International Journal of Technology 13(5) 949-957 (2022)
Received March 2022 / Revised August 2022 / Accepted August 2022

International Journal of Technology

http://ijtech.eng.ui.ac.id

Leading in the Age of the Fourth Industrial Revolution – A Perspective from Vietnam

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Abstract. The purpose of this study was to determine new leadership styles in the context of the level of development of the Vietnamese economy in the last years and what is likely to happen in the next 10 years or more. Another aim was to create the combination of leadership best thinking that will enable Vietnamese leaders to adapt successfully in the implementation of the fourth industrial revolution (4IR) in Vietnam. The 4IR is fundamentally different because it involves the fusion of a range of new technologies that link the physical, digital and biological worlds, impacting all disciplines, economies, and industries. Transformational analysis in combination with documents review, in-depth interviews with Delphi technique in VUCA (Volatile, Uncertain, Complex and Ambiguous) environment with 64 top government leaders, researchers, and scholars. including hi-tech enterprises conducted to see the major characteristics and skills that a leader needs in the digitalization ages in the digitalization age. The study results were that there are five models of leadership in 4IR best practices: traditional leadership, transformational leadership, agile leadership, block-chain leadership, and human values and ethics. The principal conclusion was that the more resilience Vietnam is ready, the more successful Vietnam will achieve beyond the 4IR.

Keywords: 4.0 Industry revolution; Block-chain leadership; Resilience; Vietnam; VUCA

1. Introduction

People are talking about the boom of technology and the dominance of technology in this century and technological development is called the Fourth Industrial Revolution, or 4IR for short, a continuous stage of technical development known in mankind's history. This 4IR is bringing many changes to nearly all aspects of life. In the 4IR, technology becomes an essential part of the business.

Technology can be considered a particular member of the team or a staff of the organization. All aspects of life are closely connected owing to the presence of technology,

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doi: 10.14716/ijtech.v13i5.5839

the internet of things (IoT), or artificial intelligence (AI), the core components of the 4IR. Economic activities become more active while managing people or leading an organization requires leaders to develop more complicated skills. Leadership in the age of 4IR should be different from traditional leadership as, besides human beings, intellectual intelligence is getting involved in doing business. It will include the core values of traditional leadership while being technology-oriented and still highly valuing humanity.

There have been many leadership theories developed and become popular in different contexts. Traditional leadership, transformational leadership, and agile leadership, to name a few. These leadership styles proved their efficiency in a relevant business context. In the time of the 4IR, a leader will not just lead a group of humans or manage the collaboration among this group; this person now has to deal with the special team member called technology to make it serve the business and to ensure its smooth collaboration with human staff. Digital technologies have disrupted everything within IT, leadership styles, and how we manage our organizations. What should be an appropriate leadership style to basically fit these changes in the world of business and managing people? Moreover, in the time of technology dominance, many human values tend to be forgotten or ignored in the wave of the technology boom. Whether ethics, as always a core principle of doing business, is still considered a leadership principle under the 4IR.

Against this background, this research proposes a new leadership style suitable for the 4IR. This will also give leaders as well as researchers a suggestion on how to manage the business in the context of swift technological development.

Specifically, this research aimed at finding answers to the following questions:

- What are Vietnamese leaders' best thinking for the 4.0 Industrial Revolution?
- What should the Government of Vietnam do to support organization leaders to develop their skills by 4IR successfully?

2. Literature Review

2.1. The Fourth Industrial Revolution

Previous industrial revolutions have been characterized by the adoption of various techniques for production. The 4IR will happen mainly in biotechnology, digital technology, and physical technology. According to Klingenberg and Antunes (2017) the 4IR is made from technical advances, economic scenarios, and demographic changes. Scheer (2015) believes that technological advances do not mean new technologies. In fact, some of them were already present 30 years ago but only became feasible recently with the development of information and communication technology (ICT) (Brettel et al., 2014). According to Oguro (2016) AI, IoT, and big data are core elements of the 4IR. 4IR will include breakthroughs in IT, biotechnology or digital technology, and smart mobile applicants.

The 4IR will have a significant impact on the economy. It is worth a lot of money. The research concluded that an industrial-scale version of the IoT, could add $14.2 trillion to the world economy over the next 15 years. It also highlighted the huge economic growth potential of 4IR, going so far as to state that the value added would not only include financial benefits but would be enhancing worker safety (Accenture, 2014). The impact of intangible assets and technical and technological development on the financial result of an enterprise is present, but still does not play a decisive role in improving economic efficiency (Rytova et al., 2021).

2.2. Theories of Leadership

Leadership has long been a subject of interest for philosophers and historians, but scholars have only started scientific studies about leadership since the twentieth century.

Scholars and researchers around the world have taken many different definitions of leadership, and these definitions have changed over time. Goleman (1998) outlined three areas of leadership skills: completely technical skills, cognitive ability, and emotional intelligence. Research pointed out main qualities of leadership included confidence, cognitive ability, integrity, motivation ability, and enthusiasm (Kirkpatrick & Locke, 1991). Mumford et al. (2000) believed that daring to face challenges, the capability of influence, and social commitment were key characteristics of a good leader.

In general, from the review of past research on leadership, it can be seen that research on leadership capacity may look at the context, elements of the environment outside the organization, and other relevant objects when studying leadership. However, all research showed that qualities, knowledge, and skills were necessary for a business leader. No one can tell exactly how the future will be. This explains why changes are often associated with uncertainties. Organizations are constantly faced with changes, especially changes in technological and economic innovation. The right leadership style is very important to transform and keep going in the right direction.

2.3. Leadership in the 4IR

In general, there have been quite a number of studies that provided models of leadership capacity. Good models in developed countries have also been studied and tested in other countries and showed that most capabilities were appropriate. However, the research on leadership capacity improvement must be done and updated regularly in the context of the current globalization, especially in the 4IR. With innovation and digitalization happening in all aspects of life, from technology to communication and services, leaders have to be able to inspire their employees to innovate and hold on to these ideas.

Oosthuizen (2017) suggested a 10-type intelligence framework called the 4IR Intelligence Framework, consisting of Contextual Intelligence (CI), Emotional Intelligence (EI), Inspired Intelligence (II), Physical Intelligence (PI), Entrepreneurial Intelligence (EntI), Strategic Intelligence (SI), Transdisciplinary Intelligence (TI), Ecosystem Intelligence (EcoI), Socratic Intelligence (SocI), and, Ethical Intelligence (EthI). Herold (2016) suggested a model for leadership in the 4IR, which includes four pillars, traditional leadership, diversity, agile leadership, and responsible ethics. The five facets of agility include innovating, performing, reflecting, risking, and defending, all of which play an important role in the leader's success. Finally, ethical responsibility is an increasingly key factor in determining a leader's success (Herold, 2016).

Determinant factors for 4IR leadership attributes include visionary, contingent reward, courage, idealized influences, inspiration, intellectual stimulation, passion, strategic thinking, focus, collaboration, innovation, willingness to change, communication, emotional intelligence, spiritual intelligence, responsibility and accountability, technology, entrepreneurial, adaptive, shaping society, problem-solving, critical thinking (Daud et al., 2021). A leader's transformational leadership and external pressure, such as a customer's smart factory investment, have positive impacts on a firm's operational technology (OT) and information technology (IT) adoptions (Chumnumporn et al., 2022).

2.4. Vietnamese Quotes

At the National Scientific Conference The 4IR and the legal issues posed for the construction and improvement of the Vietnam legal system took place in Hanoi on 24 June 2019, Prime Minister Nguyen Xuan Phuc directed: The 4IR is turning international legal issues into national legal ones and vice vers. And said that if you want to promote innovation, the policy itself, the mechanism must also be open and creative. Deputy Prime Minister Vu Duc Dam stated at the Industry 4.0 Summit 2019 on 3 October 2019 in Hanoi

that Government needs to pay special attention to training human resources ready for Industry 4.0. At the Vietnam Private Sector Economic Forum 2019 held in September in Hanoi, Deputy Minister of Planning and Investment (MPI) Vu Dai Thang said that for Vietnam to seize opportunities and facilitate enterprises to benefit from Industry 4.0, MPI is compiling a national strategy, which will clarify what the digital economy means, with specific tasks for ministries and agencies.

2.5. Vietnam's Economy in the Era of 4IR

The 4IR creates a breakthrough in developing countries like Vietnam, shortening the development gap compared to other countries worldwide. Vietnam has significant potential in the 4IR: The determination of the Party and the State; The advantage of late comer country; The relatively large population and the golden demographic structure; The plentiful, cheap, dynamic, and creative labor force; The relatively good telecommunications infrastructure (Hau, 2019).

Vietnam currently ranks 3rd in the ASEAN region in terms of the size of the digital economy. Digital technologies have also been applied in manufacturing, agriculture, and services. In 2019, the World Economic Forum ranked 141 economies (accounting for 99% of world GDP) through 103 indices grouped into 12 pillars. The pillars cover socio-economic factors such as institutions, infrastructure, IT application, macroeconomic stability, health care, skills, product markets, labor markets, financial systems, market size, business dynamics, and innovation capacity (Schwab, 2019). In particular, mobile payment increased by 104% in transactions and 155% in value. Vietnam's information security index increased by 50 levels from 100 to 50 (PwC, 2022). The Covid-19 pandemic has seriously affected the world and Vietnam's economy, causing businesses to change the way they operate to adapt and survive. Many retail brands like BigC and Vinmart have quickly adapted their business models to the needs of consumers by applying 4.0 technology to their operations. Businesses focus more on online channels and learn new strategies to attract more customers. Technology companies also offer solutions to support online shopping, such as Bedicho and Grab Mart. Even big companies like Tiki, Shopee, and Lazada also appear more often in advertising campaigns and attractive promotions to reach more consumers. These are the basic conditions for developing an economy based on digital technologies and the foundation for entering the era of 4IR. Technology makes economics and helps a nation live in a peaceful and happy place. Technology also helps the nation's capability in defense and security. Digital transformation is necessary to create a new storage system or even a plug-in and sell system beyond 4IR.

3. Research Methodology

Delphi technique and VUCA (Volatile, Uncertain, Complex, and Ambiguous) were applied during the establishment of the new theory. The leadership practices in adapting to the 4IR will focus on the agility of business leaders to be able to sense, foresee, learn and adapt to a fast and continuously changing VUCA world of the future. The modern leaders will not only have to react to any unforeseen crisis affecting the organization, but they will also need to be able to adapt to overcome the challenges that arise from the crisis and anticipate what other challenges that may arise in the future, and prepare for the company for it accordingly. Two rounds were executed in this paper, amid which criticism was requested from the experts. They were permitted to adjust their starting judgments approximately the issue displayed in each circular, given that each expert can survey and evaluate the criticism from other specialists (Al-Hazza et al., 2022).

In this study, desk review and in-depth interviews were used to determine the leadership's best thinking in Vietnam. Sixty-four informants from state officers, researchers, social associations, professional associations, and hi-tech enterprises, including seven aforementioned groups, participated in this study. Therefore, research findings would be found in three main groups: public organizations with 22 informants counted for 34%, non-profit organizations with ten informants for 16%, and private organizations with 32 informants for 50%.

Table 1 Organizations That Are Involved in the Study

No.	Affiliations	Sector	No. of informants
1	Ministry of Natural Resources and Environment (MONRE)	Public	1
2	Department of Personnel and Organisation	Public	1
3	Ho Chi Minh City People's Committee	Public	3
4	Da Nang Department of Agriculture and Rural Development	Public	1
5	Da Nang Department of Planning and Investment	Public	1
6	Da Nang Department of Information and Communications	Public	1
7	Congress of Ca Mau Province	Public	1
8	Vietnam Academy of Science and Technology (VAST)	Public	1
9	Quang Trung Software City (QTSC)	Public	1
10	Saigon Hitech Park (SHTP)	Public	2
11	Universities (ULAW, HCMUT, UEB)	Public	3
12	Enterprises in the hi-tech industry	Public	6
13	International Labour Organization (ILO)	Non-profit	2
14	The Japanese Chamber of Commerce and Industry in HCMC (JCCIH)	Non-profit	1
15	Vietnam Central Institute for Economic Management (CIEM)	Non-profit	2
16	Vietnam Research Institute of Electronic, Informatics and Automation (VIELINA)	Non-profit	1
17	Hochiminh Computer Association (HCA)	Non-profit	1
18	Vietnam Plastics Association (VPA)	Non-profit	1
19	Vietnam Mechanical Association	Non-profit	1
20	Vietnam Automation Association (VAA)	Non-profit	1
21	Institute for Sciences – Society and Innovation (ISSI)	Private	1
22	Green Ocean Institute - Nguyen Tat Thanh University	Private	1
23	NTTU Hi-tech Institute	Private	1
24	Universities (FU, HUTECH, NTTU)	Private	3
25	Enterprises in the hi-tech industry	Private	26
			64

4. Results and Discussion

This research developed a new leadership style suitable for doing business in the time of 4IR. Answers to the following questions provided the foundation to build up a new theory on leadership in the era of 4IR. The public group investigated the challenges of data and cyber security concerns, lack of a culture of collaboration among different parties, and the disruptive impact on strategy planning by organizations, while the private group investigated the challenges of skills shortages, inability to raise large-scale financial investments in a short time and the resistance to the culture of digitalization.

The five key challenges are expected to have a disruptive impact on the mismatch between job loss for traditional skills and job creation for new skills; business models need to be transformed in a rapid way to adapt to the introduction of new technology, and organizations need to manage its total value chain in a whole new paradigm and furthermore, digitalization creates ethical dilemma for business and society because of its ability to amass and access to a vast amount of personal data of its users which could lead

to unethical manipulation. Therefore, adapting successfully to a new world scenario impacted by 4IR requires the focus development of strong people values and ethical behaviour to handle the relationship and interaction between business and society in a more ethical manner.

4.1. Key Skills for 4IR

Developing the agility skills set for leaders to adapt more successfully for the future requires them to change from a mindset of their "all knowing due to limited knowledge and lots of experience" which is prevalent at present, to a mindset of being motivated for "lifelong learning". Lifelong Learning refers to a continuous process of gaining new knowledge and skills as individuals progress through their professional careers and personal life. Leaders should be exposed to a variety of different learning experiences in the key areas of STEM (Science, Technology, Engineering, Mathematics) and managing global organizations in order to develop multiple competencies in digital literacy, critical thinking, negotiation, innovation, decision making, conflict handling, cross-culture communication, cross-culture management, multi-generation management, business strategy, supply chain management, accounting and finance, emotional intelligence and global economics.

4.2. Leadership Best Thinking

On coding answers from interviews, this research found that typical factors formed typical characteristics of the leadership style. All these factors construct a new theory of leadership in the 4IR which is named Blockchain leadership. Block-chain leadership means maintaining command over other people and leading the business well in a wide range of circumstances, especially in new, changing, and ambiguous situations, leaders, can also inspire the staff with the belief and trust in their values. More specifically, Block-chain Leadership is the leadership style in which the leader has the ability to adapt to 4IR technology and apply the physical world to the digital world with agile, creativity, innovation, rapidity, flexibility, and resilience to recover from a shock and to continue its intended trajectory.

4.2.1. Agility

Agility is the first characteristic linked to Blockchain leadership by interviewees. In the digital age, the world changes fast, and business leaders who can quickly adapt to changes will be more likely to survive and thrive. Agility will even help businesses take advantage of opportunities arising from changes.

Dr. Tran Ngoc Tuan – deputy director of FPT University – the world-leading university on IT and IoT said "What is right yesterday may not be right today. Technology changes in seconds, so leaders have to be very quick. They must be quick at realizing the change, understanding the change, analyzing the change, and finding appropriate solutions".

Agility is a necessary characteristic of the leader in the VUCA world when everything is sudden, uncertain, and unpredictable. Agile leaders will accept that they do not know everything when deciding in the VUCA world, they need to be adaptable, visionary, and engaged.

4.2.2. Flexibility

Flexibility is somehow like agility. In many cases, agility and flexibility are grouped as one characteristic when analyzing leadership characteristics.

Mr Ho Lu Lam Tran – a successful owner of a holding company that invests in the 4IR field, said: "Successful leaders must be the ones who dare to change because change is essential for the development of the business."

The people who succeed in the VUCA world often do not have the patience to sit still. They often put their ideas into the work and then constantly change to make a difference.

Leaders who consider and apply these factors and combine them with the existing skills to reinvent the company will give them a better chance to expand their success to the side. On the other hand, those who have succeeded in their own country are the most logical models for foreign entrepreneurs to approach and learn.

4.2.3. Innovation and Creativity

Creativity can stem from the passion for discovering and conquering new things. This demonstrates the dare to initiate new things and implement innovation. Innovation and creativity are extremely important in the VUCA world, where all events are interconnected and complex. Because in the VUCA world, most incidents are unpredictable and cannot be solved just based on experience or common sense. Therefore, creativity helps leaders think of extraordinary solutions to overcome difficult moments.

Deputy Minister Vo Tuan Nhan from the Ministry of Natural Resources and Environment (MONRE) said: To innovate or to die

This is helping businesses to save on the aforementioned costs and increase productivity. New concepts of digital transformation have become a burden for many businesses. Many businesses may not be aware of technological changes in the market from the beginning but if they have an innovative leader, the business will soon become innovation-oriented. In their research, Rytova et al. (2021) affirm that innovation within an enterprise leads to economic efficiency.

4.2.4. Inspirational Motivation

Block-chain leadership will take inspirational motivation as an important characteristic that is also the foundation of all leadership theories. If employees only see their work as nothing more than a means to receive a monthly salary, gradually, they will become frustrated and reluctant to work hard. To be inspired to succeed, we all need to develop, learn and multiply our potential constantly.

Dr. Pham Chi Lan, former Vietnam Central Institute for Economic Management (CIEM) said: "Not many leaders understand the power of being inspired, so they tend to forget inspiring their employees. In fact, this is one factor contributing to a business's success. Inspiring people is also a difficult skill to develop".

4.2.5. Technology Oriented Thinking

As 4IR is the age of digitalization, being technology oriented is a must-have characteristic of the Blockchain leadership. A leader with an open mind to new technologies or changes will find it easier to survive in the era of technology when technologies lie in every object we daily deal with. Therefore, one of the interviewees highlighted important characteristics was a business mind heading toward technology. -oriented thinking does not require the leader to have technological capacity because not every business leader has a technological background. Technology-oriented thinking urges the leader to add technology as an important element to their business, operation, and human resource strategy. This keeps the leader updated with the evolvement of the economy and the market in the technology world. The VUCA world requires leaders to be alert, flexible, and quick at adapting to changes. This is based on the development of technology.

Mr Nguyen Ngoc Huy from Japan Vietnam High Technology R&D Center (JAVIHI) said: "No matter doing business in what area, we all need technology-oriented thinking."

4.2.6. Human Values and Ethics

A block-chain leader needs to demonstrate honesty and openness. The environment described in the VUCA model requires people to be open and honest with each other to solve problems or develop strategies together. An ethical leader drives their business in an ethical way that is always sustainable and safe. Being honest is not always easy; it requires

courage and strictness with yourself, but it is necessary in the VUCA world when things are unclear, unpredictable, and unreliable.

Key elements of 4IR, such as Advance Robotics, AI, Advance Engineering, Digitalization, and Big Data Analytics, could impact our future in undesirable ways if we lack the compassion and ethics to do what is right for society, business, and the planet. Therefore, we must focus on developing society ethics, business ethics, emotional agility, and responsibility.

Social ethics refers to the need for leaders to be mindful of the society and the environment in which they do business and to manage those businesses ethically and sustainably to add value to the social well-being of society and that its business practices do not cause harm to the ecosystem or the environment that will destroy the sustainability of the planet and harm the society members.

At the One Mekong One Meal Initiative announcement ceremony on 10 October 2018, Mr Vu Xuan Truong – co-founder of MEKOLOR, quoted: "4IR adjusts behavior under human values & ethics by blockchain recorded by big data".

Most businesses in the future will be connected to the global supply chain; therefore, it is important for them they need to practise good business ethics at the global level. Leaders needs to develop their resolve to be more responsible and to focus on the long-term goals of developing the organization and the transformation of its employees and also to create value for society and preserve the environment ecosystem, rather than focusing on short-term gain to the detriment of the destruction of long-term values for the organization, employees, society and environment. 4IR will transform the labor market in many ways. If we focus on positive values and ethics of the people, technology and humans together could create a bright future.

Dr. Le Dang Doanh – former President of Vietnam Central Institute for Economic Management (CIEM) said: "Life changes a lot but being honest or staying honest is always the key principle in any position".

5. Conclusions

If redefining leadership to identify a new level that every leader needs to reach in this new age is difficult, it is even more difficult to "live with" and "keep" that level. But it is a meaningful journey to be made, and it will be much easier if there is a parallel between the old methods and tools to energize and lead each leader on that journey. The blockchain leadership model is believed to contribute a tool for leaders to redefine themselves in the era of 4IR. This research has established a new leadership theory by finding answers to research questions. The objectives of the research were met. While all the traditional leadership mindset and practices are still applicable in the business environment today, it is insufficient to deal with the dynamics of the changes impacting the business world today due to changes in global consumer behavior. The leadership behavior of 4IR creates the future. 4IR can assist different countries in developing faster, not by its background or by huge capital investment but by modern and agile, transparent, and ethical leadership capability that is sustainable for the present and the future. Blockchain Leadership is the appropriate model to achieve success for organizations in the era of 4IR and beyond. It is therefore essential for Government to endorse and support the development of block-chain leadership, which is essential for the effective implementation of 4IR by the business organizations in their respective countries.

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