The “New Fit”: Skills and Competencies for The Future of Work

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Abstract:
The future of work is an emerging scholarly and managerial domain. The purpose of this paper is to propose a new theoretical model of fit of the human operator to the future of work. The new model (named Skills Fit (S-F) enables managers to properly align their workforce to new work formats. The future of work has entailed massive labor changes. However, the scope and effect of work transformation on employees’ fit in the new work context is still unclear. This is an important oversight, given the significance of new skills in the future of human work in smart manufacturing environments. Moreover, while previous research has largely focused on person-job and person-organization fit, it is unclear whether these will remain valid in new work settings. In this paper, we identify contextual characteristics of work that influence the extent to which employees experience a “New Fit” in smart work settings and propose a “Skills Fit” framework. In addition, we describe a fit gap as a manifestation of a managerial gap that organizations must address to dynamically improve their alignment to the future of work.

Keywords: Fit, future of work, skills, competencies, skills-fit, smart manufacturing.

1. INTRODUCTION

Recently the future of work has gained more scholarly, industrial and managerial attention (Balliester & Elsheikhi, 2018). The future of work involves an ongoing process in which automation, machines and artificial intelligence replace labor in tasks that workers used to perform (Autor, D. H., Levy, F., & Murnane, R. J., 2003). These changes influence traditional work arrangements, reducing the demand for labor and wages (Acemoglu & Restrepo, 2018).

This resulted in great influence on industrial and managerial practices. First, technology continues to govern how people communicate and socialize (Ray, K., & Thomas, T. A, 2019). Second, multiple work arrangements (e.g., freelancing) are increasingly dominating labor markets. For example, according to a recent survey, 53% of generation Z workers currently freelance—the highest independent workforce participation rate of any age group. This number is expected to rise to 70% by 2030 (Ozimek, A., 2019).

This rapid change has great implications on the future of human work posing new challenges. For example, multiple work arrangements, freelancing and flexible work challenge traditional boundaries of fit theories, creating a need to revisit their nature (Miller, R., 2021). While the study of smart work settings, in general, has flourished, our understanding of its contextual aspects has not. As such, applying the future of work context—the necessity to understand the future of human work in such settings, and its change over the course of different labor market and jobs—creates an opportunity to extend our understanding of how to improve firms’ alignment with human capital.

The purpose of this paper is to propose a new theoretical model of fit for the future of work into a new form of fit, we call Skills Fit (S-F) (Fig. 1).

Fig. 1. The “New Fit” (Skills-Fit): Traditional vs. Future of Work
2. THE FUTURE OF WORK

The future of work is an emerging scholarly and managerial domain (Ballister & Elsheikh, 2018; Chalutz, Ben-Gal, H., 2020). The future of work entails ongoing transformation through which automation, machines and artificial intelligence replace labor in tasks that employees used to perform (Autor, Levy, & Murnane, 2003; Autor, 2014). These evolving changes influence traditional work arrangements, shifting the demand for labor and wages (Acemoglu & Restrepo, 2018).

Automation, digitalisation and robotics have ushered a new industrial age in which machines and computers can substitute, complement and augment human workers in an increasingly wider range of activities, physical and cognitive, paving the way to the concepts of Operator 4.0 (Golan et al. 2020) and Logistics Operator 4.0 (Cimini et al. 2020). Operators of the future will be immersed in intelligent environments, with the possibility to share and receive real-time information from smart objects and will be involved in new collaboration mechanisms and social interactions with robots and artificial intelligent system (Romero et al. 2020).

The characteristics of the future of work have a great influence on the nature of organizations for several reasons. First, technology continues to direct how people and organizations interact, communicate and socialize (Ray, K., & Thomas, T. A., 2019). Emerging technologies such as artificial intelligence, data analytics, human resources analytics (Chalutz Ben-Gal, H. 2019), robotics, digital platforms, online labor markets and others are increasingly reshaping human interaction and organizational action in various domains, contributing to new forms of social exchange that are increasingly digitally based. Second, internet, social media and online labor markets play a central role in digital personal and professional communication channels (Acemoglu & Restrepo, 2018; Card & Nelson, 2019).

3. THE PROPOSED “NEW FIT”: “SKILLS FIT” MODEL

The boundaries of traditional work and organizational forms in which tasks and jobs are clearly defined have served as convenient settings to explore worker and workplace fit. Moreover, in the new work, psychological contracts between employees and their organizations need to be revisited to expand their boundaries and acclimate them to the context of the future of work (Knapp, Diehl, & Dougan, 2020; Lu, Y., Adrados, J. S., Chand, S., & Wang, L., 2021).

Because the future of work entails complex technological, managerial and work arrangements (i.e., freelancing, flexible and remote work), individuals are likely to maintain several work-related exchange relationships that are not necessarily confined within the boundaries of a single organization nor characterized by a traditional employment relationship. Due to the dynamic nature of fit, it changes and evolves over time, posing new challenges to firms and employees. Nonetheless, the nature of fit in the new work context remains unclear because theoretical frameworks were sparse until only recently. Moreover, theoretical and empirical evidence on fit in new forms of work context are limited. Thus, due to these changes, fit transforms and evolves from the traditional P-J and P-O Fit to the new fit at work and that give rise to the proposed model of S-F (Fig. 2).

Consider a practical example demonstrated in Fig. 2. We demonstrate three jobs that exhibit the three types of fit outlined in this paper. The first job is represented by an employee who is employed in a private start-up company as a programmer. The work in the company is traditional in the sense that it demonstrates a shallow and narrow scope of the new work features (i.e., physical work, traditional management and HR practices; high social exchange). This employee was recruited on the basis of a detailed job description, according to a set of required know-how, abilities and experience. This employee had to present a formal educational background acquired via a formal institution (i.e., university or college). Therefore, this employee should demonstrate P-J and P-O fit.

The second job is represented by an employee who is employed in a large public service company as a project manager. The work in the company is traditional in the sense that it demonstrates a shallow and narrow scope of the new work features. This employee was recruited on the basis of a detailed job description, according to a set of required know-how, abilities and experience. This employee had to present a formal educational background acquired via a formal institution (i.e., university or college). Therefore, this employee should demonstrate P-J and P-O fit.

The third job is represented by an individual who is working simultaneously as a freelancer on two projects: Project A as a digital adoption creator and Project B as a bug fixer. The work environment consists of a high and wide scope of the new work features (i.e., remote and flexible work, multiple contracts and low social exchange). This individual was recruited via online labor platforms (e.g., Fiverr, UpWork) utilizing no job description, and no specific know-how, abilities or experience were required to apply. However, this individual was required to present a set of skills and competencies (e.g., Python, data visualization, technology investigation). No formal education was required (i.e., a university or college degree). However, relevant self-acquired courses were preferred (e.g., Coursera, online course). Therefore, this employee should demonstrate the “new fit”, i.e., S-F.

As this example illustrates, work feature variations in traditional compared to new work settings affect employee fit experiences in terms of not only the absolute amount of potential fit that is generated but also the number of types of fit that are experienced. We argue that it captures the nuances associated with the changing nature of work more precisely than P-J and P-O fit do.
The ways that employees experience new work features ranges from low to high, and at least some studies have suggested that this may be more impactful according to the extent that it engages more technology, remote and flexible work, and ad-hoc tasks (i.e., greater scope). Specifically, some work theorists claim that the skills a person has represent knowledge crucial to task execution in the disrupted work environment (Autor, 2014; Sousa and Wilks, 2018).

A recent study of more than 800 HR leaders shows that although many expect their organizations to focus on growth in 2021, cost optimization features more widely than it did previously—and improving operational excellence remains paramount. To support these and other business priorities, 68% of HR leaders say they will be building critical skills and competencies, an objective that has topped the priorities of HR leaders for three consecutive years (Wiles, 2020).

Research on skills suggest that skills development is perceived as a strategic management objective for coping with the changing technology and business environment (Sousa and Wilks, 2018) specifically in the context of the future of work (Wiles, 2020). In a post-pandemic volatile market, there is a growing need for the complex and technical, which requires flexibility and agility (Sousa & Wilks, 2018; Wiles, 2020). Such complexity and uncertainty, partly due to the globalization and accelerated rhythms of technological change, result in a growing demand for human talent equipped with specific, contextual and sustainable skills associated with overcoming these challenges (Gerstein and Friedman, 2016).

Accordingly, workers’ fit transforms in relation to both the depth and scope of the new work features. At work, then, the more noticeable the features of new work, the more employees experience the “new fit”, i.e. skills-fit. This is especially evident when worker experience remote and digital work to the extent that their skills are critical for task performance (Wiles, 2020), and when worker performs freelance work in online labor markets, or technology enabled tasks. In short, examining fit in the new work environment should be more nuanced in terms both the form of potential fit to the specificity of the task, and the overall amount of potential fit to the work context, based on the types of skills and competencies required and the depth of new normal work features.

Based on the feature-based depth of the new work environments that workers experience, there should be a difference in the fit experienced, both in terms of the amount and forms of fit (Chalutz Ben-Gal, 2020).

3.1 Depth and scope of effects of future work features on potential fit

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4. THE FUTURE OF HUMAN WORK IN SMART WORK ENVIRONMENT

Smart work environment is not autonomous. On the contrary: humans are still the most important resource in smart work environments. There are activities that computers, AI and automation perform better than humans, but in the foreseeable future, there will always be tasks that humans do better or cheaper. It has been acknowledged that rapid advancement of smart machines with empathy skills will enable human-machine teams that can maximize human flexibility and wellness at work while maintaining the required manufacturing productivity and stability (Lu et al., 2021). Furthermore, the future will require human operators to realize how to best interact with the smart production (or service) system (Hernandez-de-Menendez et al., 2020; Jwo, et al. 2021).

Agility and job mobility and dynamic careers are expected to require from future workers the ability to move quickly from one smart environment to another (Salvetti, & Bertagni, 2020). Agile mind and agility are the hallmarks of future work (Hohl et al. 2018). However, some similarity between smart work environments may facilitate the adjustment and learning processes of such transitions (Dawson et al. 2021). Thus, it is likely that a position requirement for a certain smart work environment would include previous experience in a smart work environment.
The above discussion leads to the identification of the S-F main sets of skills (Lu, Yet al. 2021). We propose that these skills are characterized by three main skill types:

**Adjustment skills** for dynamic career of moving between projects, between positions, and between organizations. Workers with these skills are fast learners, innovators, adjust quickly to changes, and have high social skills. This set of skills which facilitate movements between organizations, sometimes works against the organizational bounding skills (included in the P-O set). In some cases, the same could be said about the adjustment skills in relation to jobs and P-J set of skills.

**Accumulated mobile skills** for frequent job transformation. These are accumulated skills facilitating the integration into new teams, new projects, or new organizations. For example: accumulated people and communication skills, accumulated experience in work processes and work management; and accumulated work-related skills, such as deep acquaintance with office tools (e.g. MS-Office or Google docs). This feature requires flexible and dynamic mind, rapid learning ability, creativity, and changes the focus of the required type of communications skills, computer literacy and team working skills.

**Specialization skills.** These skills could be divided to (1) backbone specialty skills, (2) cutting edge technology. For example, backbone specialty of computer vision, specializing in cutting edge “gesture detection”, or cutting edge “affection detection” (Lu et al. 2021).

5. CONCLUSIONS

This paper identifies and describes a gap in the traditional skills model when compared with new jobs related to the high-technology industry. The paper proposes a new skill model: Skills-Fit (S-F) that closes the gap, and enables management to align their workforce to the future of work. The nature of future of work requires three types of skills: (1) adjustment skills, (2) accumulated mobile skills, and (3) specialization skills.

Adjustment skills reflect the degree by which the worker is able to adjust to dynamic environments, and changing projects. Workers with these skills are fast learners, innovators, and have the ability to frequently change projects and teams as needed.

The accumulated mobile skills are related to core skills that the workers develop through their career, and are essential for quick integration into new projects, new teams, or new organizations. These skills include: accumulated people and communication skills, accumulated experience in work processes and work management; and accumulated work-related skills, such as deep acquaintance with office tools (e.g. MS-Office or Google docs).

The specialization skills include a sound basis for a cutting-edge technology. For example, sound basis in data science and machine learning (ML) would significantly facilitate the learning process for developing a specific machine learning application. These professional skills are related to a dynamically updated set of new technologies as discussed in section 3.

Suggested future research may investigate the following questions and issues:

- How can organizations measure Skills-Fit level in the future and develop a valid and reliable measurement scale?
- What critical skills and competencies are required for jobs in the volatile future work environment?
- Are sustainable skills interchangeable across specific jobs and/or work contexts?
- How can organizations adopt the Skills-Fit construct and integrate it with existing managerial and engineering related processes?
- What are the key features of a “Skills-Fit-Index” developed for the purpose of improved fit and task-specific performance prediction based on predetermined features?

REFERENCES

Acemoglu, D., & Restrepo, P. (2018). The race between man and machine: Implications of technology for growth, factor shares, and employment. *American Economic Review*, 108(6), 1488-1542.

Autor, D. H., Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics*, 118(4), 1279-1333.

Autor, D. (2014). Polanyi's paradox and the shape of employment growth (Vol. 20485). Cambridge, MA: *National Bureau of Economic Research.*

Ballister, T. and Elsheikh, A. (2018). The future of work a literature review (No. 994987493402676). *International Labor Organization.*

Card, D., & Nelson, C. (2019). How automation and digital disruption are shaping the workforce of the future. *Strategic HR Review*, 18 (6), 242-245.

Chalutz Ben-Gal, H. (2020). Fit in the Future of Work 2050: Towards a Person-Skills Fit Perspective. Available at SSRN: https://ssrn.com/abstract=3657080 or http://dx.doi.org/10.2139/ssrn.3657080.

Chalutz, Ben-Gal, H. (2019). An ROI-based review of HR analytics: practical implementation tools. *Personnel Review*. 48(6), 1429-1448.

Cimini, C., Lagorio, A., Romero, D., Cavalieri, S., & Stahre, J. (2020). Smart Logistics and The Logistics Operator 4.0. IFAC-PapersOnLine, 53(2), 10615-10620.

Dawson, N., Williams, M. A., & Rizoiu, M. A. (2021). Skill-driven recommendations for job transition pathways. Plos one, 16(8), e0254722.

Gerstein, M., & Friedman, H. H. (2016). Rethinking higher education: Focusing on skills and competencies. *Psychosociological Issues in Human Resource Management*, 4(2), 104-121.
Golan, M., Cohen, Y., & Singer, G. (2020). A framework for operator–workstation interaction in Industry 4.0. International Journal of Production Research, 58(8), 2421-2432.

Hernandez-de-Menendez, M., Díaz, C. A. E., & Morales-Menendez, R. (2020). Engineering education for smart 4.0 technology: a review. International Journal on Interactive Design and Manufacturing (IJIDeM), 14(3), 789-803.

Hohl, P., Klünder, J., van Bennekum, A., Lockard, R., Gifford, J., Münch, J., ... & Schneider, K. (2018). Back to the future: origins and directions of the “Agile Manifesto”–views of the originators. Journal of Software Engineering Research and Development, 6(1), 1-27.

Jwo, J. S., Lin, C. S., & Lee, C. H. (2021). Smart technology–driven aspects for human-in-the-loop smart manufacturing. The International Journal of Advanced Manufacturing Technology, 114(5), 1741-1752.

Knapp, J. R., Diehl, M. R., & Dougan, W. (2020). Towards a social-cognitive theory of multiple psychological contracts. European Journal of Work and Organizational Psychology, 29 (2), 200-214.

Lu, Y., Adrados, J. S., Chand, S., & Wang, L. (2021). Man is not a machine–anthropocentric human-machine symbiosis for ultra-flexible smart manufacturing.

Miller, R., 2021, June 11. Tech companies are looking at more flexible work models when offices reopen. Retrieved from https://techcrunch.com/2021/06/11/tech-companies-are-looking-at-more-flexible-work-models-when-offices-reopen/.

Ozimek, A., 2019. October 3, Freelancing and the Economy in 2019, Retrieved from https://www.upwork.com/i/freelancing-in-america/2019.

Ray, K., and Thomas, T. A. (2019). Online outsourcing and the future of work. Journal of Global Responsibility, 10 (3), 226-238.

Romero D, Stahre J, Taisch M. (2020). The Operator 4.0: Towards socially sustainable factories of the future, Computers & Industrial Engineering, 139, 106128, https://doi.org/10.1016/j.cie.2019.106128.

Salvetti, F., & Bertagni, B. (2020). Leadership 5.0: An Agile Mindset for a Digital Future. Int. J. Adv. Corp. Learn., 13(2), 57-66.

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.

Wiles, J. (2020). May, 22. Build the workforce you need Post-COVID-19. https://www.gartner.com/smarterwithgartner/build-the-workforce-you-need-post-covid-19/.

Yu, R., Burke, M., & Raad, N. (2019). Exploring impact of future flexible working model evolution on urban environment, economy and planning. Journal of Urban Management, 8(3), 447-457