic leadership styles (Atiku & Randa, 2021). Therefore, the post-pandemic work environment is determined by

technology, as business models tend to adopt these changes (Errichiello & Pianese, 2021). Unemployment is one of the most important and everlasting debates in the economic literature since it usually occurs every decade due to crisis. Meanwhile, it is most common among youth, and long-term effects are severe in countries with high rates, making policymakers focus more on the problem (Stijepic, 2021). In the last decade, the effect of digitalization was the most cited issue in economic discourse, especially since technological advances, automation, and artificial intelligence (AI) are the key to future discussions. Meanwhile, advances in automation using AI enhancements are changing the direction of the labor market by growing the number and types of jobs available, where increased automation capabilities with AI are turning robots into cobots (Collaborative Robots that work safely with humans) in the industrial era 5.0 as a new industrial revolution (İscan, 2021). Therefore, a solution is required to minimize this impact by increasing employees' creativity managed by effective leaders (Ivcevic et al., 2021).

The industrial revolution describes an era in which major transformations significantly impact society (Piacentini

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et al., 2021). Meanwhile, revolution 5.0 is transforming business activities to operate remotely due to advances in information and communication technology and using robotics to achieve high performance (Bednar & Welch, 2020). Therefore, organizations must adopt these changes to survive and compete with innovation, especially during the global COVID-19 pandemic crisis (Russ, 2021).

Since the employee is the main source of creativity in organizations, therefore, leadership style has more influence on the generation and execution of creative ideas (Ghimire et al., 2021). Furthermore, the employees' tendency towards creativity has great potential for innovation organizations (Muñoz-Pascual et al., 2021). Mangla (2021) stated a more dynamic and digitized future for work when normal physical arrangements existed before the pandemic evolved to include multiple models. Leadership in digitalization or e-leadership prioritizes a stronger artificial intelligence (AI) (Lichtenthaler, 2021). However, Yom and Gibbs (2021) stated that it involves a component of flexible service to meet the needs of contemporary organizations. A previous study by Barr and Nathenson (2021) also showed that the values of purpose and social goodness, namely transformational leadership models, are used in the workplace to increase innovation.

This study analyzes different opinions on the most effective leadership style to manage employee's creativity in organizational innovation. Therefore, the best combination of leadership styles during the COVID-19 pandemic is found to be a reference for managers, which makes scientific contributions to Human Resource Management facing the challenges of the new era ahead, especially in Indonesia.

2. Literature Review

2.1. A New Era Since the COVID-19 Pandemic

Piacentini et al. (2021) stated that the global industrial revolution since 1930 has evolved as follows:

1. Industrial Revolution 1.0: Started in the mid-18th century in Great Britain and ended in the 1930s. During this era, the main activity was agriculture which was later transformed into an industry. Furthermore, there were changes in energy production (steam engines, etc.) to improve industrial operations, which was the major aspect of the start of this era.
2. Industrial Revolution 2.0: The main characteristic of this era was the change in production modes, which developed into mass production chains and automation, especially in the automotive industry. In addition, oil and electricity were important sources

of energy for the telephone, radio, and aviation technology industries.

3. Industrial Revolution 3.0: New technologies that were derived from the expansion of science were being applied in the electronics, computer, Internet, mobile devices, and biotechnology industries, and also the recognition of gas and nuclear energy.
4. Industrial Revolution 4.0: This era began with the emergence of the millennium with the development of larger and faster scientific ideas and methods. Moreover, the emergence of robots, drones, mechatronics, 3D, nanotechnology, computing applications, Big Data, virtual reality, and artificial intelligence (AI) is a marker of this era.
5. Industrial Revolution 5.0: This era started in early 2020 with the development of AI, which consists of integrating certain activities using advanced robotic and computing systems. Therefore, this revolution is called Cobot or Collaborative Robot, where machines or robots work together with humans in a safe and easy to operate manner.

Based on Carayannis et al. (2021) and Piacentini et al. (2021), this study synthesizes that the new era since the COVID19 pandemic and in the future Revolution 5.0 is a time of transformation to larger technological processes in aspects of life in the society. This era demands innovative company operations from creative employees for organizational innovation. Therefore, a breakthrough from a leader in the management of creative employees is required for organization sustainability.

2.2. E-Leadership on Employee Creativity

E-Leadership is a modern leadership style that uses digital technologies to manage members of an organization to achieve goals (Even, 2021). Meanwhile, Bresciani et al. (2021) stated that it is a traditional way of visual interaction, which is being replaced by electronic media with a leadership style that directs people to work remotely using new technologies that improve their work and find new business models. Furthermore, a previous study by Satriadi and Agusven (2021) stated that E-Leadership has 4 dimensions as indicators, namely: (1) Having agility, creativity, and ability to connect several teams in the organization, (2) The ability to innovate, collaborate and use the clients' method or find a completely new solution, (3) Have a pattern of thinking and ability to solve problems, and (4) Able to grow trust between members of the team/organization.

A previous study by Ben Sedrine Doghri et al. (2021) on the effect of inter-organizational collaboration on ambidextrous innovation in a Tunisian virtual company showed that e-leadership has a significant impact on

employee's innovation and creativity. This is in line with a study by Gubernatorov et al. (2021), which showed that the quality of modern leaders (digital leaders) is in their work for the company's benefit, such as leading followers by motivating, involving in making decisions, delegating a lot of power to enable more creativity. This gives the company the ability to adopt new conditions and innovations. Similarly, other studies stated that developing creativity is an e-leadership challenge for business continuity and success. Based on these results, it is shown that e-leadership influences the development of employee creativity for organization sustainability (Hirudayaraj & Matić, 2021). Therefore, this study establishes hypothesis 1 that E-Leadership has a direct and positive effect on employee creativity.

2.3. Servant Leadership on Employee Creativity

Servant leadership is a style that serves and facilitates the needs of team members for organizational goals to be effectively achieved (Maglione & Neville, 2021). Meanwhile, Van der Hoven et al. (2021) stated that it is a leadership model designed to overcome the organizational crisis by prioritizing the needs, interests, and aspirations of followers (Hutabarat et al., 2021; Tran & Truong, 2021). Gocen and Sen (2021) stated that it has 5 open dimensions, which were adapted, namely "leaders decide when something is wrong with the job" while prioritizing member careers to "leader make career development a priority." Similarly, the orientation towards problem-solving was adapted to "leader provides solutions for a personal problem" and prioritizing members' interests to "leader prioritizes follower's interests." Furthermore, freedom at work was adapted to "leader gives the freedom to handle difficult situations."

A previous study by Wang et al. (2021) showed that servant leadership and the supportive climate of co-workers jointly affect employee creativity. This is in line with the results of Ghulam Jan et al. (2021) showed that servant leadership has a strong effect on Employees Innovative Work Behavior in hotel companies. Furthermore, it was supported by the results of Lemoine and Blum (2021), which showed that servant leadership improves good relations between employees and increases job engagement; therefore, creativity emerges quickly. Hence, this study establishes hypothesis 2, which states that servant leadership directly and positively affects employee creativity.

2.4. Transformational Leadership on Employee's Creativity

Transformational leadership is a style that stimulates and inspires subordinates to achieve extraordinary results that enable growth and development by responding to

various needs to align the goals of individuals, leaders, groups, and companies (Karunasekara et al., 2021). Meanwhile, Colquitt et al. (2018) stated that transformational leadership involves inspiring all members towards a common vision to develop potentials and solutions to new perspective problems (Astuty & Udin, 2020; Salim & Rajput, 2021; Wanasida et al., 2021). Furthermore, Jensen et al. (2020) stated that transformational has 4 dimensions, namely (1) Idealized Influence with the indicator "leader considers the moral and ethical consequences of the decision," (2) Inspirational motivation with the indicator "leader expresses confidence that the goal is achievable," (3) Intellectual stimulation with the indicator "leader makes others see the problem from various perspectives," (4) Individualized consideration with the indicator "leader spends time teaching and training."

A previous study by Karunasekara et al. (2021) examined the role of employee's creativity through transformational leadership in five-star hotels in Sri Lanka. The result from 312 employees and direct supervisors showed that the transformational leadership style increases creativity among followers. This shows that employee creativity under transformational leaders is influenced by feeling high personal initiative. Meanwhile, Ma et al. (2020) found empirical results for a positive relationship between transformational leadership and employee creativity. Similarly, the results of (2020) showed that transformational leadership positively affects employee creativity. Therefore, based on a previous study, hypothesis 3 is established, which stated that transformational leadership has a direct and positive effect on Employee Creativity.

2.5. Employee Creativity on Organizational Innovation

Employee creativity is the use of ideas in completing work as the main key for companies to deal with problems more effectively and create organizational sustainability (Zhang et al., 2021). This is in line with the opinion of Aldabbas et al. (2021), which stated that employees become more innovative in finding new ways to solve problems; therefore, a spirit of creativity emerges to increase ideas for organizational sustainability. Meanwhile, Employee creativity indicators, as stated by Y. Wang et al. (2021), include (1) contributing creative ideas to solve challenges arising from work, (2) contributing creative ideas to improve the quality of work, (3) creating new ideas to solve problems, (4) searching for new methods or techniques to complete and (5) "promoting ideas for others to apply."

Every business wants to make a profit; therefore, the goal of activities is to make profits by increasing employee productivity and creativity (Kang & Lee, 2021). For example, during the COVID-19 pandemic crisis, organizational

innovation aimed to survive and defend against losses as well as bankruptcy; therefore, there were no layoffs of employees (Gorgenyi-Hegyes et al., 2021). Meanwhile, organizational innovation indicators about Ravichandran (2018), Schomaker and Bauer (2020), Kristinae et al. (2020), and Rai et al. (2021) are as follows: (1) Company add product types; therefore, there is no reduction of employees, (2) There was no reduction in salary from the company, (3) Work patterns and co-workers have become flexible and result-oriented, (4) Employees were allowed to contribute creative ideas to develop solutions for effective and efficient business for the company's sustainability, (5) Employees received training opportunities to improve technical competence for more creative.

The COVID-19 pandemic had caused several adverse consequences, such as economic shocks, global health crises, changes in social behavior, and challenges at the organizational level to continue business operations; therefore, employee creativity is needed to support organizational sustainability (Azizi et al., 2021). This is in line with a previous study by Muñoz-Pascual et al. (2021), which stated that employee creativity strongly influences organizational innovation. Therefore, based on these studies, hypothesis 4 states that employee creativity directly and positively affects organizational innovation.

2.6. Hypothesis Model

Based on the literature review, it was found that 4 hypotheses were empirically tested to prove the most effective leadership style in managing employee creativity in developing Organizational Innovation, and the best

combination was found in the Revolution 5.0 era. The hypothesis model is shown in Figure 1.

3. Research Methods

3.1. Sampling Method

A non-probability purposive sampling technique was used, and data were sourced from the LinkedIn social media population, while the inclusion criteria were employees that have worked for at least 6 years; therefore, the samples were representative and generally accepted (Campbell et al., 2020). Furthermore, an online questionnaire with a 6-point Likert scale was developed using a google form based on indicators adapted from the previous study. Meanwhile, 377 respondents gave feedback which was processed with SPSS 26.0, and the structural equation model was analyzed with Amos 25 to test the model and hypothesis. The test results discussed the most effective leadership style in managing employee creativity in increasing organizational innovation. Therefore, the best combination was found in the era of the COVID19 pandemic crisis with the challenges of Revolution 5.0.

3.2. Data Analysis Technique

Hair et al. (2014) stated that SEM Amos is used to processing complex data, where each variable has several indicator items to be tested, namely Virtual (EL) and Transformational Leadership (TL) with 4 items, Servant Leadership (SL), Employee Creativity (EC), and Organizational Innovation (OI) with 5 items. Similarly,

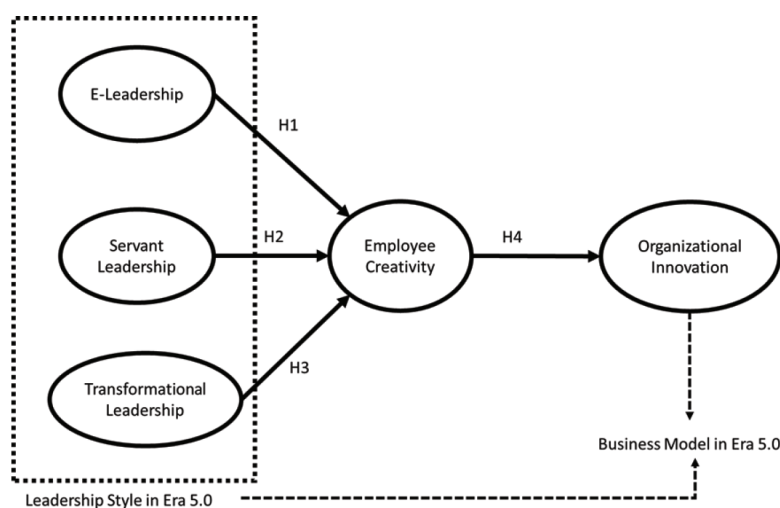


Figure 1: Hypothesis Model

Hair et al. (2014) also stated that the standard model fit is $P > 0.05$, and the estimated influence of the relationship between variables is a minimum value of $CR > 1.96$.

4. Results

The model construct is declared fit after a gradual elimination process is carried out until a P-value greater than 0.05, is reached (Collier, 2020). The results of the fit model are shown in Table 1 below.

The Fit model from the process is shown in Figure 2 below:

Based on Figure 2, the remaining indicator items from the elimination process are 17 items, namely Virtual Leadership,

no items were eliminated (EL1, EL2, EL3, and EL4), Servant Leadership (SL2, SL4, and SL5), Transformational Leadership (TL1, TL3, and TL4), Employee Creativity (EC1, EC3, EC4, and EC5), and Organizational Innovation (OI2, OI3, and OI5). Therefore, the output of the hypothesis test is shown in Table 2.

The results of the Amos SEM data processing are as follows:

1. Hypothesis 1 is accepted; Virtual Leadership affects employee creativity with a CR value of $5.49 > 1.96$.
2. Hypothesis 2 is accepted; Servant leadership affects employee creativity with a CR value of $3.645 > 1.96$.

Table 1: Construct Fit Model $P > 0.05$

Model	NPAR	CMIN	DF	P	CMIN/DF
Default	41	135.368	112	0.066	1.209
Saturated	153	0.000	0		
Independence	17	4262.872	136	0.000	31.345

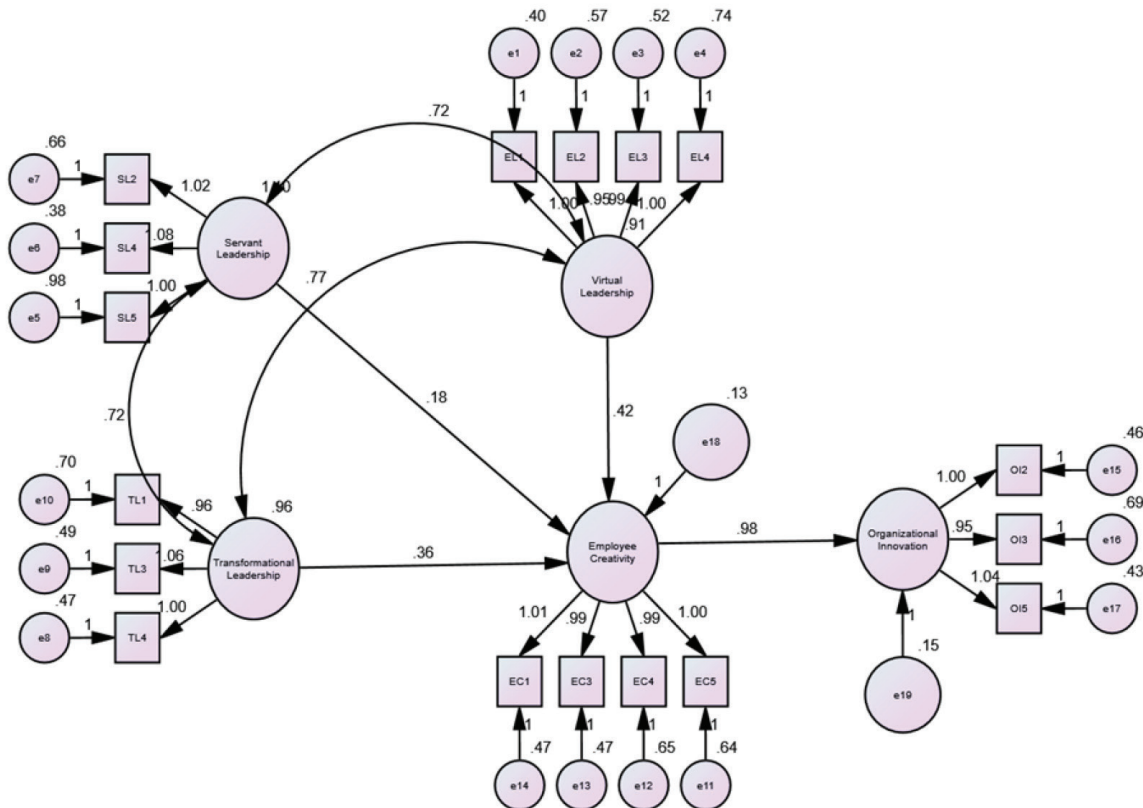


Figure 2: Standardize Fit Model

Table 2: Hypothesis Test Results

Relationship Variables	Estimate	S.E.	C.R.	P	Result
Employee Creativity ← Virtual Leadership	0.422	0.077	5.494	***	Accepted
Employee Creativity ← Servant Leadership	0.178	0.049	3.645	***	Accepted
Employee Creativity ← Transformational Leadership	0.358	0.073	4.925	***	Accepted
Organizational Innovation ← Employee Creativity	0.978	0.063	15.455	***	Accepted

Note: **, p -value < 0.05; ***, p -value < 0.001. Significant at the 0.05 level.

3. Hypothesis 3 is accepted; Transformational leadership affects employee creativity with a CR value of $4.92 > 1.96$.
4. Hypothesis 4 is accepted; Employee creativity affects organizational innovation with a CR value of $15.45 > 1.96$.

5. Discussion

This study shows that during the COVID 19 pandemic and in the future, employee creativity is needed for organizational innovation development. Similarly, a previous study showed that virtual leadership affects employee creativity which supports the results of Ben Sedrine Doghri et al. (2021) and Gubernatorov et al. (2021), and (Hirudayaraj & Matić, 2021), which states that e-leadership is influential in the development of employee creativity for the organization sustainability.

The results of hypothesis 2 also support a previous study where servant leadership affects employee creativity; therefore, Wang et al. (2021) and Ghulam Jan et al. (2021) showed a strong influence on employees' innovative work behavior. This is also in line with Lemoine and Blum (2021), which state that servant leadership builds good relations among employees and increases job engagement; therefore, creativity emerges quickly.

Based on the results of hypothesis 3, it is shown that transformational leadership has a strong effect on Employee Creativity. This is supported by a previous study from Karunasekara et al. (2021), which stated that employee's creativity is influenced by transformational leadership in five-star hotels in Sri Lanka. Similarly, Ma et al. (2020) also found a positive relationship between transformational leadership and employee creativity. Furthermore, the results align with a study by (Astuty & Udin, 2020; Salim & Rajput, 2021; Wanasida et al., 2021) which showed that transformational leadership has a positive effect on employee's creativity.

The results of hypothesis 4 showed that employee creativity has a strong influence on organizational innovation. Meanwhile, Azizi et al. (2021) stated that the COVID19 pandemic caused various adverse consequences, such as economic shocks, global health crisis, changes in

social behavior, and challenges at the organizational level to continue business operations. Therefore, employee creativity is required to support the sustainability of the Organization. This study also supports Muñoz-Pascual et al. (2021), which shows that employee creativity strongly influences organizational innovation.

6. Conclusion

An employee is the main source of creativity in organizations, and it is influenced by leadership style to generate and implement creative ideas for organizational sustainability. The results show that virtual, servant, and transformational leadership influence employee creativity. Moreover, employee creativity strongly influences organizational innovation; therefore, a new model was found to meet the challenges during the COVID-19 pandemic crisis, which is leadership. Therefore, organizations have the potential to easily innovate during the crisis and especially, in the highly competitive future, revolution 5.0.

Therefore, it is suggested that organizational leaders adopt an effective leadership style to manage employee creativity which has direct implications for organizational innovation. For further study, qualitative analysis of the most effective leadership style in the revolution 5.0 era is recommended.

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