

A Study on the Digital Workforce Gaps

Dr.T.S.Sivakumaran B.E.,M.Tech.,Ph.D

Professor/Department Of Power Engineering,

College of Engineering and Technology,

Bule Hora University, Ethiopia

sivakumaran1969@gmail.com

Mr. Henok G/medihen Teklu (MSc.)

Power System Engineering (Electrical Engineering)

Head of Department at Bule Hora University CET, ECE Department

Email ID: hennateygo@gmail.com or erimtsister@gmail.com

Kumilachew Chane Bogale, Lexturer.

Department of Electrical and Computer Engineering,.

College of Engineering and Technology,

Bule Hora University, Ethiopia.

kumilachewchane@gmail.com.

SKB.Rathika M.E.,MBA

Assistant professor

Department of computer science engineering,

Sree Sakthi Engineering College, Coimbatore

Abstract:

The evolution of rapid technology in a work-off new era has ushered, in a highly adaptable demand, and tech-savvy process workforce. This kind of study delves into the critical concept of gaps in the digital workforce, which aims to identify the new challenges organizations face in cultivating and workforce equipped with the digital skills based on necessary [1]. Additionally, the solutions and strategies explore that based on bridging these empower and gaps teams that have been thriving in the digitized landscape increasingly. According to the comprehensive literature empirical and review research, these investigations with study multifaceted digital workforce gap dimensions. It examines the process with discrepancies between evolving technological process requirements and skill existing sets across the industries [6]. The factors of analysis encompass technological obsolescence, the impact of transformation on the rapid digital job roles, and training inadequate programs. Furthermore, the process of study highlights the consequences on organizational performance of digital workforce gaps, satisfaction of employees, and capabilities innovation. It process elucidates the social of this process gaps implication, including the disparities of potential opportunities for economic access to employment meaningful [18]. Drawing upon best practices and case successful studies, based on this research process a framework has been addressing the digital workforce gaps. It explores the training methodologies tailored, reskilling and upskilling initiatives, hiring strategic practices, and a culture conducive the fostering continuous learning adaptation. It provides aims to insights for policymakers, and organizational leaders, and navigates educators of digital workforce landscape complexities

Key words: Digital workforce, artificial intelligence, digital economy, digital skills.

Introduction:

The landscape process will be evolving rapidly, and this technological advancement driven through the digitization process of industries based across the globe. The digital emergence era has been transformative through the changes in the business way operates, creating new opportunities newly and challenges alike. Among the changes the most significant issue facing pressing organizations today by growing gap trough the digital workforce. By anticipating, understanding, and addressing proactively digital workforce gaps, future-ready capable teams of technological harnessing advancements have to drive sustainable growth in the digital age. The Digital workforce refers to the collective employee body, skilled individuals, and professionals who possess the knowledge, competencies navigate, skills, and

digital leverage technologies effectively based on the work environment [9]. As per continue industries to embrace automation, data analytics, artificial intelligence, and some other digital tools, processed with the demand based on proficient workforce digital becomes increasingly sustained competitiveness and growth. Despite the advantages of evident of technology has brought over businesses in the efficiency of terms, scalability, and innovation, there has been exists with a noticeable process of gap between the demanded skills based on the digital economy and the skills available within the workforce. this poses gap significant process of challenge for aiming organizations fully with the harness potential of digital to drive with technologies of their success. This is a process study that aims to delve deeper into the various dimensions of the digital workforce gap and examine the causes, potential solutions, and consequences [13]. By understanding these gap intricacies, educators, businesses, policymakers, and stakeholders can collaborate with the bridge to divide and equip the process workforce according to the requisite skills and needed knowledge to thrive with an increasingly environment of digital-centric.

Focus on key areas:

The competence and the specific skills have been identified with the high demand based on the digital economy. After analyzing the process the existing gap between digital skills and capabilities is explored.

According to that explored impact of digital workforce gap based on the businesses, societal progress, and economic growth. The strategies of evaluation are based on the initiatives with the best practices that have been aimed at closing with the digital skills gap.

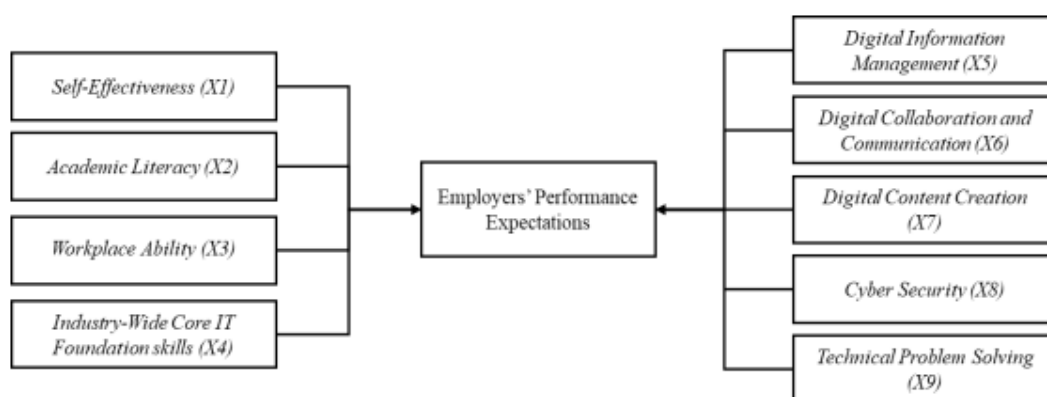


Fig 1: Employees performance

Consider the role of education, continuous learning, and training programs that prepare individuals according to the demands of the digital workforce [19]. Examine the diversity of importance, inclusion in skilled-based building, equity, and digital adaptable workforce. By addressing the process based on the critical areas, the process of study provides insights and fosters recommendations, skilled with the workforce capable of innovation driving, and adaptable to growth in the age of digital workforce.

Survey of digital workforce gaps:

The digital workforce gap refers to disparities based on the skills and required expertise from the current economy digital and possesses abilities of the workforce existing. This process with gaps often highlighted due to the various reports and studies, challenges based on the shedding light by economies and industries in technological adapting advancements [25]. The studies of several analyses have been conducted with the process of digital workforce gaps, that aim to understand the extent of the purpose and issue of potential solutions. It typically focused on several numbers of keys. Skill gaps-based research has often identified skills specific that are in high demand to technological data analysis advancement, digital marketing, coding, cybersecurity, machine learning, AI, and more. There has been a shortage of professional skills and a way to gap bridge. Research impact automation examines artificial intelligence job roles and the composition workforce. It delves into the process into which jobs were most susceptible to automation and this affects the skill sets required for employment future. Training and education studies emphasize programs to prepare for the current future workforce demands in the digital era. The importance of highlighting reskilling and upskilling initiatives has been to close the gap between the process of skills existing and the need for emerging technologies.

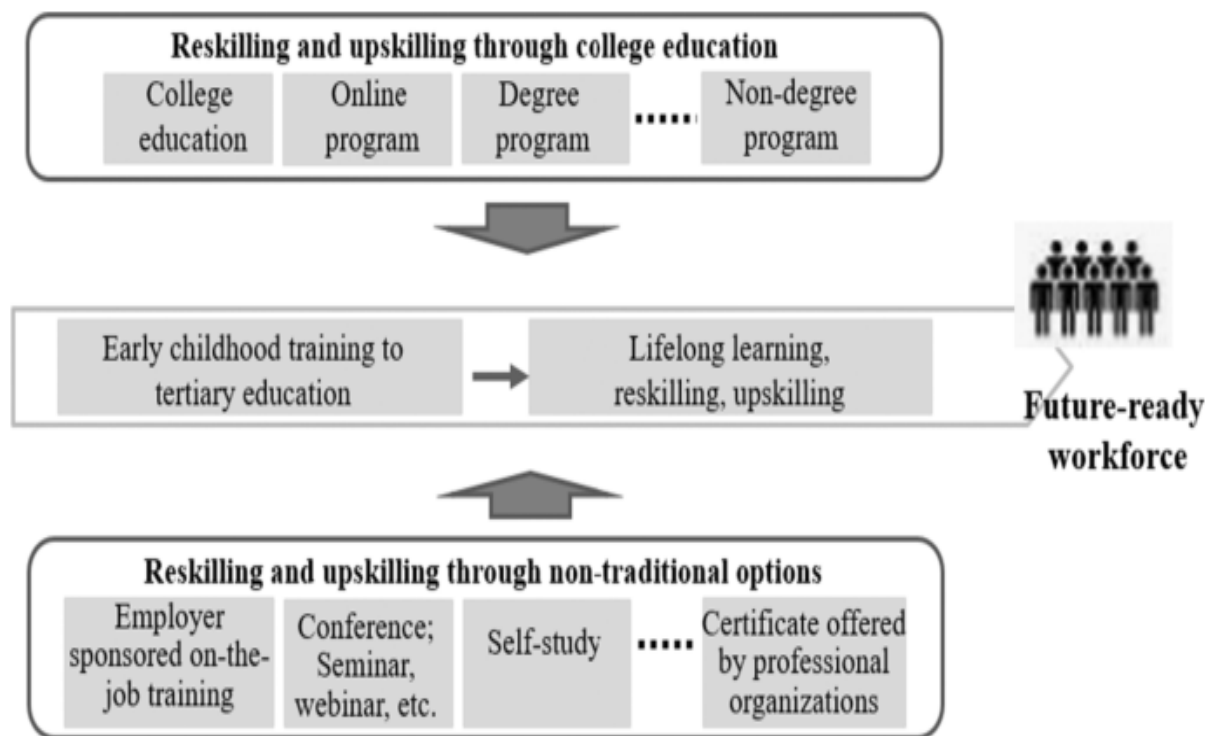


Fig 2: Reskilling and upskilling process

Some of the studies have been focused on particular healthcare industries, manufacturing, finance, etc. exploring the unique challenges each sector faces with adapting to transformation digital and it required skills for the sector's innovation [27]. Regional and global-based research has been analyzing the different regions and countries' impacted processes through the digital workforce gap and taking the address gaps. Inclusion and diversity emphasize certain studies of the importance of closing the digital workforce gap, according to the perspective diversity and based on the background contribute to innovation and digital age problem-solving. To access the digital workforce gaps latest studies can be explored with publications and explored by consulting firms, governmental organizations, research institutions, and specific-industry associations [26]. Organizations like McKinsey & company, world economic forum, Deloitte, and others reports release and studies. Additionally, academic conferences and journals in the fields it related according to the technology, human resources, and business on digital workforce gaps.

Existing systems:

The concept of a digital workforce is associated with the gaps in subjects that interest the various reports. The digital workforce process with technology, digital tools or automation, or human labor replaces in the workplace. The difference between the skills and the current workforce is the skills required to navigate effectively and emerging utilize technologies [37]. This process gap exists various sectors and includes data analysis, artificial intelligence, programming, and more. Infrastructure technological disparities with the different regions and processes within the industries can be created with the implementation of digital tools.

The uneven process of distribution has been digital opportunities based on the different segments [40]. Adoption and new Integration processes will be based on Some organizations such as struggle with the basic process of the adoption access and integration process of new digital work technologies that been due the process to reasons such as basic cost, resistance based to process change, or the lack of understanding process about the new benefits and access with the potential of these new technologies.

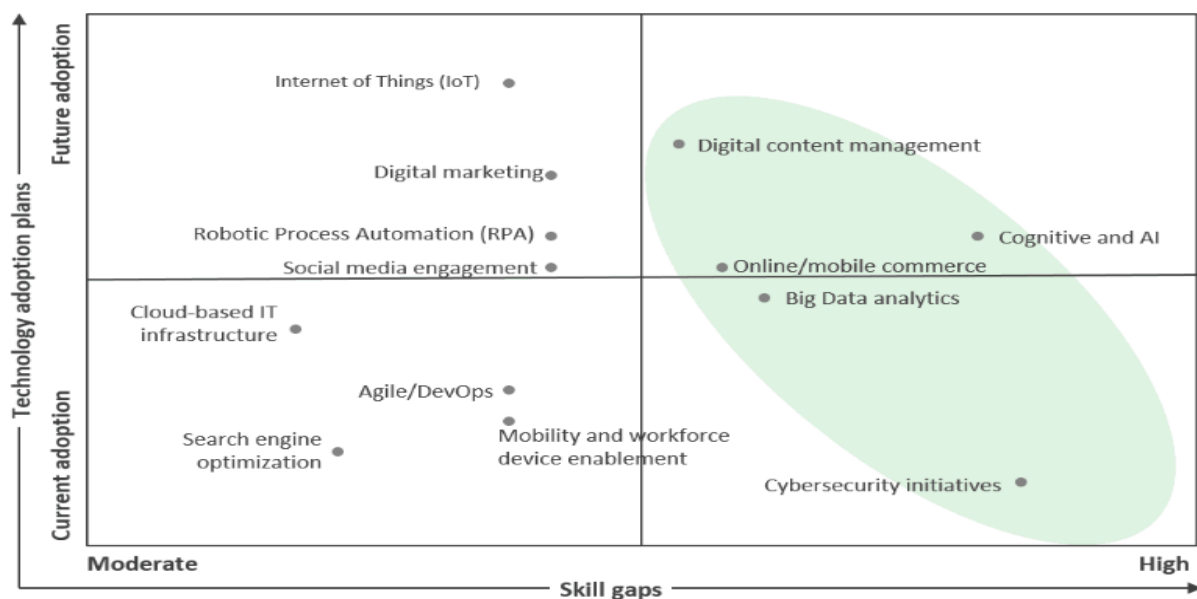


Fig 3: skills gap and technology adoption

The results are based on the gap between those processes that fully leverage according to the digital tools. It involves the various aspects of the skill technology process in digital. Data privacy and cybersecurity have process with more digitized with robust cybersecurity. Measures are more crucial and process more challenges [36]. It has to be maintained with frameworks to lead the vulnerabilities for impact with the digital workforce.

Workforce diversity can be processed with gaps according to the digital workforce. Certain processes with groups will be underrepresented in the technology-related fields, which will lead to missing opportunities for innovation growth. Remote readiness work will be processed with COVID-19-highlighted pandemic disparities with remote organizations and employees.

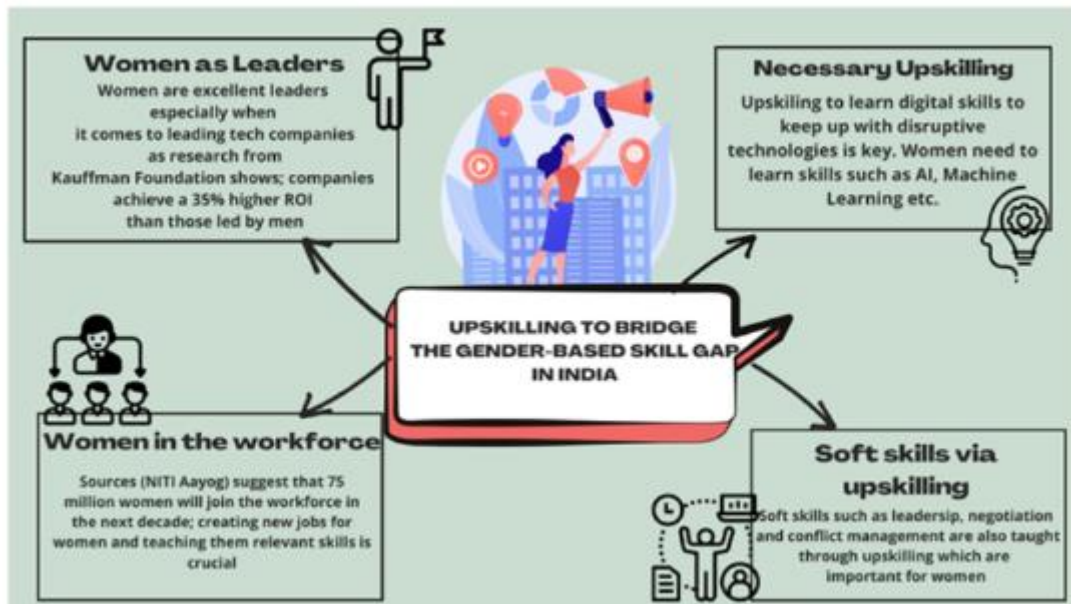


Fig 4: Upskilling workforce

Some of the lacked processes will be based on the infrastructure digital policies work effectively. According to the continuous learning process upskilling with the latest advancements in technology necessitates continuous learning. The disparities divide has been accessed based on the digital tools that are reliable to the internet connectivity process, after that it process with resources exist different socioeconomic among groups after that will create the digital divide the opportunities to certain with the demographics. The numerous studies based on the survey and reports on the organizations.

Proposed systems:

The digital workforce involves various aspects with the related skills, required with the modern based digital workforce, and technologies. It gives importance to the skilled workforce digital process. It process is based on the statistics workforce digital landscape. Trends will be digitalization industries throughout the process [42]. The knowledge based on the technology will be identified by the gaps based on the skills. After that challenges will be faced by the workforce gaps organization process.

More factors will be contributing to the workforce gaps according to the technological rapid advancements. It process with a lack of data training skills and an integration process with insufficient

digital tools. It changes the role of the job and skill-based requirements. Based on the bridge gaps the proposed systems will be processed through the skill program development. According to the collaboration between educational institutions, the online platforms will learn. Customized programs will give the training according to the industry-tailored needs.

The technology integration process continuous reskilling and upskilling process for the employees[40]. According to the technology, it is a process with framework integration and adoption. It will be a user-friendly process with systems and tools. The Talent-based recruitment will be processed with retention on the strategies. It redefines how job descriptions will be matched to the digital skill sets. It will be hiring based on the practices will be focused on the potential adaptability.

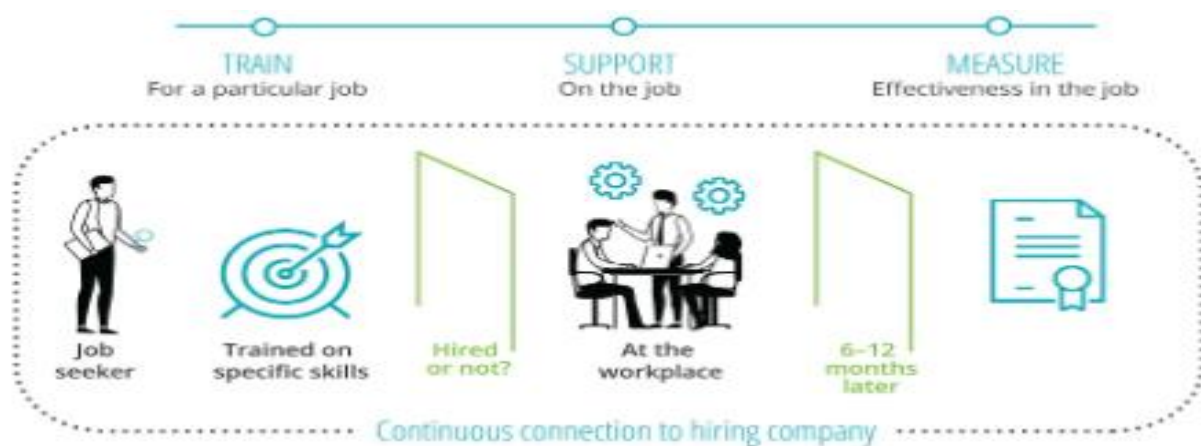


Fig 5: Upskilling process

The agile-based work collaboration and culture encourages a culture process with experimentation. The learning process will be based on remote infrastructure work. Always there will be flexible policies that work to collaborative platforms for teams of cross-functional. The implementation strategies will be phased through the system implementation approach. After that pilot programs will be in the testing phases due to the feedback mechanisms and improvement by continuous. Based on the increased workforce the effectiveness and productivity of the expected outcomes will be processed.

The enhanced innovation will be agility in more operations. It will be improved with the employee's satisfaction and process with rates of retention [41]. Always it impact with the positive impacts of the bottom line of organizations. Mitigation and challenges will be taken to change the employee's resistance based on resource allocation. According to the budget constraints, the evolving technologies will be monitored.

Closing the Gender Gap at Work

Digital Fluency is the Accelerant



Fig 6: digital workforce gap

Conclusion:

The digital workforce refers to the disparities and presents with challenging skills. The knowledge and competencies are technologically based on the modern landscape digital requirements. The conclusion analysis encompasses several key points. Skill misalignment is based significantly on the possessed by the workforce according to the current digital technologies. Most industries are based on experiencing a shortage of talent for emerging technologies of AI. The rapidly evolving advancements in technology outstripping due to the rate of workforce acquisition with the new skills. It creates discrepancies and creates for growing gap the skills-based employees to their projects. Impact based on the businesses that will have implications for the digital workforce gaps it will affect the productivity, capacity of innovation, and process complete with the ability market. Companies do not adapt to the risk of falling competitors' workforce. Education will be needed for continuous learning and upskilling programs will be bridged over to the digital workforce skills gap. Corporations, educational institutions, and collaborate with the government to design comprehensive training address-based initiatives gaps effectively. Addressing the diversity workforce gap should encompass a focus on inclusion. Ensuring according to equal access of training with new opportunities for the under representing the crucial to building a digital workforce. According to the employees and employers it has needed flexibility and adaptability. In conclusion, the digital workforce gaps addressing that require a multifaceted process approach to involve the ongoing various commitment stakeholders. Upskilling, collaboration, adaptability, and continuous learning are the bridging pivotal gaps to ensure the workforce gap to the relevant digital landscape.

References

1. Fonseca, L.M. Industry 4.0 and the Digital Society: Concepts, Dimensions and Envisioned Benefits. *Proc. Int. Conf. Bus. Excell.* **2018**, 12, 386–397. [Google Scholar] [CrossRef][Green Version]
2. World Economic Forum. *The Future of Jobs Report 2020*; World Economic Forum: Geneva, Switzerland, 2020. [Google Scholar]
3. Hartman, E.A.; Bovenschulte, M. Skills Needs Analysis for “Industry 4.0” Based on Roadmaps for Smart Systems. In *the Proceedings of the Using Technology Foresights for Identifying Future Skills Needs*; International Labour Organization: Moscow, Russia, 2014. [Google Scholar]
4. Namjoshi, J.; Rawat, M. Role of Smart Manufacturing in Industry 4.0. *Mater. Today Proc.* **2022**, 63, 475–478. [Google Scholar] [CrossRef]
5. LinkedIn. LinkedIn Jobs on the Rise 2022: The 25 U.S. Roles That Are Growing in Demand. Available online: <https://www.linkedin.com/pulse/linkedin-jobs-rise-2022-25-us-roles-growing-demand-linkedin-news/> (accessed on 26 August 2022).
6. Cunningham, W.; Moroz, H.; Muller, N.; Solatorio, A. *The Demand for Digital and Complementary Skills in Southeast Asia*; World Bank: Washington, DC, USA, 2022. [Google Scholar]
7. Google Temasek; Bain & Company. *E-Conomy SEA 2021: Roaring 20s the SEA Digital Decade*; Bain & Company: Boston, MA, USA, 2021. [Google Scholar]
8. Cabinet Secretariat Office. *Gov’t Announces Five Priorities to Speed Up Digital Transformation*; Cabinet Secretariat Office: New Delhi, India, 2020. [Google Scholar]
9. Ministry of Foreign Affairs. *Rapat Terbatas Mengenai Perencanaan Transformasi Digital*, 3 Agustus 2020, Di Istana Merdeka, Provinsi DKI Jakarta. Available online: <https://kemlu.go.id/portal/id/read/1593/pidato/rapat-terbatas-mengenai-perencanaan-transformasi-digital-3-agustus-2020-di-istana-merdeka-provinsi-dki-jakarta> (accessed on 27 August 2022).
10. Wisnumurti, A.A.G.O.; Darma, I.K.; Suasih, N.N.R. Government Policy of Indonesia to Managing Demographic Bonus and Creating Indonesia Gold in 2045. *IOSR J. Humanit. Soc. Sci.* **2018**, 23, 23–34. [Google Scholar]
11. *Bappenas Rancangan Teknokratik: Rencana Pembangunan Jangka Menengah Nasional 2020–2024*; The Ministry of National Development Planning, 2019; pp. 1–289. Available online: <https://www.bappenas.go.id/datapublikasishow?q=Rencana%20Pembangunan%20dan%20Rencana%20Kerja%20Pemerintah> (accessed on 15 November 2022).
12. Das, K.; Wibowo, P.; Chui, M.; Agarwal, V.; Lath, V. *Automation and the Future of Work in Indonesia*; McKinsey & Company: Chicago, IL, USA, 2019. [Google Scholar]
13. Sudiyono, P.; Satria, N.; Sulistiono, A.A.; Mudrianingrum, Y. *Analisis Daya Serap Lulusan SMK Berdasarkan Kompetensi Keahlian*; McKinsey & Company: Jakarta, Indonesia, 2020. [Google Scholar]
14. van Laar, E.; van Deursen, A.J.A.M.; van Dijk, J.A.G.M.; de Haan, J. Twenty-First Century Digital Skills for the Creative Industries Workforce: Perspectives from Industry Experts. *First Monday* **2019**, 24. [Google Scholar] [CrossRef]
15. Setyowati, D. Mampukah Omnibus Law Atasi Defisit Pekerja Digital Pada Startup? Available online: <https://katadata.co.id/desysetyowati/digital/5f87f46cd976b/mampukah-omnibus-law-atasi-defisit-pekerja-digital-pada-startup> (accessed on 27 August 2022).
16. Bell, D. *The Coming of Post-Industrial Society*; Harper Colophon Books; Basic Books: New York, NY, USA, 1974. [Google Scholar]
17. Webster, F. *Theories of the Information Society*; Routledge: London, UK, 2006. [Google Scholar]
18. Colbert, A.; Yee, N.; George, G. The Digital Workforce and the Workplace of the Future. *Acad. Manag. J.* **2016**, 59, 731–739. [Google Scholar] [CrossRef][Green Version]

19. UNESCO. *Digital Skills Critical Jobs and Social Inclusion 2018*; UNESCO: Paris, France, 2018. [Google Scholar]
20. OECD. *New Skills for the Digital Economy: Measuring the Demand and Supply of ICT Skills at Work*; OECD Digital Economy Papers; OECD: Paris, France, 2016. [Google Scholar]
21. ITU. *Digital Skills Toolkit*; ITU: Geneva, Switzerland, 2018. [Google Scholar]
22. Zhu, T.J.; Fritzler, A.; Orlowski, J. *Data Insights: Jobs, Skills and Migration Trends Methodology & Validation Results*; World Bank Group: Washington, DC, USA, 2018. [Google Scholar]
23. Government of Indonesia. *Kerangka Kualifikasi Nasional Indonesia*; Peraturan Presiden: Indonesia, 2012; Available online: <https://peraturan.bpk.go.id/Home/Details/41251/perpres-no-8-tahun-2012> (accessed on 15 November 2022).
24. Kadir, S.; Nirwansyah; Bachrul, B.A. *Technical and Vocational Education and Training in Indonesia: Challenges and Opportunities for the Future*; National University of Singapore: Singapore, 2016. [Google Scholar]
25. Ceric, A.; Ivic, I. Construction Labor and Skill Shortages in Croatia: Causes and Response Strategies. *Organ. Technol. Manag. Constr. Int. J.* **2020**, *12*, 2232–2244. [Google Scholar] [CrossRef]
26. Paul, S. An Analysis of the Skill Shortage Problems in Indian IT Companies. *Soc. Sci.* **2018**, *7*, 159. [Google Scholar] [CrossRef][Green Version]
27. Richardson, S. *What Is a Skill Shortage?* National Institute of Labour Studies Inc.: Adelaide, Australia, 2007. [Google Scholar]
28. CEDEFOP. *Insights into Skill Shortages and Skill Mismatch: Learning from Cedefop's European Skills and Jobs Survey 2018*; European Centre for the Development of Vocational Training: Thessaloniki, Greece, 2018. [Google Scholar]
29. Foroughi, A. Supply Chain Workforce Training: Addressing the Digital Skills Gap. *High. Educ. Ski. Work.-Based Learn.* **2021**, *11*, 683–696. [Google Scholar] [CrossRef]
30. Morris, D.; Vanino, E.; Corradini, C. Effect of Regional Skill Gaps and Skill Shortages on Firm Productivity. *Environ. Plan. A: Econ. Space* **2020**, *52*, 933–952. [Google Scholar] [CrossRef]
31. *World Bank Indonesia's Critical Occupations List 2018*; World Bank: Washington, DC, USA, 2020.
32. World Bank. *Preparing ICT Skills for Digital Economy: Indonesia within the ASEAN Context 2018*; World Bank: Washington, DC, USA, 2018. [Google Scholar]
33. Marsela, N.M.K.; Limbongan, K. *Indonesian ICT Workers: Determinants and Strategy to Support National Digital Transformation*; Asian Development Bank: Tokyo, Japan, 2021. [Google Scholar]
34. BPS. *Keadaan Angkatan Kerja Di Indonesia—Agustus 2020*; Badan Pusat Statistik: Jakarta, Indonesia, 2020. [Google Scholar]
35. Hyndman, R.J.; Kostenko, A.V. Minimum Sample Size Requirements for Seasonal Forecasting Models. *FORESIGHT* **2007**, *6*, 12–15. [Google Scholar]
36. Blangiardo, M.; Cameletti, M.; Baio, G.; Rue, H. Spatial and Spatio-Temporal Models with R-INLA. *Spat Spatiotemporal Epidemiol* **2013**, *4*, 33–49. [Google Scholar] [CrossRef] [PubMed]
37. Wiryasti, C.H.; Gunawan, J.; Muhamad, T. *Rapid Assessment of Information and Communication Technology Skills Demand in Indonesia*; ILO: Jakarta, Indonesia, 2020. [Google Scholar]
38. *Kominfo Connected Indonesia: More Digital, More Advanced (the 2020 Annual Report of the Ministry of Communications and Informatics of the Republic of Indonesia)*; Minister of Communications and Informatics of the Republic of Indonesia: Jakarta, Indonesia, 2020.
39. Tan, K.S.; Tang, J.T.H. *New Skills at Work: Managing Skills Challenges in ASEAN-5*. In *Research Collection School of Economics 2016*; J. P. Morgan: Singapore, 2016. [Google Scholar]
40. Zulfiyandi, S.E.; Wirawan, F.A.; Tanjung, N.P.S.; Yolanda, R.; Zaini, M.; Andrian, D.; Syafitri, K.; Amaldi, G.; Sidantha, I.N.B. *Ketenagakerjaan Dalam Data 2021*, 4th ed.; Zulfiyandi, S.E., Wirawan,

F.A.W., Eds.; Pusat Data dan Teknologi Informasi Ketenagakerjaan: Jakarta, Indonesia, 2021. [[Google Scholar](#)]

41. SMERU. *Strategy Primer Accelerating Digital Skills Development in Indonesia*; SMERU: Jakarta, Indonesia, 2022. [[Google Scholar](#)]

42. Oxford Analytica. *Indonesia's Structural Gaps Impede Its Digital Economy*; Expert Briefings 2021; Oxford Analytica: Oxford, UK, 2021. [[Google Scholar](#)]

43. Alpha Beta *Building Digital Skills for the Changing Workforce in Asia Pacific and Japan (APJ): AWS APJ Digital Skills Study 2022*; Amazon Web Services: Seattle, WA, USA, 2022.

44. Alpha Beta Keterampilan Untuk Masa Depan: Memperkuat Ekonomi Indonesia Dengan Meningkatkan Keterampilan Digital 2021. 2021; Available online: <https://fdocuments.net/document/keterampilan-untuk-masa-depan-alphabeta.html?page=1> (accessed on 15 November 2022).

45. DTS Kominfo Digital Talent Scholarship. Available online: <https://digitalent.kominfo.go.id/> (accessed on 30 October 2022).