

The Role of Virtual Leadership to Improve Learning Organizations in Industry 4.0

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Abstract

To be able to achieve the goals of organizational success requires leaders who are not only able to carry out management functions such as planning, organizing, directing, and supervising an organization. But the leader here has a very crucial role, especially in the development of industry 4.0. The development of industry 4.0 itself prioritizes technology based on maximum speed and efficiency. Where traditionally, the leader is always there when in the company in controlling and overseeing his subordinates. However, sometimes challenges occur because the leader is not always in place. It is a challenge for the company, so that with this virtual leadership, it is expected to be an opportunity to improve the company's progress following industry 4.0 adoption. Hence, virtual leadership becomes a competitive advantage for the company's progress, especially for the development of learning organizations in the company. That is why this article will discuss the role of Virtual Leadership to realize Learning Organizations in the Industrial Age 4.0. This paper used qualitative methods by reviewing and synthesizing journals related to Virtual Leadership and Learning Organizations. Virtual leadership in learning organizations requires something more. In learning organizations, managers learn to think about 'control with' rather than 'control' of others. Because the term Industry 4.0 continues to gain strength. The presence of industry 4.0 will make it easier for virtual leaders to improve digital manufacturing drives and create other business profits in the company.

Keywords: Virtual leadership, learning organization, industry 4.0

1. Introduction

The industrial revolution 4.0 is a phase of the technological revolution that is changing the way people move on the scale, scope, complexity, and transformation of previous life experiences. The basic principle of industrial revolution 4.0 is to combine machines, workflows, and systems by implementing intelligent networks along the production chain and process. It aims to control each other independently. The rapid development of technology will encourage changes in people's behavior. An increase in needs will drive changes and create a new business opportunity that is very promising.

The development of internet usage drives changes and new business opportunities. Where business people also realize this opportunity to utilize the Internet in the business process. The use of the Internet in the process of doing business will continue to experience growth. They range from electronic information exchange to business strategy applications, marketing, sales, and customer service. The Internet will also support global communication and cooperation between employees, consumers, sellers, and other business partners. Also, the Internet allows people from different organizations or locations to work together as a virtual team to develop, produce, market, and maintain products or services.

However, it is unfortunate that not all company leaders understand the development of industrial revolution 4.0. Especially for virtual leadership, that should be an added value in increasing company performance effectively and efficiently. e-Leadership or virtual leadership refers to the authentic leadership of teams in today's nontraditional virtual business environment. e-Leadership takes place in an environment where work is conducted electronically through information technology.

Many e-leadership behaviors can be identified and linked to both transformational and transactional leadership styles. Leaders who inspire goals for virtual teams reflect transformational-style motivational skills. Providing role and expectation clarity for virtual teams reflects the contingent reward factor of transactional-style leadership. e-Leaders working in a distributed project environment need to be excellent communicators and overcome the challenges involved with virtual communications. Their goal should be to keep all stakeholders, and team members engaged, regardless of location, and effectively communicate to all individuals involved in the project. Challenges in communication can lead to difficulties in task completion and productivity in the project. Communication is essential to the success of projects and is closely related to performance and productivity. The best methods are that all team members have equal and immediate access to and are trained on and effective for everyone [1].

Leading Virtual Project Teams addresses the challenges that today's virtual project management environment poses to traditional methods of leadership and communication. Leadership for successful virtual team management is different from traditional, collocated project team management. Being familiar with appropriate e-leadership styles for virtual project teams and transitioning toward new leadership styles, communication techniques for virtual project teams, and e-leadership competencies is essential for managing projects and human resources in successful organizations today. By recognizing how virtual teams are different from traditional teams, those managing virtual projects may offer benefits to the organization by providing positive, successful leadership and exceptional communications resulting in better project deliverables and products. To overcome the leadership and organizational identity crisis subsuming many organizations, original ideas about how best to nurture the global workforce need to come to light as soon as possible [2].

Therefore it is crucial the virtual role of leaders in learning organizations because this will impact improving company performance. Furthermore, as the study conducted by Purvanova et al. (2018), e-leadership also aims to build and enhance the relationships among organizational members defined by an organization's structure. Nevertheless, the fundamental difference is that e-leadership takes shape in the virtual context where ICTs mediate collaboration. In such a virtual environment, communication between leaders and followers is conveyed via ICT and collects and disseminates information to support organizational tasks

[3].

Bogler et al. (2013) stated that more interactions are carried out through the Internet, where subordinates rarely meet directly with their superiors. This tendency emphasizes the greater interest in the influence of leadership styles on follower outcomes in contexts that are not appropriate for face-to-face interactions - 'natural influences' for leadership relationships. To date, the validity of the differences between transformational and transactional leadership styles has been widely agreed upon in face-to-face interactions. Most research on virtual leadership has been carried out in laboratories, where 'virtual' teams and individual leadership styles are manipulated to influence exogenous variables, such as communication modalities from mass media, efficacy measures, commitment to research, and support for conformity to interaction style and performance team [4]. For this reason, this article will discuss the role of virtual leadership in realizing learning organizations in industry 4.0.

2. Methods and Equipment

In this paper, we used qualitative methods by reviewing and synthesize journals related to virtual leadership, and learning organization. Rahmayanti et al. (2019) said six steps to review articles in this method: 1) developing research and research questions. In this step, researchers have to justify why they conducted their review as a guideline to choose an appropriate design and provide the structure for the next step of the review process. 2) Defining the research questions in this research represents one of the most critical steps to be taken in any study, such as an empirical study, a conceptual piece, or a review paper. All authors' reviews must necessarily exclude a multitude of work near the boundary of their problem, even if they work that other reviews might choose to include. Therefore, in this research, the researcher must define their review's key concept to formulate the research questions. This step starts with identifying potentially relevant studies. When a review focuses on the findings in general, it should ideally capture all the studies of interest. Researchers must select and justify a search strategy that is appropriate for research questions. 3) Screening for involvement. To claim that papers are appropriate with the research questions, researchers should ask themselves if each paper addresses the problem under inquiry and helps them answer the reasonable question. 4) Assessing the quality of primary research. Researchers start the step by looking at the assessment tools, such as the definition of the variables, their respective measures, the description of the research method, and the results. Next, aggregating those results and selecting the papers by interpreting the findings and the recommendations for future research. 5) Reducing data. In this step, the researcher gathered and extracted applicable information from each study. Extracting data for reviews usually includes some thematic coding and conceptual classification, making interpretations and judgments. 6. The last step is analyzing data using appropriate techniques to make the information reasonable and report the review results. Narrative and developmental reviews present the logical reasoning and justifications behind the findings. Authors have to organize, compare, collate, summarize, interpret the information previously extracted to suggest a new contribution to knowledge [5].

3. Results

Unlike in traditional environments, e-leaders cannot communicate with their team members through face-to-face interactions. Instead, diverse ICTs have become the conveyance during virtual collaborations. However, ICTs have their limitations and may not transfer the same rich social, emotional, and non-verbal information present in traditional face-to-face settings.

With virtual leadership, challenges with visibility and transparency as to what the team members are doing and when it is being done must be carefully addressed. Maintaining respect, promoting the project vision, setting goals, and enabling team member accountability

for a geographically dispersed group can become significant challenges to the project manager who lacks e-leadership competencies. The inventory of challenges continues with technological challenges, such as the expense of equipment, support, and infrastructure necessary for virtual communications and Internet and connectivity challenges.

The main objective of industry 4.0 is the distribution of goods and needs. Industry 4.0 enables data collection of community needs in real-time and sends the data to producers.

Producing, producers can produce the right amount as needed. Of course, economically, this can be done with price stability. In business, this can be an expanded market. Product tracking and the transition will increasingly lead to new services. It is related to the protection of Industry 4.0, integrating producers with supply lines without geographical boundaries. So this is a competitive advantage that can be used as a resource for virtual leadership.

4. Discussion

Collier et al. (2012) stated that as virtual teams have become a pervasive element of modern work, research into the factors that impact team performance in virtual settings has grown exponentially. Despite such scrutiny, our understanding of how individual attributes and emergent team processes, including leadership, combine to influence virtual team outcomes remains underdeveloped. Virtual leadership styles are emerging; there is still a need for research assessing how certain leadership styles interact with communication technologies to affect team processes and outcomes. Using a sample of 243 undergraduate business students assigned to 71 virtual teams, this study explored the relationships between the Big Five personality factors, leader emergence, team trustworthiness, peer-rated member performance contributions, and team performance. As predicted, agreeableness and conscientiousness were positively related to the task and social-oriented dimensions of leader emergence. Contrary to expectations, emotional stability was not related to either dimension of leadership emergence. Evidence of the predicted relationships between emergent leadership and peer ratings of member contributions to team performance was obtained for a task- but not social-oriented behaviors. At the team level, aggregated social-oriented leadership behaviors predicted aggregate perceptions of team trustworthiness. Only aggregated task-oriented emergent leadership behaviors predicted virtual team performance. It is expected that the results of research submitted by the virtual team. Therefore we need balanced connectivity in this virtual team member to improve the performance of the organization itself [6].

Hoegl, et al. (2016) stated that Many virtual project teams perform better when leadership is shared (rather than centralized with the formal team leader). However, team leaders are often not prepared to identify shared leadership potential or share leadership responsibility. Based on a study of 96 globally dispersed software development teams, we show that team leaders tend to underestimate the team members' capacity to lead themselves. Consequently, these leaders monopolize decision-making authority and provide insufficient levels of autonomy for team members to tackle their tasks. Preventing the team members from unfolding their true potential, these leaders unconsciously jeopardize virtual team performance. Paradoxically, it is thus team leaders themselves hindering leadership effectiveness in virtual teams. Exports worldwide, however, are eager to draw on expert knowledge residing in multiple locations around the globe to foster knowledge sharing for enhancing innovation, performance, and sustainable competitive advantage. Thus, companies are looking for ways to successfully lead increasingly virtual teams, then rolling back to more co-located project teams. The key to this strategy execution is the dilemma addressing the leadership challenge of virtual collaboration. In particular, geographical dispersion reduces project leaders' direct influence on followers' actions. While in face-to-face teams, project leaders can exert direct influence on their team

members; distant team members often do not feel obliged to adhere to their leaders' commands in the same way as members of face-to-face teams do [7].

Darics (2017) stated that doing leadership in the virtual realm has become a routine part of many leaders' daily work. Yet, our understanding of how leadership is enacted in mediated contexts, especially in text-only channels, is minimal. Building the understanding of how important nonverbal communication is in leadership and management communication because virtual collaborations can only successfully function if the leader can resolve miscommunication, adopt an upbeat interactional style, and facilitate a supportive working environment [8].

Liao (2016) stated that virtual teams could benefit both employees and the employer. Employees may enjoy the flexibility of conducting their work in far-flung locations, ranging from their employer offices to client sites and from hotel rooms to their homes. Such flexibility may facilitate the balance of employees' work and life and potentially increase their satisfaction with the job. Understanding leadership functioning in virtual teams becomes critical as organizations increasingly use dispersed teams for talent acquisition [9].

Lim (2018) stated that organizations find it particularly challenging to motivate virtual team members to exhibit and manage their leadership behaviors despite the pervasiveness of self-managing virtual teams. Awareness is key to inducing several leadership behaviors: directive leadership, supportive leadership, and interpersonal helping. Further, for directive leadership and interpersonal helping, the relationship is contingent on IT-enabled task knowledge and IT-enabled presence awareness. At low IT-enabled task knowledge awareness or high IT-enabled presence awareness, virtual team members who perceived IT-enabled disclosure awareness employed directive leadership and interpersonal helping [10].

Ibrahim (2015) stated that virtual leadership is a concept that integrated mobile technology in leadership style and differed from the conventional style. Virtual leadership is defined as using a computer by the leader for task-orienting, decision-making, and problem-solving in a group. As the development of mobile technology rises, most leaders prefer to use mobile technology devices to coordinate their members in the organization. It may increase productivity by reducing operational costs. The result showed that virtual leadership contributed positively to team communication, while team communication was positively contributed to job performance [11].

Chua etc. al. (2017) stated that E-leadership is defined as a social influence process mediated by information and communication technology to produce a change in behavior and performance with individuals and groups in an organization. The problem that faces e-leadership is sometimes not the shortage of facilities or the failure of the e-learning platform but the behavior of leaders, the organizational culture, the readiness of leaders and staff, and their unwillingness to adapt and change. Some leaders who have easy access to technology do not use it because they lack confidence and e-skills and feel that technology in leadership entails problems and complications [12].

Ali etc. al. (2019) stated that Organizational learning received significant attention among academics and practitioners during the 1970s to 1990s because of the increasing pressure and pace of change on organizations. This earlier literature on organizational learning was developed along two distinct lines. The first emphasized that employees constantly learn from everyday practices and everyday interactions in their organization. The second school of thought conceptualized organizational learning as a process concerned with gathering

information and diffusing knowledge. Following this period, organizational learning was conceived to be closely related to knowledge management. Thus, this literature proposed that the organizational learning process was social, collective, situated in practice, and comprised knowledge acquisition, distribution, interpretation, and codification. This recognition of the process of managing knowledge enhances our understanding of how organizational learning occurs. Alternatively, learning is seen as a means of developing organizational capabilities, leading to better performance and competitive advantage [13].

Khan (2019) stated that organizational learning is a set of actions (related to acquisition, dissemination, interpretation of knowledge, and organizational memory) generating a positive change within the organization. At present, organizational learning is

They are interpreted as a source of competitive advantage in the context of strategic management. An organization characterized as a learning entity accepts those behaviors that lead to different perspectives and ways of doing things. The supplement to organizational learning is a formal arrangement, which allows organizations to process relevant information, practices, and knowledge as a basis for change and innovation [14].

Khunsoonthornkit and Panjakajornsak (2018) stated that a learning organization is an organization with the philosophy and resolution to create sustainable solutions and outcomes. Moreover, it also integrates and exchanges perspectives with partners to promote the organization. Its corporate culture builds learning awareness and develops according to the organization's strategies and assimilates and modernizes the organization. There are four levels of learning: individual, team, organization, and society. A learning organization can encourage personnel to assimilate based on mutual assimilation and vision. There are seven aspects of learning models: 1) continuous learning, 2) inquiry and dialogue, 3) collaboration and teamwork, 4) empowerment of people, 5) creation of the system, 6) connection to the environment, and 7) strategic leadership. And Effective outcomes on learning organizations can be used as one criterion in evaluating success in building a learning organization [15].

Antunes, etc. al. (2019) stated that Although the definitions of organizational learning vary considerably, there is a consensus that the organizational learning represents a particular model of organizational culture promoted by the attention given to the change and how it occurs, the flexibility and openness to new ways of work, depending on the goals of the organization and of its performance targets. However, we must emphasize that organizational learning and its difficulties, knowledge management in the company, and organizational memory have a relatively recent development in their area of study. Therefore, it is necessary to continue researching, deepening concepts and disseminating information, questioning the forms of learning, sharing content, the form of this storage in organizations, and contributing to the successful business [16].

Ojha et al. (2018) stated that Organizational learning helps acquire newer capabilities that could sustain the competitive advantage of a firm. Organizational learning is defined as "the process of improving actions through better knowledge and understanding." It is one of the most vital competencies of an organization and a primary responsibility of its leaders. So a leader is an essential factor in building it [17].

Tortorella et al. (2019) stated that the development of learning capabilities influences knowledge, trust, and understanding in an organization, supporting the growth and development of today's business, which is integrated into the organization's routines. Therefore, the correct conceptualization in the management of an organization is crucial to

improve the organization for the better. So needed, good learning skills are needed in managing team members and leaders themselves [18].

5. Conclusion

Leadership is the only way by which an organization can turn into a learning organization. The traditional views of leaders who set goals, make decisions, and direct troops reflect individualistic views. Virtual leadership in learning organizations requires something more. In learning organizations, managers learn to think in terms of 'control with' rather than 'control' of others. Because the term Industry 4.0 creates opportunities to continue to get new strength. The presence of industry 4.0 will make it easier for virtual leaders to improve digital manufacturing drives and create profits. Benefits include fewer costs in moving employees, reducing real estate costs, increasing team skills, working around the clock due to different time zones, cheaper cross-functional interactions, increasing customer service, and eliminating travel and physical office expenses and the list of benefits continues to grow. With virtual leadership, challenges with visibility and transparency about what team members do and when to do must be overcome. Maintaining respect, promoting project vision, setting goals, and enabling team members to account for geographically dispersed groups can be a significant challenge for project managers who do not have e-leadership competencies. Inventory challenges continue with technological challenges, such as the cost of equipment, support, and infrastructure needed for virtual communication and the Internet and connectivity challenges. Training and development of future leaders, specifically those leaders who lead in virtual settings, need to address the unique challenges of e-leadership and incorporate training design tools that actively reflect these challenges.

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Conflict of Interest

The authors have no conflict of interest to declare.

References

- [1] Lee, Margaret R. (2014). "Leading Virtual Project Team: Adapting Leadership Theories And Communication Techniques to 21st Century Organization". London: CRC Press.
- [2] Lojeski, Karen Sobel. (2010). "Leading the Virtual Workforce: How Great Leaders Transform Organizations in the 21st Century". New Jersey: John Wiley & Sons Inc.
- [3] Purvanova, Radostina, and Renata Kenda. (2018). Paradoxical Virtual Leadership: Reconsidering Virtuality Through a Paradox Lens. *Group & Organization Management*, 1-35.
- [4] Bogler, Ronit, Avner Caspi, and Sonia Roccas. (2013). Transformational and Passive Leadership: An Initial Investigation of University Instructors as Leaders in a Virtual Learning Environment. *Educational Management Administration & Leadership*, 41(3), 372-392.
- [5] Rahmayanti, Henita, Maulida, Ernita, & Kamayana, Emil. (2019). The Role Of Sustainable Urban Building in Industry 4.0. In *Journal of Physics: Conference Series*, IOP Publishing, 1387(1), 1-6.
- [6] Coglisier, Claudia C., William L. Gardner, Mark B. Gavin, and J. Christian Broberg. (2012). Big Five Personality Factors and Leader Emergence in Virtual Teams: Relationships with Team Trustworthiness, Member Performance Contributions, and

- Team Performance. *Group & Organization Management*, 37(6), 752-784.
- [7] Hoegl, Martin, and Miriam Muethel. (2016). Enabling Shared Leadership in Virtual Project Teams: A Practitioners Guide. *Project Management Journal*, 47(1), 7-12.
- [8] Darics, Erika. (2017). E-Leadership or How to Be Boss in Instant Messaging? The Role of Nonverbal Communication. *International Journal of Business Communication*, 1-27.
- [9] Liao, Chenwei. (2016). Leadership in Virtual Teams: A Multilevel Perspective. *Human Resource Management Review*, 1-12.
- [10] Lim, Joanne Yong Kwan. (2018). IT Enabled Awareness and Self Directed Leadership Behaviors in Virtual Teams. *Information and Organization*, 28, 71-88.
- [11] Ibrahim, Mohd Yusri. (2015). Model of Virtual Leadership, IntraTeam Communication and Job Performance Among School Leaders in Malaysia. *Procedia Social and Behavioral Sciences*, 186, 674-680.
- [12] Chua, Yan Piaw, and Yee Pei Chua. (2017). How are E- Leadership Practices in Implementing a School Virtual Learning Environment Enhanced? A Grounded Model Study. *Computer & Education*, 1-22.
- [13] Ali, Sadaqat, Linda D. Peters, Ikram Ullah Khana, Wajahat Ali, and Naveed Saifa. (2019). Organizational Learning and Hotel Performance: The Role Capabilities Hierarchy. *International Journal of Hospitality Management*, 1-12.
- [14] Khan, Naseer Abbas, and Ali Nawaz Khan. (2019). What Followers are Saying about Transformational Leaders Fostering Employee Innovation via Organizational Learning. Knowledge Sharing and Social Media Use in Public. *Government Information Quarterly*, 1-11.
- [15] Khunsoonthornkit, Ardharn, and Vinai Panjakajornsak. (2018). Structural Equation Model to Assess the Impact of Learning Organization and Commitment on the Performance of Research Organizations. *Kasetsart Journal of Social Sciences*, 1-6.
- [16] Antunes, Helder De Jesus Ginja, and Paulo Goncalves Pinheiro. (2019). Linking Knowledge Management, Organizational Learning, and Memory. *Journal of Innovation & Knowledge*, 1-10.
- [17] Ojha, Divesh, Elisabeth Struckell, Chandan Acharya, and Pankaj Patel. (2018). Supply Chain Organizational Learning, Exploration, Exploitation, and Firm Performance: A Creation Dispersion Perspective. *International Journal of Production Economics*, 1-52.
- [18] Tortorella, Guilherme Luz, Alejandro Mac Cawley Vergara, Jose Arturo Garza Reyes, and Rapinder Sawhney. (2019). Organizational Learning Path-Based Upon Industry 4.0 Adoption: An Empirical Study with Brazilian Manufacturers. *International Journal of Production Economics*, 219, 284-294.