

The Needs to Develop Human Resources from T- to X-Shaped Person to Attain and Maintain Industrial Sustainability and Competitiveness

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ABSTRACT

The rapid development of digital technology has an impact on industry and society. Industry 4.0 and society 5.0 indicate the latest industrial and societal trends that are relevant to new and advanced digital technologies. In Industry 4.0, utilizing advanced digital technologies require both technical capability and a leadership ability. This situation will directly or indirectly impact the sustainability as well as competitiveness of the industry. Industries that are unable to adapt, especially their human resources, to this situation will find it difficult to survive and in the worst case will no longer be able to survive. Therefore, this paper aims to evaluate the idea of developing human resources, namely X-shaped people, to ensure the sustainability and competitiveness of the industry. The method used in this study are literature studies, theoretical reviews, and expert opinions. This paper concludes that industry and academia need to develop the X-shaped person in order to attain and maintain industrial sustainability for today and in the future.

Keywords: X-shaped person, T-shaped person, Industry 4.0, Future industrial leader.

1. INTRODUCTION

Currently and in the future, technological developments are increasing rapidly in all fields, especially due to the impact of digital technology. It is not surprising that Industry 4.0, which is based on the use of advanced digital technologies such as Artificial Intelligence, Big Data, etc., has been widely implemented (Rüßmann et al., 2015). Industry 4.0 has changed the way industry operates, becoming a new game changer that requires special digital literacy. Industry 4.0 will also have an impact on society as predicted by the Japanese government, known as Society 5.0 (Deguchi, 2020; Fukuyama, 2018). This situation can have positive and negative impacts on the industry. The positive impact is that the industry will become more efficient, effective and productive than before. However, the industry may face difficulties in ensuring its sustainability when its human resources are no longer able to cope with this situation.

Therefore, in order for the presence of digital technology to have appositive impacts, human resources must be improved so they are able to adapt to this situation accordingly. In the past, the traditional type of person was known as I-shaped person, which means that human resource development only focused on technical aspects. As technology develops, the I-shaped people are no longer suitable because technical abilities alone are not enough to compete, so specific people are needed who have balanced technical and managerial abilities, known as T-shaped person (Gibson, 2021; Hammer et al., 2021). In addition, because the requirement of one technical ability alone is no longer sufficient to deal with technological complexity, the M-shaped and Comb-shaped person are more relevant, namely people who have several technical and managerial abilities (Bassano, 2018; Dekoninck & Bridge, 2023; Hammer et al., 2021; Veenendaal, 2020).

Several previous studies have shown the need for further improvement from a T-shaped person to an X-shaped person (Veenendal, 2020; Rahman, 2024). Current study shows that in general the X-shaped person has advantages compared to T- or I-shaped person, in terms of expertise, collaboration, innovation and flexibility (Rahman, 2024). From another point of view, this paper presents a study that assesses I-shaped, T-shaped and X-shaped pe in terms of agility, resilience, technology, innovation and leadership factors. These factors are considered to be important factors

that ensure industries to survive especially due to the rapid development of digital and advanced technology.

This paper intends to highlight that X-shaped people will be needed to lead the industry to ensure sustainability and competitiveness due to changes in the current and future strategic environment especially due to the rapid development of digital and advanced technologies. Therefore, this paper will evaluate the idea of developing human resources, namely X-shaped person, to ensure the sustainability and competitiveness of the industry.

2. LITERATURE REVIEW

2.1 Specialist vs Generalist

A method for categorizing a person can be done based on their area of interest related to skills and knowledge, for example specialist or generalist. A specialist is a person who has special skills and knowledge in one area of interest. A specialist tends to focus on exploitation rather than exploration (Kelly et al., 2011). A generalist is a person who has broad skills and knowledge in various areas of interest. A generalist tends to be more interest about exploratory learning (Kelly et al., 2011). Some differences between a specialist and a generalist are summarized in Table 1 (Nickols, 2004).

Table 1. Differentiation between a specialist and a generalist.

Aspect	Specialist	Generalist
Focus	The work	The environment
Way of looking	Inward	Outward
Domain	Tactic	Strategy
Focal point	Task	Context
Expertise on	Execution	Negotiation
Management	Manage the work	Manage the environment
Field of expertise	Science & Technology	People & Politics

2.2 I-, T-, and X-shaped Person

The categorization of a person determines the character of his/her professional interests and jobs. Several types of persons namely I, H, T, Pi, M, Dash are defined as follows (Bassano, 2018; Dekoninck & Bridge, 2023; Veenendaal, 2020).

1. I-Shaped person: Also known as functional experts or specialists, they are experts in certain (in-depth) skills or knowledge (Figure 1-2) (Buxton, 2009).
2. H-Shaped person: Individuals with specialist or experts in two fields.
3. T-Shaped person: Individuals with a combination of depth and breadth of skill or knowledge (Figure 1-2) (Saviano et al., 2016).
4. Pi-Shaped person: Individuals with a combination of deep specialized skills and broad of general knowledge (Figure 1).
5. Comb-Shaped person: Individuals with multiple specialized skills and broad general knowledge (Figure 1).
6. Dash-Shaped person: Also known as generalists, they have broad general knowledge but no specific skills.

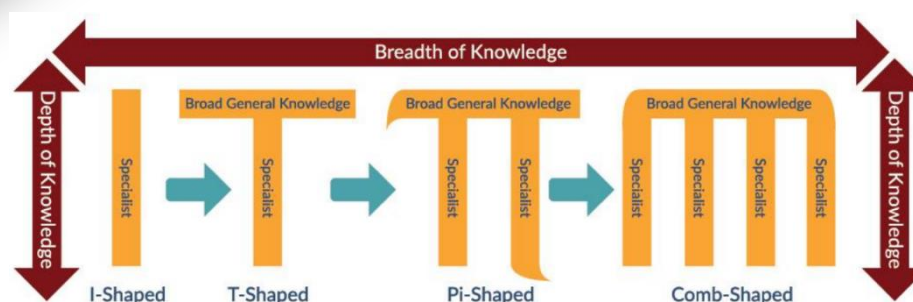


Figure 1. The shapes of person (Dekoninck & Bridge, 2023; Veenendaal, 2020).

The simple type of person, the I-shaped person, is developed through an educational process that emphasizes expertise in a particular field. The education system that develops I-shaped person is based on the need for expertise in a particular field. However, current and future needs characterized by rapid development of technology and tough business pressure require more abilities that cannot be fulfilled by I-shaped person (Buxton, 2009). Because I-shaped person is considered lack of general abilities and management knowledge. Therefore, T-shaped people are expected to be a solution due to the ever-changing business pressures and rapid technological developments (Figure 2). It's not surprising that there are many studies and references that comprehensively examine T shaped person (Barile et al., 2023; Bassano, 2018; Gibson, 2021; Saviano et al., 2016; Schaffer, 2021).

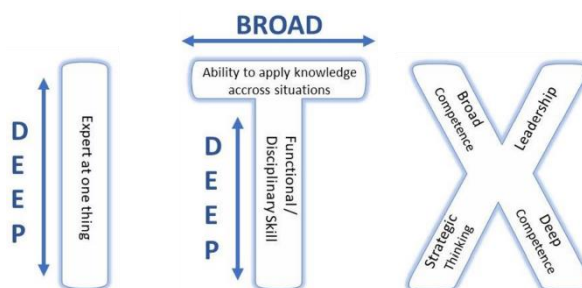


Figure 2. Characteristic of I-shaped, T-shaped, and X-shaped Person (Veenendaal, 2020).

Even though T-shaped people are considered capable of overcoming current human resources qualification problems. However, this paper will discuss a type of person which is predicted to be more in line with future situations and conditions due to the rapid development of digital technology, business pressures, and changes in digital society. In the future, organizations will utilize digital technology in their operations so that dependence on skilled workers will slowly decrease. Therefore, someone who will lead an organization is expected to have a T-shaped type with leadership qualifications (Rahman, 2024). It is familiar as X-shaped person which is a person with T-shaped qualifications with additional leadership abilities (Figure 2, Table 2). The X-shaped person is someone who has deep expertise built on strong credibility but can also lead a diverse team to achieve a goal (Rahman, 2024).

Table 2. Comparison of I-, T-, and X-shaped person (Rahman, 2024).

Aspect	I-Shaped	T-Shaped	X-Shaped
Expertise	Deep in one area, limited elsewhere	Deep in one area, broad in others	Deep in one area, broad in others, plus leadership quality
Collaboration	Low, primarily works within speciality	High, across various disciplines	Very high, excell in leading teams
Innovation	Low, focused on specific domain	High, thanks to interdisciplinary approach	Highest, drives innovation through leadership and collaboration
Flexibility	Low, prefer specialized tasks	High, adaptable to different roles	High, adaptable to leadership and collaborative roles

3. METHODS

The methods used in this study are literature studies, theoretical reviews, and expert opinions. The reasoning using expert opinions is that experts normally have many years of experience in the field of human resource development so they know the strengths and weaknesses of people in the professional field. Therefore, when the organizational/industry situation changes e.g. due to digital transformation, they can foresee what will happen to their human resources (Figure 3).

Furthermore, based on expert assessments, it is possible to determine a concept for the development of a new type of person, known as X-shaped person, that fit to the situation changes.

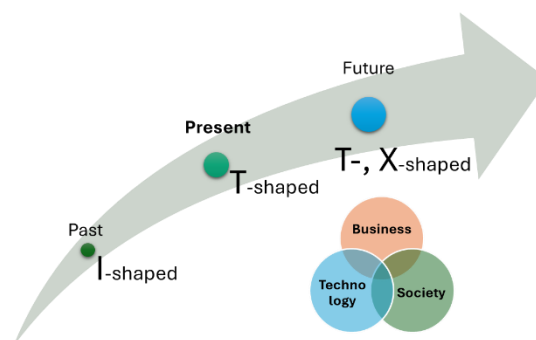


Figure 3. The roadmap towards X-shaped person.

4. RESULTS AND DISCUSSION

4.1 Results

This paper will only examine I-, T-, and X-shaped person for their suitability to current and future professional needs and challenges. Factors considered for the assessment are agility and flexibility (agility), resilience, digital technology savvy (technology), innovation, and leadership. The assessment results are presented in Table 3.

Table 3. The results of the assessment of I-, T-, X-shaped person.

Factors	Weight Factor (WF)	I ^a	WF.I	T ^a	WF.T	X ^a	WF.X
Agility	0.1	2	0.2	4	0.4	4	0.4
Resilience	0.15	2	0.3	4	0.6	4	0.6
Technology	0.2	3	0.6	4	0.8	4	0.8
Innovation	0.25	3	0.75	3	0.75	3	0.75
Leadership	0.3	1	0.3	2	0.6	4	1.2
Total	1		2.15		3.15		3.75

a1. The assessment is carried out subjectively by the author
2. The score is 1 to 5

4.2 Discussion

In this study, the results of the subjective assessment show that X-shaped person has the highest score of 3.75 (Table 3). This score indicates that X-shaped person is relatively relevant to the current and future needs of industries especially due to changes in strategic environment, especially digital and advanced technologies. The X-shaped person's score of 3.75 is actually slightly greater than the T-shaped person's score of 3.15, this difference is partly caused by leadership factors (Table 3).

Rachman (2024) shows in Table 2 that according to the study, T-shaped person is still considered relevant to current and future needs of industries as long as the T-shaped person is not in a top leadership position. Furthermore, the main factor that differentiates T-shaped person from X-shaped person according to Veenendaal, 2020 is on leadership capability and strategic thinking (Figure 2).

The findings of this study in Table 3 after taking into account the factors of agility, resilience, technology, innovation and leadership confirms that X-shaped person is the right person for industrial sustainability and competitiveness due to the changes in the strategic environment, namely digital and advanced technologies development. The main factors that differentiate X-shaped person

from T-shaped, and I-shaped person on this study are leadership, technology, and innovation (Table 3). This finding, regarding X-shaped person, unexpectedly confirm the study results of Rachman (2024) in Table 2 which uses different factors of expertise, collaboration, innovation and flexibility with different study approach.

Therefore, developing an X-shaped person can be done by providing leadership skills and abilities to a T-shaped person. This can be done through several leadership development programs (LDP) held within or outside the organization. This paper suggests that to maximize the development of X-shaped person is to recruit young T-shaped person from outside organization or to nurture the young T-shaped person from within organization for special LDP. LDP can also be done through the government program held by National Resilience Institute of Republic of Indonesia (Lemhannas RI) for short-, medium- and long-term program. The main advantage of the leadership program at Lemhannas RI is on the national and outeard looking insight with the solid spirit of nationalism.

5. CONCLUSION

Based on the results of the study, this paper concludes that based on factors of agility, resilience, technology, innovation and leadership, an X-shaped person is the ideal type of person for current and future industrial needs considering changes in the strategic environment due to the development of digital and advanced technology. The difference between an X-shaped person and a T-shaped person lies in leadership capability and strategic thinking. Therefore, the development of X-shaped person will be a challenge for both industries and individuals. The X-shaped person is considered ideal only when considering the mentioned factors, therefore with different considerations factors and priorities can give different results.

The weaknesses of this study are caused by the subjectivity of consideration factors for assessment, industry participation in this study as well as the dynamic changes in strategic environment. Therefore, it is recommended to conduct the assessments with more industry participation and determine the assessment factors more precisely.

Practically speaking, this study has given industry and academia a sense of urgency to prioritize the development of X-shaped person despite the shortcomings of this study. This study also confirms that T-shaped person is still suitable for current situation. Further solutions for practical solution in developing the X-shaped person can be done through one's own initiative or organizational leadership development program (LDP). The initiative depends on the person's will, ability and determination. The young X-shaped person can be sourced from inside or outside the organization such as at Lemhannas RI. The Effectiveness of LDP depends on candidate quality, the program, and the seriousness of the organizations to develop X-shaped person.

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