The Future of Work: Human-AI Collaboration and Skill Adaptation in The Context of Digital Transformation

Erika L. Abalora[1], Dia Camille C. Candido[2], Daniela T. Carreon[3], and Ricky G. Basilio[4]

[1,2,3,4]College of Arts and Sciences, Department of Statistics, Rizal Technological University, Boni Campus, Mandaluyong City, Philippines

Abstract— This study examined how employees perceive digital transformation, focusing on AI integration, digital skill development, hybrid work adoption, and the future of work with AI. It also examined how demographic factors influenced these perceptions, including educational background, occupational role, and work tenure. A total of 153 Mandaluyong City employees were surveyed utilizing convenience sample methods, both face-to-face and online. A mixed-method approach incorporated quantitative analysis of rated items and qualitative insights from open-ended questions, using statistical tools such as percentage, mean, and the Kruskal-Wallis H-Test. Based on the findings, most employees had a tertiary education, worked in the business process industry, and had one to five years of experience. Significant differences in views on AI integration, digital skills development, and work changes were linked to educational background, work tenure, and occupational roles. These insights may guide policymakers and organizations in understanding employee perspectives on workplace digital transformation while discussing future research directions.

Keywords— Future of Work, Digital Transformation, Human-AI Collaboration, Skill Adaptation.

INTRODUCTION

Major digital transformation has occurred in workplaces globally due to significant technological advancements, especially in Artificial Intelligence (AI). The trend has been sped up by the COVID-19 pandemic, allowing employees and AI technology to work together more closely for improved efficiency. Artificial Intelligence (AI) has advanced from simple tasks such as data input to more complicated areas like machine learning and developing virtual assistants (Wang & Siau, 2019). These improvements have greatly enhanced effectiveness and accuracy. A new collaboration has been created between people and artificial intelligence, combining their strengths to achieve improved results. Schwab (2018) emphasizes the importance of continually developing new skills in order to stay relevant as technology progresses and some skills become obsolete. Being flexible is crucial in workplaces controlled by artificial intelligence. People's success relies more on critical thinking, emotional intelligence, and adaptability. Businesses play an important part by providing training programs to assist employees keep pace with technological advancements. The emergence of AI technology brings up ethical issues, including data privacy and algorithmic biases. As stated in O*NET theory, humans and technology may coexist peacefully without replacing one another (Paul et al., 2022). This study highlights the development of AI and how it changes the dynamic between humans and technology, recognizing the need for skill adaptation, especially for employees. It will examine the potential and difficulties created by this transition, as well as the critical role that governments and policymakers play in defining the future workforce. As artificial intelligence gains popularity in the workplace, so does the demand for ethical considerations and skill adaptation. The O*NET theory emphasizes the

complementary nature of human-AI cooperation; yet, challenges such as shortages of skills and ethical dilemmas must be addressed by trained policy (Brynjolfsson and McAfee 2014). Ras et al. (2017) emphasize the need for continuous learning and leadership development in enhancing AI's ability to augment human talents, enabling higher-paying jobs and competitive advantages.

LITERATURE REVIEW

A. The Future of Work

The future of work is in rapid evolution due to continuous redefinition of industries and jobs because of technological advancement-particularly AI and automation. Faishal et al. (2023) raises the possibility that changes in labor markets, patterns of employment, and socio-economic landscapes will be influenced by AI in response to decreased demands for specific skills and the emergence of new opportunities. According to Schwab (2018), the Fourth Industrial Revolution requires ongoing skill adaptation, as digital technologies replace ordinary jobs and free human workers for more creative tasks. Technology-enabled flexible work arrangements provide greater work-life balance and job satisfaction for employees, while also reducing costs for employers (Ashoush et al., 2015; Adams-Prassl, 2020). With the advancement of technology, there are opportunities and challenges including job losses and the growing importance of continuous training to address skill gaps (Bessen, 2019). Some predict a future where certain professions become obsolete, while others argue that new roles will emerge to replace those lost to automation. Bessen, J. Whittaker et al. (2019b) argue that more than replacement of human work by AI and automation, the former creates new forms of work requiring creativity, emotional intelligence, and problem-solving skills, augmenting rather than replacing human work. Work in this context means an "augmentation" rather than a "replacement"; hence, the significance of human-AI collaboration increases in the future workplace.

B. Digital Transformation

The COVID-19 outbreak sped up the use of digital tools, helping companies facilitate remote work and keep services running smoothly (Whiton et al., 2019). Digital transformation is when digital technologies are incorporated throughout a company, transforming how they provide value to customers (Vial, 2019). AI is a major factor in driving this change, particularly in sectors such as finance, healthcare, and manufacturing, where operations have been greatly improved by automation and machine learning. The extensive utilization of AI at work prompts worries about discrimination and privacy breaches, since AI systems may inadvertently reinforce bias against marginalized individuals or those who have faced discrimination in the past (Kim & Bodie, 2021).

The idea of humans working together with AI is becoming more popular as AI systems are increasingly used in business operations. Rather than replacing human workers, AI is increasingly being viewed as a tool that enhances human capabilities. O*NET theory suggests that AI and human workers can co-exist harmoniously, with each complementing the strengths of the other (Paul et al., 2022). In the context of an artificial intelligence-driven workplace, skill adaptation is significant. As Morandini et al. (2023) explained, the upskilling/reskilling of employees is especially important in view of new changes and challenges brought forth by integrating AI into the workspace. However, too strong a belief in AI will nullify developing these skills in employees; therefore, every organization should find a correct balance between human capabilities and the AI way of doing things.

II. METHODOLOGY

The researchers constructed a 28-item questionnaire with a 4-point Likert scale and an open-ended question to collect data needed in the study, which experts further validated to ensure the effectiveness and conciseness of the survey instrument. The study targeted employees who were currently working in Mandaluyong.

The main objective of this study was to determine the difference in the respondents' perceptions with different profiles to the digital transformation in the workplace, with the goal for employees' smooth transition to the future of work.

The statistical tests and analysis of results were used to determine the percentage, mean, and Kruskal-Wallis H-Test to know the proportion of the respondents, the average, and the difference in the respondents' perceptions. Further tests used were the post-hoc tests to specify which groups have different perceptions.

A. Participants

One hundred fifty-three respondents participated in the study, with 96 (62.75%) had tertiary education as the highest educational level. Most employees (33 or 21.57%) currently work in business processes or sectors. More than half of them (100 or 65.36%) have a year or at most 5 years of work tenure.

III. RESULTS AND DISCUSSION

3.1. Descriptive Characteristics of the Demographic Information

The demographic profile of the respondents is presented in table 1, with the majority achieving tertiary education (62.75%, 96), in the business process sector (21.57%, 33), and have 1 to 5 years working experience (65.36%, 100).

A significant number of employees have completed higher education. Wang and Yuan (2024) found that firms tend to prefer hiring college graduates due to their adaptability and having the relevant skills. Additionally, most employees are employed in fast food, customer service, and business process outsourcing (BPO). The rapid rise of the BPO industry created more opportunities and promoted incentives and benefits, increasing employee job satisfaction (Reyes et al., 2018). Moreover, many employees change jobs for better work environments, benefits, and higher salaries. For this reason, employees tend to stay at a job for less than five years.

Table 1: Descriptive statistics of respondents (n=153)

Variables	Categories	N	Percentage
Highest Educational Level	Primary	2	1.96
	Secondary	26	16.99
	Tertiary	96	62.75
	Vocational	13	8.50
	Postgraduate Studies	15	9.80
	Academe	19	12.42
	Healthcare	24	15.69

Occupational Role	Business Process	33	21.57
	Banking and Finance	8	5.23
	Information Service	18	11.76
	Science and Engineering	14	9.15
	Retail and Trade	15	9.80
	Hospitality	13	8.50
	Public Service	9	5.88
Work Tenure	1 to 5 years	100	65.36
	6 to 10 years	34	22.22
	11 to 15 years	3	1.96
	16 to 20 years	7	4.58
	More than 20 years	9	5.88

3.2 Current status of digital transformation in the workplace

Table 2: Current status of digital transformation in the workplace

Variables	Mean	SD
Integration and Automation of Artificial Intelligence	2.94	0.95
Digital Skills Development	3.18	0.82
Hybrid Work Environments	3.00	0.92
Changes in the Nature of Work with AI Integration	3.01	0.84
Future of Work with AI Integration	3.28	0.74

Table 2 illustrates the perception of employees regarding the status of digital transformation in the modern workplace. It is assessed through the five dimensions as shown in the table. The findings indicate that employees are familiar with the integration and automation of AI ($x = 2.94, SD = 0.95$). The digital skills development of employees is also evident, achieving a mean of 3.18 and a standard deviation of 0.82. The prevalence of hybrid work environments is apparent ($x = 3.00, SD = 0.92$). Employees also frequently adapt to the changes in their work by integrating AI ($x = 3.01, SD = 0.84$). Furthermore, employees acknowledge the significance of AI integration in the future of work ($x = 3.28, SD = 0.74$).

The results suggest that employees possess high knowledge and digital skills. George and Thomas (2019) emphasized that incorporating AI in the workplace could benefit organizations by lowering workloads, improving workforce management, and streamlined hiring processes. Hecker and Loprest (2019) state that the increasing digitalization of professions and tasks demands digital skills. The operations of businesses have been significantly impacted by digital transformation. This triggered a need for organizations and employees to adapt to this change by improving their digital competencies. Mahmutaj and Jusufi (2023) also acknowledge the role that digital skills play in improving a company's performance and growth, emphasizing further the need to improve digital skills in the modern workplace.

3.3 Difference between employees' perception of the current state of digital transformation in the workplace when grouped according to demographic profile

Table 3: Difference between employees' perception of the current state of digital transformation in the workplace when grouped according to demographic profile

Demographic Profile	Parameters	Kruskal-Wallis	p-value	Conclusion	Interpretation
Highest Educational Level	Integration and Automation of Artificial Intelligence	12.55	0.028	Reject Ho	Significant
	Digital Skills Development	17.92	0.003	Reject Ho	Significant
	Hybrid Work Environments	3.20	0.669	Failed to Reject Ho	Not Significant
	Changes in the Nature of Work with AI Integration	3.07	0.689	Failed to Reject Ho	Not Significant
	Future of Work with AI Integration	3.44	0.632	Failed to Reject Ho	Not Significant
Occupational Role	Integration and Automation of Artificial Intelligence	27.80	<0.001	Reject Ho	Significant
	Digital Skills Development	20.20	0.010	Reject Ho	Significant
	Hybrid Work Environments	20.10	0.010	Reject Ho	Significant
	Changes in the Nature of Work with AI Integration	12.00	0.152	Failed to Reject Ho	Not Significant
	Future of Work with AI Integration	16.00	0.042	Reject Ho	Significant
Work Tenure	Integration and Automation of Artificial Intelligence	10.81	0.029	Reject Ho	Significant
	Digital Skills Development	13.19	0.010	Reject Ho	Significant
	Hybrid Work Environments	3.70	0.449	Failed to Reject Ho	Not Significant

|					
	Changes in the Nature of Work with AI Integration	12.37	0.015	Reject Ho	Significant
	Future of Work with AI Integration	9.91	0.042	Reject Ho	Significant

Table 3 presents the differences in the respondents' perceptions of the current state of digital transformation in the workplace when grouped according to their demographic profile. As Ali and Bhaskar (2016) noted, when the p-value is less than the chosen significance level, the null hypothesis is rejected. In this study, the threshold set for all tests was 0.05. When grouped according to their highest educational level, the results indicate that employees' views of the integration and automation of Artificial Intelligence$(h - test = 12.55, \ p = 0.028 < 0.05)$, and digital skills development $(h - test = 17.92, \ p = 0.003 < 0.05)$ differs significantly. However, when it comes to hybrid work environments $(h - test = 3.20, \ p = 0.669 > 0.05)$, changes in the nature of work with AI integration$(h - test = 3.07, \ p = 0.0689 > 0.05)$, and the future of work with AI integration$(h - test = 3.44, \ p = 0.632 > 0.05)$, employees' perceptions do not vary.

Furthermore, the data show that when categorized by their occupational role, employees' views on integration and automation of Artificial Intelligence $(h - test = 27.80, \ p = \sim 0.001 < 0.05)$, digital skills development $(h - test = 20.20, \ p = 0.010 < 0.05)$ and hybrid work environments $(h - test = 20.10, \ p = 0.010 < 0.05)$, differ. However, employees' perceptions did not differ regarding changes in the nature of work with AI integration$(h - test = 12.00, \ p = 0.152 > 0.05)$. Lastly, employees have differing views on the importance of the future of work with AI integration $(h - test = 16.00, \ p = 0.042 < 0.05)$. Employees with different highest educational levels have differing views on the integration and automation of Artificial Intelligence $(h - test = 10.81, \ p = 0.029 < 0.05)$, and digital skills development $(h - test = 13.19, \ p = 0.010 < 0.05)$. On the other hand, respondents' perception of hybrid work environments $(h - test = 3.70, \ p = 0.449 > 0.05)$, changes in the nature of work with AI integration $(h - test = 12.37, \ p = 0.015 < 0.05)$, and the future of work with AI integration $(h - test = 9.91, \ p = 0.042 < 0.05)$ do not vary.

Mulas-Granados et al. (2019) found that people with higher educational levels have a more positive view of AI and automation. They also pointed out that older generations with traditional education still need to be convinced about AI as they struggle to stay on top of the fast-paced change of technology. Employees in different occupational roles have differing viewpoints and standards when it comes to AI integration and digital skills development (Morandini et al., 2023). Managers tend to understand AI's strategic implications in decision-making better than frontline employees, who tend to utilize AI more for their daily tasks. Furthermore, employees with more extensive work experience are more likely to be proactive in tackling and changing their job duties and responsibilities (Beal, 2015). A study by Teclaw et al. (2014) supports this, stating that differing work tenure affects employees' perception of their workplace atmosphere. Employees' understanding of AI and digital skills, including their adaptation to workplace changes and willingness to work with AI, are affected by their difference in length of employment.

3.4 Regulatory framework
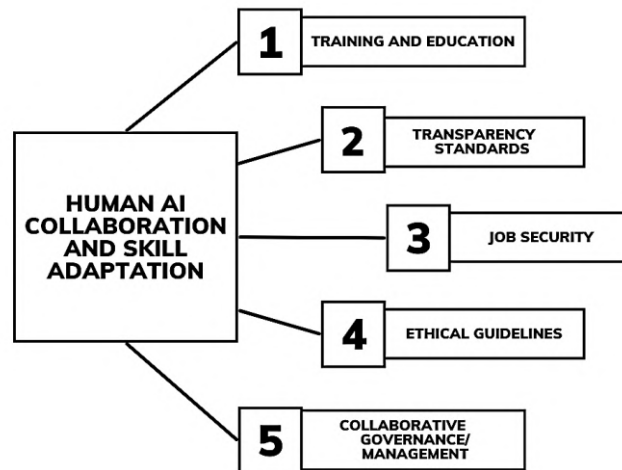
Figure 01: Regulatory framework

Figure 1 shows the regulatory framework proposed based on the findings of the study and the answers gathered from the surveyed employees. A study by Rodrigues (2020) found that existing policies and regulations on AI are still lacking. The researchers proposed a regulatory framework to help facilitate the transition to the future of work and address the concerns of respondents. To promote productive interactions in the workplace, developing a framework is important (Wang & Miao, 2022). This regulatory framework was chosen because it applies to employees working in various organizations, making it relevant across different companies.

The components of the regulatory framework include implementing training and education programs to offer career counseling and opportunities for the unemployed to find job opportunities. Transparency standards are also added to ensure employees have the right to be informed about changes made in their work and workplaces due to AI integration. Job security policies are proposed in the framework to protect workers against unfair job termination due to the integration of AI. Ethical guidelines are suggested to protect their privacy and prevent discriminatory practices and other issues that AI may have on them. Lastly, collaborative governance and management allow high-ranking officials to make decisions that benefit both the organizations and employees while addressing employee well-being issues. A combination of these policies is designed to protect workers and address employees' issues and concerns to alleviate the concerns and hesitations that they have with the implementation of AI in their workplace, as well as working collaboratively with the technology.

IV. CONCLUSION

AI has been emerging for decades, making humans dependent on the advantages and disadvantages it may give. Industries, companies, and businesses focus more on the accessibility, ease of access, and profit it boosts. This study focused on examining the current state of digital transformation in the workplace for a smooth transition to the future of work, delving into the factors that influence the respondents' perceptions of the current state of digital transformation in the workplace conducted in the second semester of the Academic Year 2023-2024. The researchers used a descriptive design to describe the population and the current state of digital transformation in

the workplace. The statistical tests used were percentage, mean, and Kruskal-Wallis H-Test to determine the proportion of the respondents and the average and difference of the respondents' perceptions. Further tests used were the post-hoc tests to specify which groups of employees have different perceptions.

The demographic profiles of the employees, namely highest educational level, occupational role, and work tenure were used to assess the differences in perceptions of digital transformation in the workplace. The employees show variation in the views of employees with different highest educational levels and work tenure regarding integrating AI in the workplace, the need for digital skills, and the changes and the future of work with AI integration. Employees with different occupational roles also yielded variations of perceptions in factors like AI integration, development of digital skills, flexible work arrangements, and AI-integrated future of work.

The researchers created a regulatory framework for employees to navigate the transition to the future of work smoothly. The regulatory framework includes training and education programs, transparency standards, job security protocols, ethical guidelines, and collaborative governance/management for employees to navigate in the workplace using AI as an advantage effectively. The primary focus of this framework is to encourage policymakers and organizations to prioritize the welfare of the employees and highlight data privacy and ethical considerations.

ACKNOWLEDGMENT

REFERENCES

[1] Ali, Z., & Bhaskar, Sb. (2016). Basic Statistical Tools in Research and Data Analysis. Indian Journal of Anaesthesia, 60(9), 662. https://doi.org/10.4103/0019-5049.190623

[2] Ashoush, M. A., Abdelrahman, A. H., & Younis, R. A. (2015). Flexible Work Arrangements: Related Topics and Directions. *Organizations & Markets: Policies & Processes eJournal*. https://doi.org/10.5755/J01.EE.29.1.19247.

[3] Beal, D. J. (2015). ESM 2.0: State of the Art and Future Potential of Experience Sampling Methods in Organizational Research. Annual Review of Organizational Psychology and Organizational Behavior, 2(1), 383–407. https://doi.org/10.1146/annurev-orgpsych-032414-111335

[4] Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W.W. Norton & Company.

[5] George, G., & Thomas, M. R. (2019). Integration of Artificial Intelligence in Human Resource. *International Journal of Innovative Technology and Exploring Engineering*, *9*(2), 5069–5073. https://doi.org/10.35940/ijitee.l3364.129219

[6] Hecker, I., & Loprest, P. (2019). Foundational Digital Skills for Career Progress. In ERIC. Urban Institute. https://eric.ed.gov/?id=ED601774

[7] Kim, P. T., & Bodie, M. T. (2021). Artificial intelligence and the future of work. *California Law Review*, 109(6), 2557-2580.

[8] Mahmutaj, L. R., & Jusufi, N. (2023). The importance of digital skills in firms' innovation: the case of Western Balkans. Journal of Technology Management & Innovation, 18(3), 98–102. https://doi.org/10.4067/S0718-27242023000300098

[9] Morandini, S., Fraboni, F., De Angelis, M., Puzzo, G., Giusino, D., & Pietrantoni, L. (2023). The impact of artificial intelligence on workers' skills: upskilling and reskilling in organisations. Informing Science: The International Journal of an Emerging Transdiscipline, 26, 039–068. https://doi.org/10.28945/5078

[10] Mulas-Granados, C., Varghese, R., Wallenstein, J., Boranova, V., & deChalendar, A. (2019). Automation, Skills and the Future of Work: What do Workers Think? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3524309

[11] Paul, J., Patel, P., & Anderson, S. (2022). O*NET theory and human-AI collaboration. *International Journal of Human Resource Studies*, 12(2), 54-69.

[12] Ras, E., Wild, F., Stahl, C., & Baudet, A. (2017). Bridging the skills gap of workers in Industry 4.0 by human performance augmentation tools. Proceedings of the 10th International Conference on PErvasive Technologies Related to Assistive Environments - PETRA '17. https://doi.org/10.1145/3056540.3076192

[13] Reyes, G., Bret, K., Medrano, M., Mark, L., & Paradero. (2018). Employees' job satisfaction and working conditions in the business process outsourcing (BPO) industry at Ortigas Center, Pasig City. INTERNATIONAL REVIEW OF HUMANITIES AND SCIENTIFIC RESEARCH. https://irhsr.org/papers/1528179374.pdf

[14] Rodrigues, R. (2020). Legal and Human Rights Issues of AI: Gaps, Challenges and Vulnerabilities. Journal of Responsible Technology, 4(100005). https://doi.org/10.1016/j.jrt.2020.100005

[15] Schwab, K. (2018). *The fourth industrial revolution*. Crown Business.

[16] Teclaw, R., Osatuke, K., Fishman, J., Moore, S. C., & Dyrenforth, S. (2014). Employee age and tenure within organizations. The Health Care Manager, 33(1), 4–19. https://doi.org/10.1097/01.hcm.0000440616.31891.2d

[17] Wang, J., & Miao, L. (2022). Human-AI collaboration in the workplace: An overview of the challenges and opportunities. AI & Society, 37(1), 15-27.

[18] Wang, W., & Siau, K. (2019). Artificial intelligence, machine learning, automation, robotics, future of work and future of humanity. *Journal of Database Management*, 30(1), 61–79. https://doi.org/10.4018/jdm.2019010104

[19] Wang, Z., & Yuan, Z. (2024). Employee Education Level and the Cost of Equity Capital. *Finance Research Letters (Online)*, 105181–105181. https://doi.org/10.1016/j.frl.2024.105181

[20] Whiton, J., Muro, M., & Maxim, R. (2019b, January 22). Automation and Artificial Intelligence: How machines are affecting people and places. *Brookings*. https://www.brookings.edu/articles/automation-and-artificial-intelligence-how-machines-affect-people-and-places/

[21] Wilkens, U. (2020). Artificial intelligence in the workplace – A double-edged sword. *The International Journal of Information and Learning Technology*, ahead-of-print. https://doi.org/10.1108/ijilt-02-2020-0022