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Urgency of Digital Literacy to Improving Work Readiness in the Industrial Revolution 4.0

Taufiq Rahmat[1*], M Taufan Ashshiddiqi[2], Diah Apriliani[3]

[1,2,3] Universitas Al-Ghifari, Bandung, Indonesia

Abstract
The Industrial Revolution 4.0 and the COVID-19 pandemic changed the habits and workings of the business world and the industrial world with a digital technology approach, which has the potential to threaten various professions and employment opportunities. Graduates add to unemployment rates. Prospective workers need digital literacy competencies to compete in the current world of work. This study seeks to measure the extent and importance of digital literacy competence for the Gen-Z workforce of higher education graduates facing the world of work. This study uses an explanatory method with a sure approach. Data collection was done using a Likert scale 1-5 questionnaire, distributed to 133 respondents selected by the researchers, and targeted the workforce of college graduates aged 24-29 (Gen-Z) in the South West Java region with a simple random sampling technique. Then, the data were analyzed using descriptive analysis and structural equations, such as structural equation modeling. Digital literacy competence, including knowledge, skills, attitudes, and values, has a positive effect on the work readiness of Generation Z in rural South West Java. Further research is needed to develop human resources in these areas.

Keywords: *digital literacy competence, work readiness, gen-z, rural area, ir 4.0*

Paper type: *Research paper*

***Corresponding author**: taufiqrahmat@unfari.ac.id
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INTRODUCTION

Products/services that are cheaper, faster, and more reliable (Schwab, 2018). Technology that comes with all its ease of access and flexibility (Xu et al., 2018) Has the potential to threaten to eliminate various jobs or professions that only rely on routine and procedural technical skills (Schwertner, 2017). Characteristics of the industrial era 4.0 are the Internet of Things (IoT), Cloud computing and big data, and Artificial intelligence. (Ullah et al., 2020) and machine learning (Firouzi et al., 2020). ICT can change the process of completing work that previously required a long time and was manual (Friedlmaier et al., 2018) or limited to using computers to become more instant, practical, accurate, and real-time (Jabbar et al., 2020).

This change impacts the shift in the need for soft skills (World Economic Forum, 2017) Which workers need to compete in the workforce. Especially skills in Emotional intelligence, Service orientation, System analysis, Complex problem-solving, Logical reasoning, and Cognitive flexibility. (Sousa & Wilks, 2018). So, digital literacy competence (Falloon, 2020) becomes a model in the development of human resources in order to have competitiveness and excellence (Shopova, 2014). Digital competence encompasses the full range of abilities and proficiencies required for effectively navigating the internet, information and communication technology (ICT), and possessing literacy in information and media. Stergiou et al. (2020) argue that digital literacy is founded upon multiple domains of learning, including knowledge, attitudes, and skills necessary for critical, creative, flexible, and ethical identification, location, access, retrieval, storage, and organization of information. (Taufiq Rahmat & Resmiati, 2021).

Competencies that are relevant to the needs of Industry 4.0 become self-sufficiency. (Rahmat et al., 2022) in entering the labor market (Hong et al., 2012). With excellent and adaptive skills and knowledge, students as prospective workers will have the readiness and ability to compete in the world of work. (Gueye & Exposito, 2020). Work readiness is a combination of practical and academic preparation in carrying out duties and responsibilities and for success in fulfilling optimal performance standards carried out by workers in the world of work. (Borg & Scott-Young, 2020). The level of work readiness of novice workers can be seen from their ability to work following the skills and demands of the world of work they face, as well as the length of waiting time to get a job. In

2021, the Open Unemployment Rate (TPT) was dominated by the young age group, and diploma and university graduates still contribute to the unemployment rate of 5.98% and 5.87%, respectively. (Bps, 2021). Shows that there are still gaps, unpreparedness, and mismatches between the competencies of novice workers produced by universities and the jobs available in the job market. Universities are considered not maximal in developing skills and expertise, which results in less absorption of graduates in the world of work. (Harvey, 2000).

Alignment between education and the world of work that adapts to technology is the key to surviving the current attack of the Industrial Revolution 4.0 (Senge et al., 2001). The workforce is in dire need of intelligent digital literacy skills, and universities, as institutions of growth, have a responsibility to offer educational programs that align with the demands of cultivating skills and competencies for proficiently utilizing and comprehending digital technology as a foundation for lifelong learning. (Sarta et al., 2021). Learning developed to keep up with technological developments can support work readiness by following their field of expertise in the future. (Efimov & Lapteva, 2017). So, this study seeks to create a digital literacy competency framework and measure the importance of digital competence for the workforce entering the world of work in the Industrial Revolution era.

Digital literacy competence**.** Digital literacy refers to the understanding, mindset, and capability to employ digital tools and media in a suitable manner (Rahmat, Faozanudin, & Nurany, 2024). It encompasses the capacity to recognize, obtain, control, combine, assess, examine, and amalgamate digital resources, as well as to explore new knowledge, generate information securely and appropriately, and foster social interactions and communication with others via digital platforms. Digital literacy competencies encompass life skills that revolve around the capacity to utilize technology, information, and communication tools, along with social skills, learning capabilities, and attitudes (Rahmat & Apriliani, 2023). These competencies involve critical and creative thinking, serving as a source of inspiration in the realm of digital expertise. They encompass insights, skills, and behaviors related to the utilization of digital technology methods or systems. (Zhou et al., 2015) both hardware and software (Wan et al., 2015) have become an essential part of the world of work in the era of the Industrial

Revolution 4.0 (Sima et al., 2020). In fact, during the COVID-19 pandemic, almost all work was shifted to work from home (WFH), which forced workers and the business world to make a massive migration toward digitalization (Bick et al., 2020). Workers and companies that have been able to be friendly with the speed of information technology and have good digital literacy tend to be more resilient. Some have even experienced a significant increase in business scale, even in the COVID-19 condition (Beaunoyer et al., 2020). The components of the digital literacy competency framework in this study were adopted from UNESCO, including knowledge, skills, attitudes, and values. (Law et al., 2018).

Table 1.

Variable Operational and Digital Literacy Competency Code

Dimension	Indicator	Code
Knowledge	1. Get to know hardware and software commonly used to support careers	KNW1
	2. Able to search data and information about relevant careers	KNW2
	3. Have insight into the development of digital technology for career development and its use	KNW3
	4. Have insight into the opportunities and threats of digital technology to career availability	KNW4
Skills	1. Able to operate applications and take advantage of features that are commonly used for communication through digital technology in order to support careers	SKL1
	2. Able to search for relevant and reliable data and information to be used as a reference for career opportunities	SKL2
	3. Able to adopt digital technology to increase the effectiveness and efficiency of career development	SKL3
	4. Able to map and take advantage of digital technology developments to solve career problems	SKL4
Attitude & Values	1. Have an awareness about the risks of using digital technology	AVS1
	2. Awareness to filter and control digital technology	AVS2
	3. Understand ethics and regulations in using digital technology	AVS3
	4. The habit of analyzing and presenting positive and factual data and information	AVS4

Source : Law et al., 2018.

Working readiness. Work readiness is a person's physical, mental, and experience maturity that can assist in completing a job according to their abilities. The evaluation of work readiness will be based on the attributes exhibited by an

individual, which include displaying logical thinking, demonstrating cooperation skills, possessing a critical mindset, exhibiting ambition for progress, taking responsibility, and adapting effectively to the surrounding environment. In accordance with the times, skills and expertise will result in the absorption of graduates in the world of work. The possibility to compete and succeed in the workplace also depends on the mental, physical, knowledge, and abilities that follow the needs in the workplace (Alexander et al., 2017) and the ability to maintain a job after obtaining it becomes an integral part of job readiness (Alexander et al., 2017) As a tool for facing competition, the world of work is getting tougher. Job readiness is characterized by a readiness to do work, ease of adapting to the work environment (Nikolaev et al., 2020) and technological advances, which describe attitudes and attributes of success in the workplace. Work readiness can predict career development and the potential performance of graduates after entering the world of work. Job readiness is measured using the components of waiting time for graduates to get their first job, suitability of the field of work with their competencies, user satisfaction, and promotion opportunities.

Table 2.
Operational Variables of Work Readiness

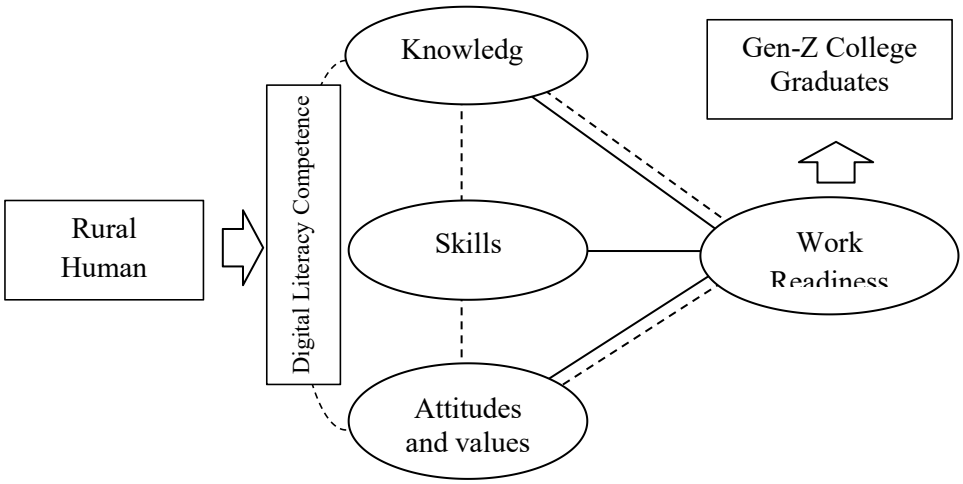
Dimension	Indicator	Code
Mental and Physical Maturity	1. Mental and physical health	MPL1
	2. Ambitious to move forward	MPL2
	3. Responsible	MPL3
	4. Readiness to accept work pressure	MPL4
Knowledge and workability	1. Have logical considerations	KWL1
	2. Have a critical and innovative attitude	KWL2
	3. Adaptability and collaboration	KWL3
	4. Ability to follow the field of work	KWL4
Work experience and learning skills	1. Linear work experience	WLS1
	2. Cross-disciplinary work experience	WLS2
	3. Experience participating in professional training and certification	WLS3
	4. Job search experience	WLS4

Source: Nikolaev et al., 2020

Previous research emphasizes urban communities, but it has not been carried out for rural communities affected by development disparities. Therefore, researchers are interested in researching digital literacy competency models and work readiness, as well as the influence between the two on rural communities who, including the workforce category, are college graduates and are in the 24-29-year age range. The theoretical relationship modeling or research framework in this study is described as follows:

Figure 1.

Theoretical Framework for Digital Literacy Competence and Work Readiness



Source: developed by researchers, 2022

METHODS

This research is explanatory, using a quantitative approach (Taufiq Rahmat et al., 2022) to explain the position of the variables studied and the relationship between a variable and other variables (Zook & Pearce, 2018). The instrument for collecting data is an ordinal scale, with a Likert scale of 1 for very satisfied, 2 for satisfied, 3 for neutral, 4 for dissatisfied, and 5 for very dissatisfied (Jebb et al., 2021). Questionnaires were distributed to respondents selected by researchers targeting the workforce of college graduates with an age range of 24-29 (Gen-Z) in the South West Java area of 108,824 people (Zook & Pearce, 2018), with an error tolerance of 5% using slovin to 133 Respondents:

The respondents were selected using the cluster area simple random sampling technique. Afterward, the data underwent descriptive analysis, where the average scores of the variables were computed. Subsequently, structural equation modeling (SEM) was employed with the Smart PLS 4.0 application. This allowed researchers to assess and estimate the coefficients of the model, considering the theoretical connections between the combined variables from regression analysis, factor analysis, and path analysis. The validity and reliability were then tested using the outer model, which includes:

1. Convergent validity refers to the degree of agreement between a latent variable and its corresponding indicators. It is assessed by examining the loading factor, which indicates the strength of the relationship. An expected value for convergent validity is greater than 0.7.
2. Discriminant Validity is a measure that assesses the ability of a construct to differentiate itself from others. It involves comparing the loading value of the construct on its intended factors, ensuring that it is higher than the loading value on other constructs.
3. Composite reliability refers to the reliability of the data, and if the composite reliability value exceeds 0.8, it indicates a high level of reliability.
4. The Average Variance Extracted (AVE) is a measure that indicates the amount of variance captured by a construct. It is expected that the AVE value should be greater than 0.5.
5. The Cronbach's Alpha test, with a criterion of expected values greater than 0.6 for all constructs, was employed to enhance the reliability assessment.

In order to forecast the causal relationship between latent variables, a test for R-square or a goodness-of-fit model test is conducted, referred to as:

1. The R Square value represents the determination coefficient for the endogenous construct. It is used to quantify the extent to which the model can explain the variability in the independent variables.

$$Kd = R^2 \times 100\%$$

2. Q-square is employed to evaluate the extent to which the observed values and parameter estimates generated by the model align. A Q-square score greater than 0 signifies that the model holds predictive significance, while a Q-square

score below 0 suggests a lack of predictive relevance. The following formula can be utilized to calculate this value:

$$Q^2 = 1 - (1 - R\ \tfrac{2}{1})(1 - R\ \tfrac{2}{2}) \ldots (1 - R_P^2)$$

The estimation of Path Coefficients refers to the value of the coefficient, the strength of the correlation, or the impact of latent constructs. This estimation was performed using the Bootstrapping procedure.

RESULTS AND DISCUSSION

Digital Literacy Competency Levels and Work Readiness

The description of digital literacy competence and Work Readiness based on respondents' perceptions is described as follows:

Table 3

Description of Digital Literacy Competence and Work Readiness

Digital Literacy Competence			**Work readiness**		
Dimension	**Code Indicator**	**Mean**	**Dimension**	**Code Indicator**	**Mean**
Attitude & Values	AVS1	3,571	Work experience and learning skills	WLS1	3,579
	AVS2	3,699		WLS2	3,729
	AVS3	3,925		WLS3	3,947
	AVS4	3,744		WLS4	3,759
Knowledge	KNW1	3,925	Knowledge and workability	KWL1	3,609
	KNW2	3,707		KWL2	3.985
	KNW3	4,180		KWL3	3,962
	KNW4	3,970		KWL4	4,180
Skills	SKL1	3,624	Mental and Physical Maturity	MPL1	3,925
	SKL2	4,000		MPL2	3,677
	SKL3	3,962		MPL3	4.158
	SKL4	4.195		MPL4	3,970
Total Average		**3,875**	**Total Average**		**3,873**

Source: Results of data processing by researchers, 2022

The respondents' research shows that the level of digital literacy competence and work readiness is 3.4 - 4.1, meaning that the index of the two variables is at a high level. Digital literacy competencies Gen-Z college graduates in rural areas are already at the high category level. It is supported by their ability to search for data and information about relevant careers, search for relevant and reliable data

and information for being used as a reference for career opportunities, and the ability to map and utilize digital technology developments to solve career problems. In addition, Gen-Z in rural areas still lacks operating applications and career development features, lacks awareness of the risks of using digital technology, and lacks awareness of filtering and controlling digital technology.

Regarding job readiness, Gen-Z graduates of universities in Rural West Java, South, are already at the high category level. They are supported by mental and physical health, responsibility toward a bachelor's degree, responsibility for the future of their work, and the ability to work according to the field of work. However, the research findings describe that university graduates in rural areas lack the ambition to advance (demotivate), always choose jobs by considering the suitability of graduates with income and welfare values obtained in the village, and have weak linear work experience with employment opportunities in the village. This is what causes rural college graduates to prefer a career in urban areas, which causes urbanization problems to increase.

Validity and Reliability Test

This study's validity test is viewed from convergent and discriminant validity.

Table 4.

Convergent Validity and Discriminant Validity values

	Knowledge	Skills	Attitude & Values	Work Readiness
AVS1	0.792	0.809	0.801	0.811
AVS2	0.701	0.738	0.858	0.771
AVS3	0.622	0.617	0.743	0.681
AVS4	0.613	0.662	0.817	0.700
KNW1	0.940	0.886	0.792	0.906
KNW2	0.882	0.842	0.763	0.848
KNW3	0.903	0.873	0.777	0.881
KNW4	0.810	0.716	0.678	0.772
KWL1	0.781	0.851	0.796	0.854
KWL2	0.818	0.875	0.750	0.864
KWL3	0.865	0.897	0.779	0.881
KWL4	0.821	0.862	0.745	0.856
MPL1	0.915	0.858	0.766	0.892
MPL2	0.854	0.809	0.730	0.853
MPL3	0.865	0.835	0.734	0.876
MPL4	0.810	0.716	0.678	0.772
SKL1	0.800	0.876	0.835	0.848
SKL2	0.846	0.905	0.785	0.876
SKL3	0.876	0.911	0.786	0.891
SKL4	0.842	0.889	0.757	0.864
WLS1	0.796	0.809	0.800	0.815
WLS2	0.715	0.756	0.844	0.789
WLS3	0.643	0.641	0.747	0.702
WLS4	0.603	0.649	0.787	0.705

Source: *Results of data processing by researchers, 2022*

The provided table demonstrates that the outer loadings yield values exceeding 0.7, indicating the validity of these indicators as measures of the latent variable. Based on the obtained outer loading values, it can be concluded that each indicator in this study meets the necessary requirements. The table further reveals that all cross-loading values for each indicator of every latent variable exhibit higher significance compared to the cross-loading values of indicators from other variables. This observation confirms the good discriminant validity of each latent variable. Another approach to assess convergent and discriminant validity

involves examining the Average Variance Extracted (AVE) value. An AVE value greater than 0.5 is recommended as an indicator of good validity. The subsequent results display the calculated AVE for each variable.

Table 5.

Composite Reliability, Cronbach's Alpha, and AVE

	Cronbach's Alpha	rho A	Composite Reliability	Average Variance Extracted (AVE)
Knowledge	0.907	0.912	0.935	0.783
Skills	0.917	0.918	0.942	0.802
Attitude & Values	0.819	0.823	0.881	0.649
Work Readiness	0.956	0.959	0.962	0.679

The data analysis shows that the AVE value generated from this study is more than 0.5. : Knowledge is 0.783, Skills 0.802, Attitude & Values is 0.649, and Work Readiness is 0.679. It can also be seen that the value of composite reliability from this research is above 0.7, which can be stated as follows: composite reliability of knowledge is 0.935; Skills 0.942; Attitude & Values 0.881, and Work Readiness is 0.962. As mentioned in the previous paragraph, in this study, Cronbach's alpha value of each research variable is also above 0.6. Therefore, the value of Cronbach's Alpha on each variable of this research is Knowledge is 0.907, Skills 0.917, Attitude & Values is 0.819, and Work Readiness is 0.956. The reliability of the data in this study is ensured by considering the values of AVE, composite reliability, and Cronbach's alpha. Therefore, with the outcomes of the measurement model (outer model), further analysis can be undertaken to assess the structural model (inner model).

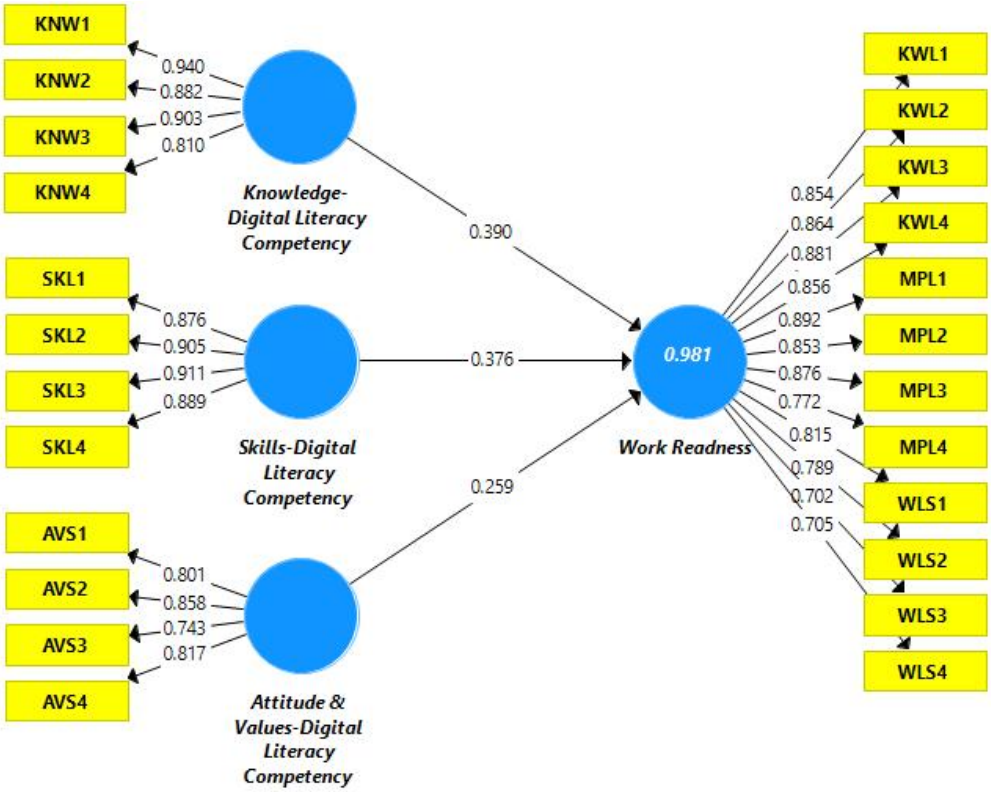
Structural Model Testing (Inner Model)

Once the data has successfully passed the test in the outer model, the evaluation proceeds to the examination of the structural model (inner model). The purpose of conducting the structural model testing is to analyze the relationships

between the constructs. Presented below are the outcomes of the evaluation of the structural research model.

Figure 2.

Structural Model



The path coefficient test in this study was carried out to see the relationship between variables. The following is the result of the path coefficient tested through bootstrapping:

Table 6.

Path Coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)
Attitude & Values-Digital Literacy Competency → Work Readiness	0.259	0.257	0.047
Knowledge-Digital Literacy Competency → Work Readiness	0.390	0.393	0.028
Skills-Digital Literacy Competency → Work Readiness	0.376	0.374	0.047

Based on the path coefficient test presented by the researcher in the table above, the equation can be obtained, namely $Y = 0.259\ X_1 + 0.390\ X_2 + 0.376\ X_3$. Through these equations, it can be concluded that there is a positive reciprocal relationship between variables and financial knowledge and attitude variables. The evaluation of the PLS structural model begins by looking at the coefficient of determination or R-square of each latent dependent variable. The coefficient of determination R-Square (R^2) tests the structural model for each dependent variable. Below are the results of the coefficient of determination test from this study:

Table 7

R- Square

	R Square	R Square Adjusted
Work Readiness	0.981	0.980

Through the table, it can be concluded that the R-value generated from this study is 0.981. It can be interpreted as an influence of 98.1 % of the Knowledge, Skills, Attitude, & Values variables on Work Readiness. In addition, it can also be seen that 0.019 or 1.9% of Work Readiness is influenced by other variables that are not included in this study.

Hypothesis test

Hypothesis testing using the Partial Least Square (PLS) program can be viewed from the T-statistics and P-values through the bootstrapping method and the Path coefficients in Table. The p-values on the three variables show several 0.000 so that it is less than 0.05, and the t-statistics of knowledge is 13,939, Skills is 8,000, and Attitude & Values is 5,457 greater than the t-table which is 1,656. Based on the path analysis model and hypothesis testing, it shows that a person's variable level of digital literacy competence affects job readiness. Having good digital literacy competence will increase the level of work readiness. Therefore, to realize work readiness, Gen-Z in Rural areas, especially in the South West Java Region, needs to increase digital literacy competencies for university graduates. They consider that college graduates still contribute to a high national unemployment rate. Suppose a person's level of digital literacy competence is high. In that case, it will increase mental and physical readiness, optimism, and a

sense of responsibility to meet career competition in the era of the Industrial Revolution 4.0. The results of this study are supported by previous research that an individual with the skills and knowledge of digitalization has a high job readiness opportunity to be accepted in today's world of work (Lestari & Santoso, 2019; Putri & Supriansyah, 2021; Yulianti et al., 2021). Referring to UNESCO concluded that digital literacy competence influences job readiness (Becker et al., 2017). In addition, graduates with good digital literacy competencies have a higher level of promotion and adaptability to the work environment. One factor influencing a future workforce's good job readiness is the skills and knowledge forged during education. Even though universities have made digital transformations, some students still stutter using and utilizing information technology to access and prepare for their careers (T Rahmat et al., 2021).

CONCLUSION

SEM-PLS test shows a significant positive effect on the relationship between knowledge, skills, attitudes & values on digital literacy competence and work readiness. Its Means that all hypotheses are accepted, meaning that the higher the level of digital literacy competence, the higher the Work Readiness of Generation Z in the Rural Regions of South West Java. The level of digital literacy competence and job readiness, Gen-Z College graduates in Rural West Java, South are already at the high category level. Gen-Z in rural areas is stuttering in operating applications and taking advantage of features such as unique sites to search for career development opportunities, the risks of digital technology, and a lack of awareness to filter and control digital technology. In addition, university graduates in rural areas are still pessimistic about the jobs available in the village. The value of income and welfare obtained in the village is not in accordance with the general income standards of college graduates. Plus, work experience to take advantage of career opportunities in the village is still weak, and they tend to choose a career in the city, which is seen as more prospective, logical, and linear with college graduates. In addition, the distribution of the digital literacy movement to the rural level is still seen as unfair. It tends to be centralized in urban areas, which are used to and have large career fields generation in rural areas. This research is limited to Gen-Z college graduates and has not identified the entire generation of college graduates or Gen-Z for all

graduates. The findings recommend follow-up research focusing on village issues, namely developing digital literacy-based rural human resources to prepare careers to face the progress of the times. Following developing village career applications, expanding employment opportunities through optimizing village potential, and strengthening village government autonomy to prevent career stuttering.

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About the Author

Taufiq Rahmat is a lecturer in the Management program at Universitas Al-Ghifari Bandung, specializing in research on Human Resource Management, Halal Industry, and Labor Economics within the framework of environmentally friendly Shariah-compliant economic development.

M. Taufan Ashshiddiqi is a lecturer in the Management program at Universitas Al-Ghifari Bandung, focusing on research in the field of Micro and Small Business Finance. With expertise in this area, he contributes significantly to the understanding of financial dynamics in small-scale enterprises.

Diah Apriliani is a lecturer in the International Relations program at Universitas Al-Ghifari Bandung, with a research focus on economic diplomacy, green economy, and diplomacy from an Islamic perspective. Her work explores the nexus between diplomacy, economics, and environmental sustainability through the lens of Islamic principles.

REFERENCES

Alexander, B., Becker, S. A., Cummins, M., & Giesinger, C. H. (2017). *Digital literacy in higher education, Part II: An NMC Horizon project strategic brief*. The New Media Consortium.

Beaunoyer, E., Dupéré, S., & Guitton, M. J. (2020). COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in Human Behavior*, *111*, 106424.

Becker, S. A., Cummins, M., Davis, A., Freeman, A., Hall, C. G., & Ananthanarayanan, V. (2017). *NMC horizon report: 2017 higher education edition*. The New Media Consortium.

Bick, A., Blandin, A., & Mertens, K. (2020). *Work from home after the COVID-19 Outbreak*. Federal Reserve Bank of Dallas, Research Department.

Borg, J., & Scott-Young, C. M. (2020). Employers' perspectives on work readiness in construction: are project management graduates hitting the ground running? *International Journal of Managing Projects in Business*.

Bps. (2021). Keadaan Ketenagakerjaan Indonesia. *Badan Pusat Statistik*, *11*(84), 1–27.

Efimov, V., & Lapteva, A. (2017). University 4.0: Philosophical Analysis. *ICERI2017 Proceedings*, *1*(November), 589–596. https://doi.org/10.21125/iceri.2017.0242

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *68*(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4

Firouzi, F., Chakrabarty, K., & Nassif, S. (2020). *Intelligent internet of things: From device to fog and cloud*. Springer.

Friedlmaier, M., Tumasjan, A., & Welpe, I. M. (2018). Disrupting industries with blockchain: The industry, venture capital funding, and regional distribution of blockchain ventures. *Venture Capital Funding, and Regional Distribution of Blockchain Ventures (September 22, 2017). Proceedings of the 51st Annual Hawaii International Conference on System Sciences (HICSS)*.

Gueye, M., & Exposito, E. (2020). *University 4 . 0 : The Industry 4 . 0 paradigm applied to Education*. *January*. https://hal-univ-pau.archives-ouvertes.fr/hal-02957371/document

Harvey, L. (2000). New realities: The relationship between higher education and employment. *Tertiary Education & Management*, *6*(1), 3–17.

Hong, P. Y. P., Polanin, J. R., & Pigott, T. D. (2012). Validation of the employment hope scale: Measuring psychological self-sufficiency among low-income jobseekers. *Research on Social Work Practice*, *22*(3), 323–332.

Jabbar, A., Akhtar, P., & Dani, S. (2020). Real-time big data processing for instantaneous marketing decisions: A problematization approach. *Industrial Marketing Management*, *90*, 558–569.

Jebb, A. T., Ng, V., & Tay, L. (2021). A review of key Likert scale development advances: 1995–2019. *Frontiers in Psychology*, *12*, 1590.

Law, N., Woo, D., & Wong, G. (2018). *A global framework of reference on digital literacy skills for indicator 4.4. 2*. UNESCO.

Lestari, S., & Santoso, A. (2019). The Roles of Digital Literacy, Technology Literacy, and Human Literacy to Encourage Work Readiness of Accounting Education Students in the Fourth Industrial Revolution Era. *KnE Social Sciences*, *3*(11), 513. https://doi.org/10.18502/kss.v3i11.4031

Nikolaev, A., Artemiev, I., Parfenov, E., & Radnaeva, L. (2020). New Didactic Approaches in Conditions of Inclusive Education. In *Lecture Notes in Networks and Systems* (Vol. 131, Issue March). https://doi.org/10.1007/978-3-030-47415-7_30

Putri, R. Y., & Supriansyah, S. (2021). Pengaruh Literasi Digital terhadap Kesiapan Kerja Generasi Z di Sekolah Menengah Kejuruan. *Edukatif : Jurnal Ilmu Pendidikan*, *3*(5), 3007–3017. https://www.edukatif.org/index.php/edukatif/article/view/1055

Rahmat, T, Nuryani, E., Siswanto, D., & Undang, G. (2021). ServQual and WebQual 4.0 for usability check academic information system of private university. *Journal of Physics: Conference Series*, *1869*(1), 12097.

Rahmat, Taufiq, & Resmiati, E. N. (2021). ServQual dan Customer Satisfaction Index (CSI): Mengukur Tingkat Usabilitas E-Learning Pada Pembelajaran Daring Masa Adaptasi Kebiasaan Baru (AKB) Pandemi Covid-19 di Universitas Al-Ghifari. *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan*, *4*(5), 1904–1916.

Rahmat, Taufiq, Turyadi, I., Ardiansyah, I., Supriyatna, T., Taryaman, E., Tanjung, M., Karsah, A. M., Apriliani, D., & Halimah, O. S. (2022). University 4.0 Performance: Improvement of Learning Management System Using E-ServQual Post-Covid-19 Pandemic. *4th International Conference on Innovation in Engineering and Vocational Education (ICIEVE 2021)*, 261–266.

Rahmat, T., & Apriliani, D. (2023). Model of Global HR Development and Green Economy Diplomacy: Strengthening Global Environmental Governance in Indonesia. *Journal of Law and Sustainable Development*, *11*(11), e404-e404.

Rahmat, T., Faozanudin, M., & Nurany, F. (2024). *Manajemen E-Government*. Mafy Media Literasi Indonesia.

Sarta, A., Durand, R., & Vergne, J.-P. (2021). Organizational adaptation. *Journal of Management*, *47*(1), 43–75.

Schwab, K. (2018). The global competitiveness report 2018. *World Economic Forum*, *671*.

Schwertner, K. (2017). Digital transformation of business. *Trakia Journal of Sciences*, *15*(1), 388–393.

Senge, P. M., Carstedt, G., & Porter, P. L. (2001). Next industrial revolution. *MIT Sloan Management Review*, *42*(2), 24–38.

Shopova, T. (2014). Digital literacy of students and its improvement at the university. *Journal on Efficiency and Responsibility in Education and Science*, *7*(2), 26–32. https://doi.org/10.7160/eriesj.2014.070201

Sima, V., Gheorghe, I. G., Subić, J., & Nancu, D. (2020). Influences of the industry 4.0 revolution on the human capital development and consumer behavior: A systematic review. *Sustainability*, *12*(10), 4035.

Sousa, M. J., & Wilks, D. (2018). Sustainable skills for the world of work in the digital age. *Systems Research and Behavioral Science*, *35*(4), 399–405.

Stergiou, C. L., Plageras, A. P., Psannis, K. E., & Gupta, B. B. (2020). Secure machine learning scenario from big data in cloud computing via internet of things network. In *Handbook of computer networks and cyber security* (pp. 525–554). Springer.

Ullah, Z., Al-Turjman, F., Mostarda, L., & Gagliardi, R. (2020). Applications of artificial intelligence and machine learning in smart cities. *Computer Communications*, *154*, 313–323.

Wan, J., Cai, H., & Zhou, K. (2015). Industrie 4.0: enabling technologies. *Proceedings of 2015 International Conference on Intelligent Computing and Internet of Things*, 135–140.

World Economic Forum. (2017). The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution. *Global Challenge Insight Report*, *January*. https://doi.org/10.23943/princeton/9780691172811.003.0009

Xu, L. Da, Xu, E. L., & Li, L. (2018). Industry 4.0: state of the art and future trends. *International Journal of Production Research*, *56*(8), 2941–2962.

Yulianti, M., Asniati, A., & Juita, V. (2021). Pengaruh Keahlian Akuntansi, Literasi Digital dan Literasi Manusia Terhadap Kesiapan Kerja Calon Akuntan di Era Disrupsi Teknologi Digital. *Ekonomis: Journal of Economics and Business*, *5*(2), 449.

https://doi.org/10.33087/ekonomis.v5i2.389

Zhou, K., Liu, T., & Zhou, L. (2015). Industry 4.0: Towards future industrial opportunities and challenges. *2015 12th International Conference on Fuzzy Systems and Knowledge Discovery (FSKD)*, 2147–2152.

Zook, K. L., & Pearce, J. H. (2018). Quantitative descriptive analysis. In *Applied sensory analysis of foods* (pp. 43–71). Routledge.