Navigating the Fourth Industrial Revolution: Generational Differences, COVID-19 Impact, and Knowledge Sharing in the Modern Workplace

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Abstract: This systematic literature review examines the intricate interplay between generational differences, the Fourth Industrial Revolution (4IR), and the unanticipated effects of the COVID-19 pandemic on the contemporary world of work. In response to the pandemic, organizations worldwide rapidly reevaluated their work processes, embracing digital technologies and remote work. This unforeseen shift underscored the world's capacity for rapid adaptation to unforeseen challenges. However, the 4IR extends beyond technological advancements, involving non-technological aspects such as evolving business models, workforce well-being, job security, and the changing nature of work. Understanding these dimensions is vital in shaping the modern workforce. Generational differences add another layer of complexity. Each generation, from Baby Boomers to Millennials, brings distinct worldviews and work values. This review explores how different generations perceive and adapt to the evolving nature of work, especially in the context of the 4IR. In addition, the 4IR highlights the critical role of knowledge in driving innovation and competitiveness. Knowledge-sharing practices within organizations have become pivotal in staying ahead in this era of rapid technological change. By addressing both technological and non-technological dimensions of the 4IR and considering generational perspectives, this review offers a comprehensive understanding of how these forces intersect and influence the modern workplace. It provides insights and recommendations to guide organizations, policymakers, and individuals in navigating the complexities of the modern world of work, harnessing 4IR opportunities, and addressing its multifaceted challenges.

Keywords: Generational difference, Fourth Industrial Revolution, COVID-19 Impact, Workplace adaptation, Business models, Knowledge sharing, Digital technology, Workforce preparedness

1. Introduction

The contemporary work landscape is experiencing transformative shifts due to the Fourth Industrial Revolution (4IR) and the global disruption caused by the COVID-19 pandemic. These forces are fundamentally changing organisational processes, workforce dynamics, and the overall approach to business and employment (Schwab, 2017). This paper addresses the critical need to understand these changes, particularly the intersection of generational differences with the technological and non-technological aspects of the 4IR.

The rapid shift to digital technologies and remote work during the pandemic has accelerated the adoption of 4IR technologies, reshaping business models, workforce well-being, and job security (Tang & Wang, 2018). However, the 4IR encompasses more than just technological advancements. It involves significant non-technological dimensions such as evolving business models and changing work nature, necessitating a comprehensive exploration beyond the technological scope (Al-Ayash et al., 2020).

Furthermore, generational differences add another layer of complexity. Each generation, from Baby Boomers to Millennials, brings distinct worldviews and work values. Understanding how these generational dynamics intersect with the 4IR is essential for effective organizational management, leadership, and collaboration. This study aims to fill the research gap by examining these generational perspectives and providing insights into how different age cohorts adapt to and navigate the evolving work environment brought about by the 4IR and the pandemic.

By exploring these dimensions, the paper offers valuable recommendations for organizations, policymakers, and individuals better to manage the multifaceted challenges of the modern workplace and leverage the opportunities presented by the 4IR.

2. Rationale

The rationale for this systematic literature review stems from the need to examine the complex interplay between generational differences, the Fourth Industrial Revolution (4IR), and the unexpected impact of the COVID-19 pandemic on modern work environments. The rapid adoption of digital technology and remote work during the pandemic has reshaped workplace norms, highlighting the urgency of understanding organizational

adaptations and their readiness for the technological upheavals of the 4IR. These shifts have prompted a reassessment of not just technology but also non-technological aspects like business models, workforce well-being, and job security (Schwab, 2017; Tang & Wang, 2018; Martin & Hughes, 2020; Kumar et al., 2021).

Moreover, generational differences have become more pronounced within the workforce, affecting perspectives, attitudes, and behaviors across age groups from Baby Boomers to Millennials (Lyons & Schweitzer, 2017). This generational dynamic intersects significantly with the technological and cultural shifts driven by the 4IR, necessitating a deeper understanding of how these factors converge to influence leadership, management, and collaboration within organizations.

The research problem centers on the knowledge gaps regarding how the COVID-19 pandemic has catalyzed significant changes in economic activities and work processes, reflecting the global adaptability to sudden and severe disruptions (Al-Ayash et al., 2020; Hlatshwayo, 2020; Ebekozien et al., 2022). Additionally, while the 4IR is often viewed through the lens of technological innovation, its broader implications encompassing non-technological dimensions such as the transformation of business models, job security, and the overall nature of work require comprehensive exploration (Aggestam et al., 2017; Schwab, 2017).

This study aims to bridge these gaps by exploring the impacts of the 4IR on business models and investigating how generational differences affect workplace dynamics within this context. It also examines knowledge-sharing practices essential for maintaining competitiveness in a rapidly evolving technological landscape (Hidalgo et al., 2017; DeFelice & Harris, 1998). Ultimately, this research seeks to provide a nuanced understanding of the forces shaping modern workplaces, offering insights and actionable strategies for navigating the complexities of the 4IR, thereby aiding organizations, policymakers, and individuals in effectively responding to these ongoing changes.

3. Research Questions

- How has the COVID-19 pandemic influenced the adoption of digital technology and reevaluation of work processes across various countries, including South Africa, to maintain productivity during lockdowns?
- What non-technological concerns, such as changes in business models, workplace well-being, job security, and the evolving nature of work, arise in the context of the Fourth Industrial Revolution (4IR) alongside technological advancements?
- How does the 4IR impact existing business models, and what adaptations are necessary for organizations to thrive in this era of technological transformation?
- What knowledge-sharing practices are essential in the 4IR era, given the rapid pace of technological innovation, to ensure that organizations and individuals remain competitive and adaptable in this evolving landscape?

4. Methodology

This systematic literature review (SLR) explores how generational differences influence the transition to the Fourth Industrial Revolution (4IR) and examines the potential impact of COVID-19 on readiness for the 4IR. Following a systematic approach as outlined by Massaro et al. (2015), the research commenced by formulating specific questions centered on generational differences, COVID-19, the 4IR, and knowledge transfer. A detailed research protocol was then established, delineating the methodology, article selection criteria, and information extraction procedures.

The article selection phase involved conducting an extensive search through databases such as Scopus, Emerald, and Web of Science, covering publications from 2000 to 2023 and focusing on socio-economic impacts of COVID-19 rather than health aspects, as recommended by Torraco (2005). Initial searches using a combination of key terms with "AND" yielded no results, prompting a refined strategy using "OR" among keywords to enhance relevance and retrieval efficiency.

Screening of articles included reviewing abstracts, introductions, and conclusions to determine their relevance, resulting in 58 of the initial 183 articles being selected for further analysis. A detailed content analysis followed, where a codebook was used to categorize and synthesize information, leading to the identification of patterns and the development of a comprehensive code framework.

This systematic methodology facilitated the creation of a coherent storyline that synthesized findings and insights, thus enriching the discussion on how generational nuances and the unforeseen challenges of COVID-

19 are shaping readiness for the 4IR. The SLR thereby provides valuable perspectives on the dynamics at play in the modern workforce's adaptation to technological and generational shifts.

5.   Generational Dynamics in the 4IR era

As the Fourth Industrial Revolution (4IR) unfolds, marked by significant technological shifts like digitization, robotics, and biometric technologies, it intersects profoundly with generational dynamics, reshaping economic and work landscapes (Schwab, 2017; Hermann et al., 2016; Bienhaus & Haddud, 2018). This era introduces not only advancements but also challenges that necessitate a reevaluation of business models and work processes, influenced heavily by the digital revolution and e-commerce (Mourtzis et al., 2016; Shamim et al., 2016).

These technological and economic shifts are paralleled by a transition in generational workforce dynamics. Baby Boomers, known for their loyalty and traditional work values, are gradually making way for Millennials and Gen Z, who bring a different set of values and technological fluency to the workplace (Lyons & Schweitzer, 2017; Watts, 2010). This younger generation is better aligned with the 4IR's demands due to their comfort with digital technologies and remote work, presenting both opportunities and challenges for workplace integration (Kaifi et al., 2012).

Significant generational differences are evident as each cohort brings unique traits and expectations to their roles, impacting workplace behaviors and productivity criteria (Lu & Gursoy, 2016; Smola & Sutton, 2002). The rapid pace of technological change necessitates that employees adapt, requiring changes in skill sets across all generational divides (Schwab, 2017; Wilkesmann & Wilkesmann, 2018).

This evolving scenario underscores the importance of aligning competencies with the technological imperatives of the 4IR—physical, digital, and biometric. Organizations must navigate these generational shifts and technological advancements effectively to harness the full potential of their diverse workforce, optimizing workplace benefits and addressing the unique challenges presented by emerging technologies (Botha, 2018). As such, the interplay between generational dynamics and technological evolution is critical for organizational adaptation and success in the modern economic landscape.e.

6.   Baby Boomers Exist in the Workplace

Baby Boomers, entering the workforce during the heyday of mass production, were instrumental in driving efficient manufacturing processes. Their dedication was evident in punctuality, as they were the main contributors to mass production, with time clocks at workstation entrances (Lu & Gursoy, 2016). Success for this generation was synonymous with long hours and unwavering effort, fostering a deep loyalty to employers and the workplace (Macky et al., 2008). Much of their work took place on assembly lines, where speed and adherence to strict specifications were paramount, leaving little room for creativity.

Born around the time of World War II, Baby Boomers witnessed social unrest and the behavior of leaders, motivating them to prioritize family life and economic prosperity (Smola & Sutton, 2002). They facilitated the shift from a focus on military activities to an emphasis on economic endeavors, playing a crucial role in shaping economic prosperity. To adapt to the era's industrial advancements, they established business models compatible with the introduction of steam engines and electrical innovations (Drath & Horch, 2014).

While many Baby Boomers have reached retirement age, they continue to wield significant influence in numerous multinational and local organizations. These organizations often reflect their work values, rooted in loyalty, long hours, punctuality, respect for hierarchies, and adherence to prescribed routines. As younger generations, characterized by different work values, increasingly populate the workplace, generational conflicts may arise. Baby Boomers' values could face additional challenges during the Fourth Industrial Revolution as they approach retirement.

7.   Building Bridges with Generation X

Generation X represents the first cohort to encounter and appreciate the significance of application technology capabilities in the workplace aimed at enhancing efficiency (Rani & Samuel, 2016). Similar to Baby Boomers, Generation X places considerable emphasis on the production process, but they also recognize the value of injecting creativity into production through thoughtful planning. The integration of technology during their time primarily targeted the automation of existing business processes, with limited innovation directed towards altering business models. Their work values bear similarities to those of Baby Boomers, but with a slightly greater emphasis on achieving a work-life balance (K. K. Kim, 2016). They acknowledged the importance of social aspects and introduced business models that incorporated this dimension into their

respective industries. Generation X actively introduced social activities within the workplace, even if some perceived them as a potential misuse of organizational resources (Stewart et al., 2017). Some organizations went as far as establishing on-site daycare centers, which didn't necessarily change the culture of long working hours but offered a sense of comfort, knowing that families were within reach in case of emergencies.

In contrast to Baby Boomers, Generation X demonstrates a greater adaptability to changing norms and routines if it leads to working more efficiently and achieving established business objectives (Rani & Samuel, 2016). The era marked by the entry of Generation X into the labor market witnessed significant growth in the automation of office-based business functions. In some sectors, hard labor remained predominant, particularly in areas like mining, manufacturing, and vehicle assembly (Drath & Horch, 2014). Nevertheless, technological advancements varied across sectors, often influenced by the vision of individual organizations. This divergence gave rise to new careers, such as plant operators responsible for operating large machinery, a role that used to require multiple workers but was eventually streamlined to a single operator, leading to workforce reductions.

Globalization posed both challenges and opportunities, particularly in sectors like textiles, where designs could originate in one country and production and shipping take place in another. This era underscored the importance of cost-effectiveness, achieved through automated processes, cost-effective labor, and mass production. Generation X thrived in this business environment, partly due to their work values, which emphasized loyalty and commitment to their employers (Rani & Samuel, 2016). As Generation X transitioned with their unique social inclinations, personal traits, and work values, they paved the way for Generation Y, which brought a different perspective to the workplace, diverging from the values held dear by their predecessors.

8.   Navigating the Workplace with Generation Y (Millennials)

Millennials, or Generation Y, have been shaping the workplace since their emergence in the late 20th century (Kaifi et al., 2012; Kosterlitz & Lewis, 2017). As they now occupy everything from entry-level positions to middle management, their influence is pivotal as we navigate the Fourth Industrial Revolution (4IR) (Teng et al., 2019). This generation contrasts sharply with Baby Boomers, displaying a distinct approach to work-life balance, loyalty, and hierarchical respect, and is characterized by a strong preference for a balanced approach to work and life and a pronounced need for individual recognition and appreciation (Hauw & Vos, 2010; Kosterlitz & Lewis, 2017; Sungdoo Kim, 2018).

Raised during the ascent of the Information Age, Millennials were early adopters of technology in education, seeing devices like smartphones and laptops as basic necessities (Liu et al., 2019; Van Tulder et al., 2018). Their comfort with technology extends to the workplace, where they view digital tools as enablers rather than obstacles (Jones & Lee, 2020). This tech-savviness is further demonstrated in their approach to social media and online platforms, which are often preferred over traditional face-to-face interactions (Chua, 2016; Usluel & Mazman, 2009). Millennials have also leveraged these platforms to forge new career paths that capitalize on digital popularity and entrepreneurial spirit without substantial capital investment (Smith et al., 2020).

The 4IR has introduced new work paradigms that resonate well with Millennials, who favor flexible and remote work arrangements over the traditional office-bound models associated with previous generations (Berkery et al., 2020; Jung, 2019). They tend to see job security not in terms of long-term employment with a single company but in adaptable, skills-based employment, often preferring freelance or project-based roles (Lu & Gursoy, 2016; Araujo & Minetti, 2011).

As we move deeper into the 4IR, the potential for technological unemployment grows, with many predicting that AI and robotics will phase out routine jobs. However, Millennials' adaptability and tech proficiency may afford them a competitive edge in an evolving job market that values digital literacy and flexible work arrangements (Botha, 2018; Schwab, 2017; Smith et al., 2020). Their capability to navigate these changes is crucial as businesses and economies strive to harness the full potential of the 4IR, emphasizing the need for continuous learning and adaptability in the modern workforce.

9.   Generational Differences in the Face of the Fourth Industrial Revolution and Evolving Work Nature

Adapting to changing environments is crucial for organizational survival. The COVID-19 pandemic accelerated the need for businesses to swiftly adopt new working methods and technology tools to maintain productivity, often without adequate training (Rosenbloom & Markard, 2020). This demand for rapid adaptation is

becoming the new global norm, requiring consideration in future business continuity plans (Singh et al., 2020; Bhuiyan et al., 2023).

Generational differences are another key factor, particularly with the emergence of the Fourth Industrial Revolution (4IR). Older generations may perceive the 4IR as a threat to their job security due to their lower technological proficiency compared to Millennials (Myers & Sadaghiani, 2010). The 4IR's three key drivers demand technological competencies for individuals and companies to thrive, making technology unemployment a significant risk, especially for older generations (Schwab, 2017).

Technology unemployment results from technology replacing labor-intensive jobs, including robotics, automation, artificial intelligence, and biometric systems. Millennials may adapt more readily to complementing technology-driven business processes compared to preceding generations (Sung-jin Kim et al., 2012; Sungdoo Kim, 2018; Wilkesmann & Wilkesmann, 2018). Exceptions exist within each generation, with individuals displaying characteristics associated with other generations, as seen in successful technology-based companies led by Baby Boomers and Millennials (Price Waterhouse Coopers, 2014).

The nature of work is undergoing a profound transformation, characterized by agile business models demanding greater employee adaptability and competence (Agostini & Filippini, 2019; Botha, 2018; Schwab, 2017; Wilkesmann & Wilkesmann, 2018). While technology like robotics is expected to handle routine tasks, creative professions will remain resilient until Artificial Intelligence advances enough to perform creative and intuitive tasks (Agostini & Filippini, 2019). Artificial Intelligence and neural science are already demonstrating capabilities in executing creative tasks based on mathematical algorithms.

10. Transferring Knowledge Across Generations for Future job Success

The impending Fourth Industrial Revolution (4IR) underscores the critical importance of technological competencies for survival and success. However, beyond technological prowess, preserving institutional memory and ensuring business continuity are equally vital for sustained success (Kotlarsky & Oshri, 2005; S. Ryan & O'Connor, 2012; Sharon Ryan et al., 2013). Older generations possess invaluable institutional memory and tacit knowledge, which are indispensable for ensuring business continuity and achieving success (Hau et al., 2013; Nezakati et al., 2015). While Millennials exhibit a natural aptitude for technology, it is essential for gaining and maintaining a competitive edge in the 4IR era (Hau et al., 2013; Kosterlitz & Lewis, 2017). Business triumph in this era is likely to hinge on the organization's ability to facilitate knowledge transfer both within and between different generations. This approach leverages the wealth of tacit knowledge from older generations and the technological competence inherent in Millennials.

Organizations would be wise to comprehensively understand the distinct traits of each generation to harness these traits effectively and restructure their business models to capitalize on them profitably (Kaifi et al., 2012; Rani & Samuel, 2016). Failing to capture and comprehend the characteristics of each generation and subsequently failing to facilitate innovative knowledge transfer represents a missed opportunity for business leaders (Stewart et al., 2017). Among the intriguing attributes of the youngest generation is their non-linear and less structured outlook. They prefer agile methods of operation, resisting confinement to specific spaces and times, and are motivated by clear instructions and deadlines (Claus, 2019). Millennial team members may often question instructions that appear unclear, not out of defiance, but as a form of inquiry seeking clarity, which might be misconstrued as challenging authority.

11. Contribution and Conclusion of the Review

This review significantly enhances our understanding of the contemporary work landscape, the Fourth Industrial Revolution (4IR), and the impact of the COVID-19 pandemic. It highlights several critical areas:

Reassessing Work Processes Amidst COVID-19: This study underscores the transformative influence of the COVID-19 pandemic, showcasing how societies adapted to unforeseen challenges. It provides insights into how organizations rapidly integrated digital technology to maintain productivity, emphasizing the pandemic's impact on global economic activities.

Non-Technological Dimensions of the 4IR: While much focus on the 4IR revolves around technological advancements, this review emphasises the importance of non-technological aspects. These include shifts in business models, employee well-being, job security, and the evolving nature of work. It broadens the understanding of the 4IR by incorporating these critical dimensions.

Insights for Business Model Adaptations: The review explores the impact of the 4IR on business models, offering practical insights for organizations aiming to redefine their strategies and structures in response to technological transformation. This guidance is invaluable for businesses navigating the complexities of the 4IR.

Generational Dynamics Unveiled: By examining how generational disparities influence approaches to the challenges and opportunities of the 4IR, this study provides a deeper understanding of generational dynamics in the workplace. It illuminates the multifaceted interplay of generational perspectives, aiding in effective organisational management.

Navigating the Knowledge Sharing Landscape: Addressing the importance of knowledge sharing in the 4IR era, the review highlights the need for rapid knowledge and skills acquisition in a swiftly evolving technological landscape. It equips organizations and individuals with essential insights for thriving in an environment where knowledge is a vital currency.

Future Research Directions: The review calls for further exploration into how emerging technologies beyond 2022 are shaping work processes and organizational structures. Additionally, investigating the long-term effects of the COVID-19 pandemic on work dynamics and further examining the role of generational differences in adapting to ongoing technological advancements would provide deeper insights.

In conclusion, this review underscores the intricate relationship between generational differences, the 4IR, and the COVID-19 pandemic's impact on the world of work. It calls for comprehensive, adaptive strategies to address these dynamics' multifaceted challenges and opportunities. Doing so provides valuable guidance for individuals and organizations to harness the full potential of the 4IR while addressing non-technological aspects of this transformative era.

References

Agostini, L., & Filippini, R. (2019). Organizational and managerial challenges in the path toward Industry 4.0. *European Journal of Innovation Management*, *22*(3), 406–421. https://doi.org/10.1108/EJIM-02-2018-0030

Araujo, L., & Minetti, R. (2011). Knowledge sharing and the dynamics of social capital. *European Economic Review*, *55*(8), 1109–1119. https://doi.org/10.1016/j.euroecorev.2011.04.006

Arribas-Bel, D., Kourtit, K., Nijkamp, P., & Steenbruggen, J. (2015). Cyber Cities: Social Media as a Tool for Understanding Cities. *Applied Spatial Analysis and Policy*. https://doi.org/10.1007/s12061-015-9154-2

Berkery, E., Morley, M. J., Tiernan, S., & Peretz, H. (2020). From start to finish: Flexi-time as a social exchange and its impact on organizational outcomes. *European Management Journal*,. https://doi.org/10.1016/j.emj.2020.02.003

Bertola, P., & Teunissen, J. (2018). Fashion 4.0. Innovating fashion industry through digital transformation. *Research Journal of Textile and Apparel*, *22*(4), 352–369. https://doi.org/10.1108/RJTA-03-2018-0023

Bienhaus, F., & Haddud, A. (2018). Procurement 4.0: factors influencing the digitisation of procurement and supply chains. *Business Process Management Journal*, *24*(4), 965–984. https://doi.org/10.1108/BPMJ-06-2017-0139

Bhuiyan, M.R.I., Akter, M.S., & Islam, S. (2024). How does digital payment transform society as cashless society? An empirical study in the developing economy. *Journal of Science and Technology Policy Management*, 14(1)

Botha, D. (2018). Knowledge management and the future of work. *Proceedings of the European Conference on Knowledge Management, ECKM, 2* (Sep), 1142–1150.

Chua, C. (2016). *Time in the Realm of Social and Mobile Technologies*. 1–15.

Claus, L. (2019). HR disruption—Time already to reinvent talent management. *BRQ Business Research Quarterly*, *22*(3), 207–215. https://doi.org/10.1016/j.brq.2019.04.002

Cross, J. (2004). The future of eLearning. *On the Horizon*, *12*(4), 151–157. https://doi.org/10.1108/10748120410564458

Debrah, S. K., & Asare, I. K. (2012). Using ICT to overcome constraints in the agriculture value chain: Emerging trends in Ghana. *E-Agriculture and Rural Development: Global Innovations and Future Prospects*, 31–41. https://doi.org/10.4018/978-1-4666-2655-3.ch003

Drath, R., & Horch, A. (2014). Industrie 4.0: Hit or Hype? *IEEE Industrial Electronics Magazine*, *8*(2), 56–58.

Ebekozien, A., Samsurijan M.S., Aigbavboa, C., & Malek, N.M., (2022). Malaysia's low-cost housing solid waste management in the era of COVID-19: the role of the fourth industrial revolution technonogies. *Management of Environmental Quality: An International Journal* 34(1), 80-98

Hau, Y. S., Kim, B., Lee, H., & Kim, Y.-G. (2013). The effects of individual motivations and social capital on employees' tacit and explicit knowledge-sharing intentions. *International Journal of Information Management*, *33*(2), 356–366. https://doi.org/10.1016/j.ijinfomgt.2012.10.009

Hauw, S., & Vos, A. (2010). Millennials' Career Perspective and Psychological Contract Expectations: Does the Recession Lead to Lowered Expectations? *Journal of Business and Psychology*, *25*(2), 293–302. https://doi.org/10.1007/s10869-010-9162-9

Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for Industry 4.0 scenario. *Hawaii International Conference on Systems Science, Computer Science IEEE*.

Hicks, M. (2018). How HR execs can use technology to connect a divided workforce. *Strategic HR Review*, *17*(1), 23–28. https://doi.org/10.1108/shr-11-2017-0081

Jung, J. (2019). The fourth industrial revolution, knowledge production and higher education in South Korea. *Journal of Higher Education Policy and Management*, *00*(00), 1–23. https://doi.org/10.1080/1360080X.2019.1660047

Kaifi, B. a., Nafei, W. a., Khanfar, N. M., & Kaifi, M. M. (2012). A Multi-Generational Workforce: Managing and Understanding Millennials. *International Journal of Business and Management*, *7*(24), 88–93. https://doi.org/10.5539/ijbm.v7n24p88

Kim, K. K. (2016). *Celebrating America's Pastimes: Baseball, Hot Dogs, Apple Pie and Marketing?* (K. K. Kim (ed.)). Springer International Publishing. https://doi.org/10.1007/978-3-319-26647-3

Kim, Sung-jin, Hong, J., & Suh, E. (2012). A diagnosis framework for identifying the current knowledge sharing activity status in a community of practice. *Expert Systems with Applications*, *39*(18), 13093–13107. https://doi.org/10.1016/j.eswa.2012.05.092

Kim, Sungdoo. (2018). Managing millennials' personal use of technology at work. *Business Horizons*, *61*(2), 261–270. https://doi.org/10.1016/j.bushor.2017.11.007

King, M., & Newman, R. (2009). Evaluating business simulation software: approach, tools and pedagogy. *On the Horizon*, *17*(4), 368–377. https://doi.org/10.1108/10748120910998399

Kosterlitz, M., & Lewis, J. (2017). From Baby Boomer to Millennial: Succession Planning for the Future. *Nurse Leader*, *15*(6), 396–398. https://doi.org/10.1016/j.mnl.2017.09.006

Kotlarsky, J., & Oshri, I. (2005). Social ties, knowledge sharing and successful collaboration in globally distributed system development projects. *European Journal of Information Systems*, *14*(December 2004), 37–48. https://doi.org/10.1057/palgrave.ejis.3000520

Kuruczleki, É., Pelle, A., Laczi, R., & Fekete, B. (2016). The Readiness of the European. *Management*, *11*(4), 327–347.

Liu, J., Zhu, Y., Serapio, M., & Cavusgil, S. T. (2019). The new generation of millennial entrepreneurs: A review and call for research. *International Business Review*, *28*(5), 1–10. https://doi.org/10.1016/j.ibusrev.2019.05.001

Lu, A. C. C., & Gursoy, D. (2016). Impact of Job Burnout on Satisfaction and Turnover Intention: Do Generational Differences Matter? *Journal of Hospitality and Tourism Research*, *40*(2), 210–235. https://doi.org/10.1177/1096348013495696

Lyons, S. T., & Schweitzer, L. (2017). A qualitative exploration of generational identity: Making sense of young and old in the context of today's workplace. *Work, Aging and Retirement*. https://doi.org/10.1093/workar/waw024

Macky, K., Gardner, D., & Forsyth, S. (2008). Generational differences at work: Introduction and overview. *Journal of Managerial Psychology*, *23*(8), 857–861. https://doi.org/10.1108/02683940810904358

Massaro, M., Dumay, J., & Garlatti, a. (2015). Public sector knowledge management: A structured literature review. *Journal of Knowledge Management*, *19*(3), 530–558. https://doi.org/10.1108/JKM-11-2014-0466

McAndrew, M., & Johnston, A. E. (2012). The role of social media in dental education. *Journal of Dental Education*, *76*(11), 1474–1481. http://www.ncbi.nlm.nih.gov/pubmed/23144483

Meski, O., Belkadi, F., Laroche, F., Ladj, A., & Furet, B. (2019). Integrated Data and Knowledge Management as Key Factor for Industry 4.0. *IEEE Engineering Management Review*, *47*(4), 94–100. https://doi.org/10.1109/EMR.2019.2948589

Millar, C., & Lockett, M. (2014). Multigenerational organisations: A challenge for technology and social change. *Technological Forecasting and Social Change*, *89*, 273–283. https://doi.org/10.1016/j.techfore.2014.08.008

Miller, G. S., & Petak, T. A. (2019). Increasing Employee Motivation and Organizational Productivity By Implementing Flex-Time. *Increasing Employee Motivation and Organizational Productivity By Implementing Flex-Time*, 16.

Mkhize, P., Huisman, M., & Lubbe, S. (2011). An analysis of collaborative learning as a prevalent in-structional strategy of South Africa Government eLearning practices. *Proceedings of the European Conference on Games-Based Learning*, *1*.

Mourtzis, D., Fotia, S., Gamito, M., Neves-Silva, R., Correia, A., Spindler, P., Pezzotta, G., & Rossi, M. (2016). PSS Design Considering Feedback from the Entire Product-service Lifecycle and Social Media. *Procedia CIRP*, *47*, 156–161. https://doi.org/10.1016/j.procir.2016.03.092

Myers, K. K., & Sadaghiani, K. (2010). Millennials in the Workplace: A Communication Perspective on Millennials' Organizational Relationships and Performance. *Journal of Business and Psychology*, *25*(2), 225–238. https://doi.org/10.1007/s10869-010-9172-7

Nezakati, H., Amidi, A., Jusoh, Y. Y., Moghadas, S., Aziz, Y. A., & Sohrabinezhadtalemi, R. (2015). Review of Social Media Potential on Knowledge Sharing and Collaboration in Tourism Industry. *Procedia -Social and Behavioral Sciences*, *172*, 120–125. https://doi.org/10.1016/j.sbspro.2015.01.344

Nonaka, I. (1994). Dynamic Theory Knowledge of Organizational Creation. *Organization Science*, *5*(1), 14–37.

Parry, E., & Urwin, P. (2011). Generational Differences in Work Values: A Review of Theory and Evidence. *International Journal of Management Reviews*, *13*(1), 79–96. https://doi.org/10.1111/j.1468-2370.2010.00285.x

Pierce, T. (2009). Social anxiety and technology: Face-to-face communication versus technological communication among teens. *Computers in Human Behavior*, *25*(6), 1367–1372. https://doi.org/10.1016/j.chb.2009.06.003

Price Waterhouse Coopers. (2014). *Global Top 100 Companies by Market Capitalisation 31 March 2014 update*. *March*, 1–44.

Range, J. (2017, November). Farming in the age of technology. *Farmers Weekly*, 6–8. www.farmerweekly.co.za

Rani, N., & Samuel, A. (2016). A study on generational differences in work values and person-organization fit and its effect on turnover intention of Generation Y in India. *Management Research Review*, *39*(12), 1695–1719. https://doi.org/10.1108/MRR-10-2015-0249

Rosenbloom, D., & Markard, J. (2020). A COVID-19 recovery for climate. *Science*, *368*(6490), 447. https://doi.org/10.1126/SCIENCE.ABC4887

Ryan, S, & O'Connor, R. (2012). *Social interaction, team tacit knowledge and transactive memory: empirical support for the agile approach*. http://ulir.ul.ie/handle/10344/2698

Ryan, Sharon, O'Connor, R., & O'Connor, R. V. (2013). Acquiring and sharing tacit knowledge in software development teams: An empirical study. *Information and Software Technology*, *55*(9), 1614–1624. https://doi.org/10.1016/j.infsof.2013.02.013

Schwab, K. (2017). *The Fourth Industrial Revolution*. Crown Publishing Group.

Shamim, S., Cang, S., Yu, H., & Li, Y. (2016). Management approaches for Industry 4.0: A human resource management perspective. *2016 IEEE Congress on Evolutionary Computation, CEC 2016*, 5309–5316. https://doi.org/10.1109/CEC.2016.7748365

Singh, M. K., Kumar, V., & Ahmad, T. (2020). Impact of Covid-19 Pandemic on Working Culture: An Exploratory Research Among Information Technology (IT) Professionalsin Bengaluru, Karnataka (India). *SSRN Electronic Journal*, *12*(5), 3176–3184. https://doi.org/10.2139/ssrn.3568830

Smola, K. W., & Sutton, C. D. (2002). Generational differences: Revisiting generational work values for the new millennium. *Journal of Organizational Behavior*, *23*(SPEC. ISS.), 363–382. https://doi.org/10.1002/job.147

Stewart, J. S., Oliver, E. G., Cravens, K. S., & Oishi, S. (2017). Managing millennials: Embracing generational differences. *Business Horizons*, *60*(1), 45–54. https://doi.org/10.1016/j.bushor.2016.08.011

Storey, M.-A., Singer, L., Cleary, B., Figueira Filho, F., & Zagalsky, A. (2014). The (R) Evolution of social media in software engineering. *Proceedings of the on Future of Software Engineering - FOSE 2014*, 100–116. https://doi.org/10.1145/2593882.2593887

Sung, T. K. (2018). Industry 4.0: A Korea perspective. *Technological Forecasting and Social Change*, *132*(October 2017), 40–45. https://doi.org/10.1016/j.techfore.2017.11.005

Teng, W., Ma, C., Pahlevansharif, S., & Turner, J. J. (2019). Graduate readiness for the employment market of the 4th industrial revolution: The development of soft employability skills. *Education and Training*, *61*(5), 590–604. https://doi.org/10.1108/ET-07-2018-0154

Thomas, K. T. (2019). Bridging social boundaries and building social connectedness: Through youth development programs. *Equality, Diversity and Inclusion*. https://doi.org/10.1108/EDI-02-2018-0019

Tolbize, A. (2008). *Generational differences in the workplace*.

Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review*, *4*(3), 356–367. https://doi.org/10.1177/1534484305278283

Usluel, Y. K., & Mazman, S. G. (2009). Adoption of Web 2.0 tools in distance education. *Procedia - Social and Behavioral Sciences*, *1*(1), 818–823. https://doi.org/10.1016/j.sbspro.2009.01.146

Van Tulder, R., Verbeke, A., & Piscitello, L. (2018). *International Business in the Information and Digital Age.* 441.

Watts, J. (2010). Team supervision of the doctorate: managing roles, relationships and contradictions. *Teaching in Higher Education*, *15*(3), 335–339. https://doi.org/10.1080/13562511003740908

Wilkesmann, M., & Wilkesmann, U. (2018). Industry 4.0 – organizing routines or innovations? *VINE Journal of Information and Knowledge Management Systems*, *48*(2), 238–254. https://doi.org/10.1108/VJIKMS-04-2017-0019

Williams, R. (2003). *Integrating Distributed Learning with just-in-context Knowledge Management*. 1(1), 45–50.

Zhang, X., Gao, Y., Yan, X., de Pablos, P. O., Sun, Y., & Cao, X. (2015). From e-learning to social-learning: Mapping development of studies on social media-supported knowledge management. *Computers in Human Behavior*, *51*, 803–811. https://doi.org/10.1016/j.chb.2014.11.084

Zhu, C., Valcke, M., & Schellens, T. (2009). *A cross-cultural study of online collaborative learning*. *3*(1), 33–46. https://doi.org/10.1108/17504970910951138

Zhuang, Y., Fong, S., & Shi, M. (2008). Knowledge-empowered automated negotiation system for e-Commerce. *Knowledge and Information Systems*, *17*(2), 167–191. https://doi.org/10.1007/s10115-007-0119-x