

Extended Workforce Ecosystems: Intelligent Bots and Freelancers with Employee ID Cards Are Changing the Workforce Paradigm

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Abstract

In today's digital age, organizations increasingly leverage an extended workforce ecosystem incorporating freelancers and even intelligent bots with employee ID cards to bolster their operations. This article examines the advantages and challenges of these ecosystems, offering a roadmap for organizations to effectively navigate the shift towards hybrid and fully remote working models. The successful realization of this transition heavily relies on the shared attitude towards education and learning within the extended workforce ecosystem. Drawing upon data obtained from the observational study MML-TGI, the aim of which is to assess and interpret the adoption levels of educational content and identify socio-demographic segments of consumers suitable for targeted educational content, this article presents insights into the current population attitudes towards education and learning, which hold crucial implications for designing employee training programs. The primary objective of this article is to provide organizations with comprehensive and research-based knowledge, enabling them to transition from reactive ad hoc remote work arrangements to a more sustainable and effective hybrid work approach. By acting as a bridge to the future, this study facilitates the transformation towards a strategic and intentional approach to hybrid working models that align with the needs of both employees and the organization.

Keywords

digital competency framework, extended workforce, hybrid work models, intelligent bots, remote work, strategic remote work arrangements

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1 Introduction

The concept of the extended workforce is gaining prominence in today's digital age due to various factors. The rise of the gig economy, the evolving nature of work, and the increasing demand for flexibility are just a few areas that are worth noticing. The emergence of new technologies, such as automation, artificial intelligence, and other digital tools, has facilitated these changes. Organisations can optimise their operations and enhance efficiency by incorporating intelligent bots, digital workers, and similar technologies into the extended workforce. Consequently, effectively managing the extended workforce

becomes critical as it enables organisations to tap into a broader talent pool, achieve greater efficiency, and respond swiftly to market demands, resulting in a competitive advantage.

1.1 The gig economy

The rise of the gig economy has no historical parallel. It has developed into an economy with a labour market characterized by the prevalence of short-term contracts or freelance work, often facilitated by digital platforms. The gig economy has created new opportunities for individuals to work as independent contractors, freelancers, or consultants and for businesses to hire talented individuals with expertise beyond their regular employees. In an attempt to focus on the diversity of work arrangements and contexts within the gig economy, Kuhn et al. argue that a more nuanced understanding of HRM practices is needed. It can be achieved by identifying common themes across different types of gig work (Kuhn et al., 2021). Enhanced responsibility of team leaders related to novel employment arrangements has been in the focus of researchers recently. Typically, they examine the intersection between traditional human resource management and the novel employment arrangements of the expanding gig economy (Wong, 2020). While there is substantial multidisciplinary literature on the digital platform labour phenomenon, it has been largely centered on the experiences of gig workers. As digital labour platforms continue to grow and specialize, more managers, executives, and human resource practitioners will need to make decisions about whether and how to utilize gig workers (Kuhn et al., 2021). In their research, Ray et al. argue that creative business models enabled by a modern marketplace technology platform, along with appropriate government rules and regulations, will dictate how the Gig Economy of the future develops (Ray et al., 2021). In their research, they focus on the home improvement sector demonstrating how gig workers could be enabled as entrepreneurs to run their gigs with new business models (Ray et al., 2021).

1.2 Adapting to a Changing Work Environment

In the process of adapting to a changing work environment, we have to take into consideration the role of the extended workforce and considerations for its successful management. In today's fast-paced business environment, organizations need to be agile and responsive to a range of factors, from shifting market demands to new technological developments and unforeseen disruptions. One solution to this *need for flexibility* is the *extended workforce*, which enables organizations to scale their workforce up or down as required without the fixed costs and long-term commitments associated with hiring regular employees.

Upon exploring the concept of the extended workforce, it becomes apparent that the nature of the traditional workforce is undergoing significant changes. The extended workforce expands the scope of individuals involved in organizational activities beyond the conventional employee paradigm. This shift acknowledges that the composition of the workforce now includes diverse entities, such as intelligent chatbots and freelancers, who play integral roles within companies and possess employee identification cards to access company systems. This evolution reflects the dynamic nature of modern work

arrangements and the expanding range of contributors working towards organizational objectives.

In their research, Altman et al. highlight that corporate diversity, equity, and inclusion practices and goals tend to be primarily focused on internal aspects and often do not extend to encompass external contributors. Surprisingly, their global executive survey reveals that over 90% of respondents acknowledge the presence of external contributors within their workforce. In fact, a significant number of organizations rely on external contributors to perform at least 30% of the work (Altman et al., 2023b). This finding underscores the importance of recognizing and incorporating the contributions of external individuals in fostering a comprehensive and inclusive approach to diversity, equity, and inclusion within organizations.

In this context, the extended workforce has emerged as a key tool for enabling organizations to adapt to unpredictable changing circumstances, remain competitive, and pursue new opportunities. According to the research conducted by Anna Pawlowska (2019), the decision of employees to change employers is not correlated with their employability market orientation. Instead, low pay and job insecurity, resulting from the lack of long-term contracts, are the primary reasons for changing employers. It may be due to a passive attitude and a preference for a relational psychological contract with the employer. As a result, employees may need help to take advantage of new opportunities offered by modern technologies in the world of work. Individuals with higher levels of cognitive flexibility are better positioned to navigate these challenges (Pawlowska, 2019). The results of Pawlowska's study illustrate that from workers' perspective, flexibility in work relationships is a key positive element of platform-enabled work. In a rapidly changing business environment, organizations need to be flexible and agile to respond to market demands, technological changes, and other disruptions. The extended workforce provides organizations with the flexibility to scale up or down their workforce as needed without the fixed costs and commitments of hiring regular employees.

Freelancers with employee identification cards

Freelancers with employee identification cards are an intriguing aspect of the evolving workforce landscape. Elizabeth J. Altman, an assistant professor of management at the Manning School of Business, University of Massachusetts Lowell, and Steven Hatfield, a principal with Deloitte Consulting LLP serving as its global Future of Work leader, shed light on this phenomenon in their contribution titled "Collaboration, Communication, and Virtual Innovation: Orchestrating Workforce Ecosystems." Their survey and research report, presented at MIT Technology Review's EmTech Next event in 2022, delved into the intricate dynamics of modern work arrangements (MIT Sloan Management Review, 2022).

Altman and Hatfield's research aimed to explore the implications and potential benefits of integrating freelancers into the workforce ecosystem. By examining the use of employee identification cards for freelancers, they sought to understand how organizations could effectively leverage these individuals while ensuring seamless collaboration, communication, and innovation within virtual work environments. Their findings shed light on the emergence of *a more inclusive workforce ecosystem, where freelancers are seamlessly*

integrated into company systems and processes. Providing employee identification cards to freelancers signifies a deeper level of integration and trust, enabling them to access company resources and contribute to projects as valued team members (MIT Sloan Management Review, 2022).

Altman and Hatfield's research contributes to our understanding of how organizations are adapting to the changing nature of work, embracing flexible talent pools, and fostering collaboration across a diverse range of contributors. Their work highlights the importance of effectively managing and orchestrating workforce ecosystems in an increasingly digital and dynamic business landscape.

Intelligent bots

The inclusion of intelligent bots with employee identification cards presents an even more complex and thought-provoking aspect of the evolving workforce landscape. While the concept may seem unconventional, advancements in artificial intelligence (AI) and automation have led to the emergence of intelligent bots that can perform various tasks traditionally carried out by human employees.

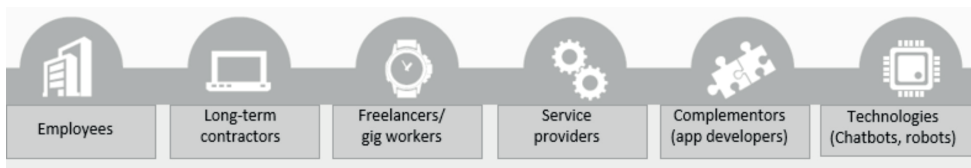
Intelligent bots equipped with employee ID cards signify a paradigm shift in how organizations conceptualize and integrate non-human entities into their workforce. These bots are designed to interact with company systems, access sensitive information, and perform assigned tasks autonomously. The challenge lies in effectively managing and integrating intelligent bots into the existing organizational structure. Ensuring that these bots adhere to established protocols, security measures, and ethical guidelines becomes crucial. It requires designing robust authentication mechanisms, monitoring their activities, and establishing clear boundaries to avoid potential risks and ensure accountability. Addressing the complexities associated with intelligent bots in the workforce requires collaboration between experts in fields such as AI, cybersecurity, and organizational management. It involves exploring the legal and ethical implications of assigning employee identification to non-human entities and establishing guidelines for their responsible use.

While the integration of intelligent bots with employee ID cards presents unique challenges, it also opens up new opportunities for efficiency, scalability, and innovation. Organizations can leverage the capabilities of these bots to streamline processes, automate routine tasks, and enhance overall productivity.

The future of the extended workforce may involve a harmonious blend of human employees, freelancers, and intelligent bots, working together seamlessly within the organizational framework. As the technology continues to advance, it will be imperative to adopt policies and practices to effectively harness the potential of intelligent bots while ensuring ethical and responsible integration into the workforce ecosystem.

Figure 1 below visually represents the extended workforce, showcasing the diverse entities contributing to organizational operations.

Figure 1: Inclusive Workforce Ecosystem



Source: own elaboration based on (Altman et al., 2023)

Defining an inclusive workforce ecosystem

In 2021, MIT Sloan Management Review and Deloitte provided a definition of workforce ecosystems, expanding the traditional understanding beyond full- and part-time employees to include a broader range of individuals and partner organizations. According to their definition, a workforce ecosystem is a structure that emphasizes value creation for an organization. It encompasses various actors, both internal and external to the organization, who work towards individual and collective goals. Additionally, it acknowledges the presence of interdependencies and complementarities among the participants within the ecosystem (Altman et al., 2023a).

Longitudinal careers

The old system of early retirement is quickly becoming obsolete. Instead, the idea of a career spanning five or six decades signifies a considerable duration of professional engagement. This extended timeframe reflects the evolving nature of work and the recognition that individuals may engage in various roles and pursuits over the course of their working lives. Such an extended career trajectory allows for multiple opportunities to pursue education, leisure activities, caregiving responsibilities, and sharing knowledge and experiences across the diverse generations present in today's workplace (Wittenberg-Cox, 2020). Embracing the concept of longitudinal careers encourages a broader personal and professional development perspective, fostering continuous growth and adaptability throughout an individual's working journey.

Changing nature of work

Another issue to consider is the changing nature of work. Work is no longer confined to a physical workplace or a traditional employment relationship. The extended workforce allows individuals to work from anywhere, anytime, and in a variety of roles and capacities. This new paradigm of work requires new approaches to management, communication, and collaboration, as well as new legal and regulatory frameworks to ensure fairness, safety, and compliance.

- *In management*, organizations need to find ways to effectively manage a dispersed and diverse workforce with different levels of experience, skills, and expectations.
- *In communication*, organizations must find ways to ensure effective communication and coordination among team members working remotely and in different time zones.
- *In collaboration*, organizations need to find ways to enable effective collaboration among team members, contractors, and other stakeholders, using technologies and tools that enable virtual teamwork and project management.
- *To ensure fairness, safety, and compliance*, organizations must establish clear policies and procedures for hiring, onboarding, training, and managing their extended workforce and ensure compliance with labour laws, data protection regulations, and other relevant standards. For example, they can use background checks, reference checks, and other screening procedures to ensure that workers have the necessary qualifications, skills, and credentials for the job and provide training on safety procedures, data privacy, and other relevant topics.

Managing dispersed teams and remote work can present challenges related to employee well-being and work-life balance (Appel-Meulenbroek et al., 2022). There are important points to consider from *blurring the lines between work and personal life*, leading to unsocial working hours and employee burnout. Along with these are onboarding challenges, barriers in the virtual environment, structural challenges, and new team roles such as change manager or chief officer of happiness (Vuchkovski et al., 2023). Apart from technology adoption and the need to master new IT skills, there is a growing recognition that digital transformational leadership and organizational agility play crucial roles in driving successful digital transformation initiatives. Digital transformational leaders, with their visionary mindset and ability to drive change, foster an environment of agility within the organization. On the other hand, an agile organization, characterized by flexible structures, empowered teams, and a culture of innovation, provides a conducive context for digital transformational leadership to thrive (AlNuaimi et al., 2022; Ly, 2023).

Last but not least, in harmony with the latest developments in decision-making and HR practices, it is essential to incorporate design thinking principles into these various aspects of the workforce. By doing so, organizations can foster innovation, collaboration, and employee engagement and create a more empathetic and user-centred work environment that addresses the unique needs and challenges of their workforce. This approach encourages creative problem-solving, enhances the employee experience, and promotes a culture of continuous improvement, ultimately driving organizational success in an ever-evolving landscape. Contemplating design thinking, Tim Brown, the Executive Chair of the international design consulting firm IDEO, wrote: "*Leaders now look to innovation as a principal source of differentiation and competitive advantage; they would do well to incorporate design thinking into all phases of the process*".¹

¹ Brown, T. (2020), p. 2. *Design Thinking*. In *On Design Thinking* (1st edition, p. 167). Harvard Business School Publishing Corporation.

The situation is challenging for team leaders and managers on one side and team members on the other. Managers may find it more difficult to recognize signs of burnout and mental health issues in remote workers, which can lead to more serious consequences if not addressed.

The alarming increase in mental health issues in the workplace necessitates an informed response from managers and organizations, as emphasized in the article "Well-Being Intelligence: A Skill Set for the New World of Work" published in the MIT Sloan Management Review (Bhatti & Roulet, 2023). Many research studies have highlighted a focus on well-being (Shahriar et al., 2022; Bartmann et al., 2023; (Karakhan et al., 2023). However, Bhatti and Roulet propose a new approach in the form of the concept of well-being intelligence. "*We propose the concept of well-being intelligence for managers as a skill set and tool to understand and improve their own and employees' well-being. As workplace challenges increase, well-being intelligence is becoming an essential leadership skill. Effective managers must be able to detect when others are struggling with well-being and know when and how to offer support*".² To address well-being in remote workplaces, organizations can implement initiatives such as reshaping their culture and providing direct well-being benefits, including offering benefits such as meditation or well-being apps and providing access to counselling. One effective approach is providing a mobile app designed to support employee well-being (Bhatti & Roulet, 2023). Considering possible features of a specifically targeted mobile app designed to help with mental health issues, based on their experience, the authors of this article suggest areas of concern which should be addressed. A mobile app aimed at mitigating the negative effects of health issues in connection with remote work should ideally include features such as:

- Stress management tools
- Guided meditation sessions
- Exercise and wellness tips
- Sleep tracking and advice
- Access to counselling services
- Reminders to take breaks and disconnect from work

Additionally, it could provide resources for setting boundaries between work and personal life, as well as for maintaining social connections and combating loneliness. The app should also be user-friendly and easily accessible on different devices with various mobile operating systems. Further, remote workers may *feel isolated and disconnected* from colleagues, team leaders and the organization, leading to feelings of loneliness and decreased motivation.

² Bhatti, K., & Roulet, T. (2023). *Well-Being Intelligence: A Skill Set for the New World of Work*. MIT Sloan Management Review. <https://sloanreview.mit.edu/article/well-being-intelligence-a-skill-set-for-the-new-world-of-work/>

There are some specific signs or early manifestations of reduced motivation that a manager should be trained to spot:

- Decreased productivity or missed deadlines
- Lack of enthusiasm or interest in work
- Avoiding responsibilities or procrastinating on tasks
- Reduced quality of work or attention to detail
- Poor attendance or tardiness
- Increased irritability or negativity towards colleagues or the organization
- Lack of initiative or contribution to team projects

To recognize these early signs, managers should maintain regular communication with their remote team members and monitor their performance closely, showing a higher level of interest in their problems and any potential requests. It's important to have open and honest conversations about any challenges or concerns that may be affecting motivation and well-being. Regular check-ins, feedback, and recognition can also help prevent decreased motivation from becoming a larger issue. These check-ins can help managers stay informed about their team members' work, provide support and guidance, and address any issues or challenges in a timely manner. By maintaining open and frequent communication, managers can also show their team members that they are valued and appreciated, which can help boost motivation and prevent larger issues from arising.

There may also be *logistical challenges* in providing remote workers with the necessary equipment and resources to perform their duties effectively. In their study, Sull et al. identify the most crucial types of equipment helping remote workers to be efficient in their work. Organization should provide the necessary hardware, Internet connection support, and communication tool. In their research, when asked what helped their transition to remote work, 45% of all respondents mentioned company-provided or subsidized technology, including hardware, collaboration platforms like Zoom and Microsoft Teams, high-bandwidth home Wi-Fi, or office furniture (Sull et al., 2020).

New technologies have brought about significant changes to how work is performed and paved the way for new forms of employment relationships, including the extended workforce.

A well-planned review article by Morrison-Smith and Ruiz addresses this issue through 255 studies focusing on the use of technology in the workplace. Along with physical factors, the authors address cognitive, social and emotional challenges faced by leaders and members of virtual teams. The added value of this study lies in its structural approach to the analysed topic. The authors collated the emerging challenges into five categories: geographical distance, temporal distance, perceived distance, the configuration of dispersed teams, and diversity of workers (Morrison-Smith & Ruiz, 2020).

Collaboration between different groups of workers, such as freelancers and full-time workers, can be successful if managed effectively. One potential challenge is ensuring that all workers are aligned with the company's goals and values and have a shared understanding of their roles and responsibilities. Effective communication and clear expectations can help to address these challenges.

The attitude towards AI-driven co-workers may vary among different workers, depending on their age, experience, and job roles. Some workers may view AI-driven tools as helpful tools that can improve productivity and efficiency, while others may feel threatened by the potential for automation to replace human workers. To successfully integrate AI-driven tools, involving workers in the implementation process and providing training and support is essential to help them develop the skills they need to work effectively with these tools.

In summary, the concept of the extended workforce is becoming increasingly important in today's digital age due to the rise of the gig economy, the need for flexibility, the emergence of new technologies, and the changing nature of work. Organizations that can effectively manage their extended workforce can gain a competitive advantage by tapping into a wider talent pool, achieving greater efficiency, and responding more quickly to market demands.

1.3 Upskilling and Newskilling the Extended Workforce: Addressing Challenges and Unlocking Benefits for Organizations

The question of how organizations can upskill the future workforce is critical in today's rapidly changing landscape. With technological advancements, shifting job requirements, and evolving skill sets, organizations face the challenge of ensuring that their workforce possesses the necessary competencies to thrive in the future. This question is at the forefront of interest for many business leaders (Forbes, 2023). Academicians also examine this question from various perspectives, e.g., agile environment and freelancer-comprised teams (Ivan et al., 2019).

Training and development of the extended workforce ecosystem is one of the crucial elements of the success of organizations. It ensures that all workers, including those in the extended workforce, have the necessary skills and knowledge to perform their roles effectively. It also helps to promote employee engagement, retention, and career growth, which are essential for the success of any organization. A multitude of studies have focused on examining the challenges associated with technology adoption and integration. Some researchers have directed their attention towards the concept of "collective flexibility," which refers to the collective right of workers to personalize various aspects of their work. It includes the ability to customize their work schedule, workplace, workload, boundaries, connectivity, and employment mode in collaboration with their employer (Kossek & Kelliher, 2023).

Organizations may face challenges in funding the education and training of their extended workforce, including freelancers and contractors, as they may have a different level of

commitment to the organization than regular employees. However, organizations can consider different options to address this issue, such as offering online training courses that are accessible to all members of the extended workforce, providing incentives for completing training programmes or partnering with educational institutions to offer subsidized or discounted training programmes to their extended workforce. Additionally, organizations can consider the return on investment of training and development programs for their extended workforce, as it can lead to increased productivity, a better quality of work, and higher retention rates.

Upskilling and reskilling of the extended workforce are essential for the success of organizations in today's rapidly changing business environment. The justification for financial investment in training leads to creating preconditions that companies/ organizations will have better preconditions:

- *To stay competitive:* As new technologies and processes emerge, organizations must ensure that their extended workforce has the necessary skills and knowledge to remain competitive and adapt to changing market demands.
- *To enhance productivity:* Upskilling and reskilling can improve the productivity of the extended workforce by equipping them with new tools and techniques to perform their jobs more efficiently.
- *To attract and retain talent:* By investing in the development of the extended workforce, organizations can attract and retain top talent who value opportunities for growth and development.
- *To increase job satisfaction:* When employees feel that they are developing new skills and knowledge, they are more likely to be engaged and satisfied with their jobs leading to increased retention and productivity.
- *To future-proof the workforce:* By investing in the development of the extended workforce, organizations can ensure that they are prepared for future technological and market changes and have a workforce with the necessary skills and knowledge to thrive in a rapidly changing business environment.

However, as mentioned earlier, funding the education of freelancers can be a challenge. Organizations can consider offering training and development opportunities as part of their compensation package or negotiating training as a part of the contract. They can also explore the use of online learning platforms and other cost-effective training methods to provide education and development opportunities to their extended workforce.

It is important to take into consideration the fact that different age groups may have varying attitudes towards education, which can impact the success of managing an extended workforce. Younger workers, such as millennials and Generation Z, may be more receptive to learning new technologies or skills as they have grown up with rapid technological advancements and a focus on lifelong learning. They may also value career

growth and development opportunities, making them more likely to engage in training and development programs.

On the other hand, older workers, such as Baby Boomers and Generation X, may have more experience but may be less open to change and may prefer traditional learning methods. They may also value stability and job security over career growth and development opportunities, which can impact their willingness to engage in training programs.

It is essential to understand these differences and tailor training and development programmes accordingly to manage an extended workforce with diverse age groups effectively. Organizations can offer a mix of traditional and modern learning methods to accommodate different learning styles and preferences. Providing incentives for completing training programmes can also increase engagement and motivation among different age groups.

The Methodology part of this article will further explore this topic and provide insights on how organizations can effectively manage their extended workforce with different age groups taking into account their attitude to education in broad terms.

2 Methodology

In this study, the authors employ a cross-sectional analysis, an observational study designed to analyse entire segments of a population within a specified period. They utilize the sign scheme and chi-square as analytical tools.

The sign scheme is a visual identification method used to establish associations between row and column categories within a two-dimensional contingency table. It employs the use of + and - signs to indicate the level of significance and direction of interaction, based on residuals derived from the independence hypothesis. The sign scheme is designed in the shape and size of a table, with the signs positioned within the corresponding fields to represent their respective values. The sign scheme is of Czech origin; the authors are Linhart and Šafář, and the scheme was modified by Řehák (Nešpor, 2023).

The research data is sourced from MML-TGI research, a longitudinal study conducted since 1996 by a prestigious research agency Median, s.r.o., focusing on consumer and media behaviour and lifestyle issues and involving 15,000 respondents in the Czech Republic. The study covers over 3,000 brands and 300 product types, as well as data on media consumption and internet usage, and is supplemented with lifestyle questions. Data has been collected using the CAWI (Computer Assisted Web Interview) method since 2021.

The aim of the cross-sectional analysis is to assess and interpret **the adoption levels of educational content** and identify socio-demographic segments of consumers who are suitable for targeted educational content delivered through relevant formats of instruction. The study utilized annual data from 2021, and the authors analysed the data to gain insights into adopting educational content.

Considering the current legislative debate, it would be useful to know the attitude of the age cohort 60+ to education content adoption, especially in the context of the proposed increase in the retirement age in the Czech Republic. This information can help organisations and educational institutions tailor their training and development programs to meet this age group's needs and preferences and encourage them to continue learning and acquiring new skills beyond retirement. Understanding the attitudes of this demographic towards educational content adoption can also help policymakers and government agencies to design policies and programmes that support lifelong learning and ensure that older workers have the necessary skills and knowledge to remain productive and engaged in the workforce.

The MML-TGI research includes various statements that relate to learning and education, and among them, Statement No. 341 is suitable for assessing consumer attitudes towards education content adoption. It reads as follows:

**341 Above all, I would like to achieve
as much knowledge and learning as possible in my life.**

This statement expresses an individual's desire to acquire new knowledge and learn as much as possible in life. Understanding consumer attitudes towards education is crucial for formulating relevant educational content and designing training programs that effectively target specific consumer segments. Therefore, Statement No. 341 can provide valuable insights for organizations seeking to develop educational content and programs that meet the needs and interests of their target audience.

From an educational perspective, it is assumed that the adoption levels of educational content inherently influence levels of insight and knowledge. Therefore, consumers with a positive attitude towards acquiring knowledge and learning, in general, are more likely to have a positive attitude towards developing new knowledge and skills provided by their employers. It is particularly relevant for the success of hybrid work models, especially remote working modes, including the educational needs of the extended workforce.

Statement No. 341 and the reduced form data (R) were collected in the form of YES/NEITHER YES NOR NO/NO responses. The authors determined that only YES responses represent a positive attitude towards education and learning. It's important to note that knowledge acquisition is an active cognitive process. Respondents who answered NEITHER YES NOR NO do not express a proactive attitude towards acquiring knowledge and cognition. In fact, this ambivalent attitude leads to the same outcome as rejecting education.

The research question specifies the research objective: to identify the socio-demographic groups with a positive attitude towards educational content adoption and those with a negative attitude towards it.

RESEARCH QUESTION: Which socio-demographic groups exhibit a positive attitude towards adopting educational content, and which groups exhibit a negative attitude towards it?

The authors formulated the hypothesis, which corresponds to one-sided alternative hypothesis when testing the deviation of the observed value ($E - \text{expected}$) in the corresponding cell of the contingency table from the expected value ($O - \text{observed}$), assuming the independence of the variables listed in the contingency table – $H_0: E = O$; $H_1: O > E$.

To evaluate the hypothesis and statistical interpretation, the author worked with the following methods and tools in the cross-sectional analysis: chi-square test, sign scheme, affinity indices and frequency plots. Table 1 below states the evaluation of the hypothesis.

Table 1: Evaluation of the hypothesis

Hypothesis	Hypothesis formulation	Hypothesis testing result
H1	The demographic segments of the 60–69 and 70–79 age cohorts are more receptive to education and learning whole population disregarding the age.	The hypothesis was verified.

Hypothesis H1 was evaluated based on **the relationship between Statement No. 341 and demographic data item Respondent's age (R)**, i.e., based on the reduced data (yes/neither yes nor no/no).

The hypothesis of overall independence between the two variables mentioned above was rejected due to its significance being less than <0.001 . Independence in this context refers to the situation where the ratios of "yes," "neither yes nor no," and "no" are the same for each age group, indicating that age has no relationship with the answers. Rejecting the hypothesis implies that there is a statistically significant difference in the answers across different age groups, as shown by the clear differences in ratios in Figure 1. Consequently, hypothesis H1 was tested using the sign scheme method, as shown in Table 2.

Table 2: Relationship between the Statement No. 341 and Respondents' Age

MML-TGI CR2021 Q1 – Q4 CONNECTED (04.01.2021 – 05.12.2021)	341 Above all, I would like to achieve as much knowledge and learning as possible in my life.					
Contingency table	+/-			Index		
CS:CSALL	yes	neither yes nor no	no	yes	neither yes nor no	no
Respondent's age (R)						
12–19 years	++ +	---	0	117	80	93
20–29 years	0	---	0	104	90	113
30–39 years	---	0	++ +	90	100	141
40–49 years	---	+++	++ +	86	113	120
50–59 years	-	+++	---	95	114	78
60–69 years	++	0	---	106	100	76
70–79 years	++ +	---	---	123	83	58

Source: own elaboration using the DATA ANALYZER software tool of the MML-TGI research

Based on the ++ sign in the cell for the combination of the age cohort 60–69 years and based on the +++ sign in the cell for the combination of the age cohort 70–79 years and positive attitude towards education and learning (Statement No. 341 = YES), **we accept the alternative hypothesis** at the 0.1% significance level.

Hypothesis H1 was confirmed; it holds for both the 60 – 69 and 70 –79 age cohorts.

The affinity index 106 in the YES group of Statement No. 341 for the studied age cohort of 60–69 years means that there are 6% more respondents in the segment of respondents with a positive attitude towards education and learning than in the population as a whole.

The affinity index 123 in the YES group of Statement No. 341 for the studied age cohort of 70–79 years means that there are 23% more respondents in the segment of respondents with a positive attitude towards education and learning than in the population as a whole.

The interpretation of data in the context of education and learning adoption

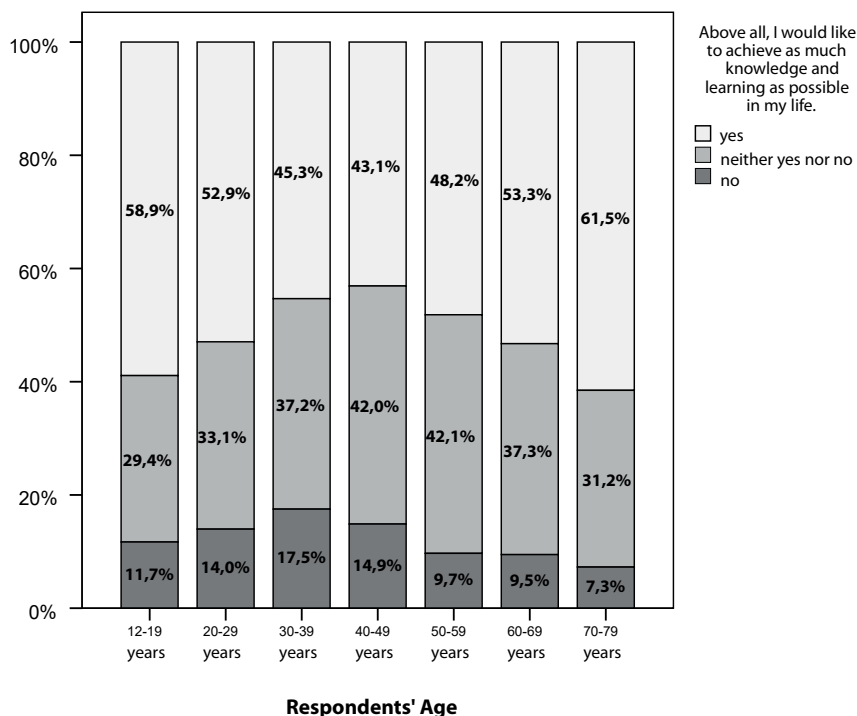
The cross-sectional analysis revealed several important facts regarding the appropriateness of targeting educational content.

In terms of age cohorts, consumers in the 60–69 and 70–79 age categories appear to be more suitable for educational content adoption (affinity index 106 and affinity index 123);

However, an interesting fact is a negative attitude towards knowledge and learning of the 30–39 and 40–49 age categories (affinity index 90 and affinity index 86).

Overall, it can be concluded that the potential of knowledge and learning adoption increases with the distance of the respondent's age category from middle age (i.e., the 40–49 age cohort) – see Fig. 2.

Figure 2: The Attitude of Respondents Towards Knowledge and Learning Depending on Age



Source: own elaboration

A cross-sectional analysis of the data from Median's MML-TGI longitudinal research provides valuable insights into the potential for adopting knowledge and learning and identifying particular socio-demographic consumer segments suitable for targeted educational content and relevant training activities.

3 Results

The study investigated which socio-demographic groups exhibit a positive attitude towards adopting educational content and which groups show a negative attitude towards it. Hypothesis H1, stating that the demographic segments of the 60–69 and 70–79 age cohorts are more receptive to education and learning than the 30–39 and 40–49 age cohorts, was confirmed based on the cross-sectional analysis using the sign scheme method at the 0.1% significance level. The affinity indices for the age cohorts 60–69 and 70–79 were 106 and 123, respectively, indicating 6% and 23%, more respondents in these age groups with a positive attitude towards education and learning than in the population as a whole.

On the other hand, the 30–39 and 40–49 age cohorts exhibited negative attitudes towards knowledge and learning, with affinity indices of 90 and 86, respectively. The results suggest that the potential for knowledge and learning adoption increases with the distance of the respondent's age category from middle age. Overall, the study provides valuable insights into the potential for adopting knowledge and learning and identifying particular socio-demographic consumer segments suitable for targeted educational content and relevant training activities.

4 Discussion and suggestions for further research

Based on the results of this study, several potential avenues for further research could be explored.

Firstly, the authors suggest *investigating the reasons behind the negative attitudes towards knowledge and learning in the 30–39 and 40–49 age cohorts*. Are any specific factors contributing to this trend, such as work or family obligations, or is it a broader cultural trend?

Secondly, it would be useful to examine *how different educational content and training activities and platforms may be better suited to different age groups*. For example, are older adults more likely to benefit from certain types of online learning platforms or in-person training programs?

Thirdly, researchers might focus on *the role of socioeconomic status in attitudes towards knowledge and learning*. Are individuals with higher income or education levels more likely to have positive attitudes towards education, and how can this be leveraged in educational content development and delivery?

Last but not least, exploring *the relationship between attitudes towards education and the actual adoption of educational content and training activities* would be valuable. Do individuals with positive attitudes towards education really engage in more learning activities, or are other factors at play?

In conclusion, this study aimed to identify which socio-demographic groups exhibit a positive or negative attitude towards adopting educational content. Additionally, further research could be conducted to investigate the impact of other demographic factors, such as gender, education level, and income, on adopting educational content. Such research could provide more precise targeting of education and training activities, resulting in better outcomes for the individual, the employer and society as a whole. Overall, the findings of this study have significant implications for the design and delivery of educational content. However, specific future research is necessary to deepen our understanding of these issues.

5 Conclusions

The objective of this article was to provide comprehensive and research-based state-of-the-art information for organizations, facilitating the transition from ad hoc remote work arrangements to a more sustainable and effective approach to hybrid work.

The article offers analytical insights for companies looking to leverage the benefits of intelligent bots, external developers or other freelancers in their extended workforce ecosystems while addressing the unique challenges associated with managing and integrating these workers into the company's operations. Specifically, the authors examined the issues related to the gig economy, adaptation to a changing work environment and the need for upskilling and newskilling the extended workforce.

Companies looking to leverage the benefits of intelligent bots, external developers, or other freelancers in their extended workforce ecosystems can take several steps while addressing the unique challenges associated with managing and integrating these workers into the company's operations. Firstly, they can establish clear guidelines and expectations for communication, performance, and behaviour, which can help ensure everyone is on the same page and working towards the same goals. Secondly, they can provide training and support to these workers to help them understand the company's culture, values, goals, and the specific tools and technologies they will be using. Thirdly, they can leverage technology solutions, such as collaboration platforms and project management tools, to facilitate communication, coordination, and knowledge-sharing across the entire workforce ecosystem. Finally, they can establish mechanisms for monitoring and measuring the performance of these workers, including regular feedback and performance reviews, to ensure that they are meeting expectations and contributing to the company's success.

Implementing all these managerial approaches, knowledge and skills in effectively managing and integrating the extended workforce ecosystems of intelligent bots, external

developers, or other freelancers into a company's operations will help leaders navigate an uncertain and ever-changing future. It requires a strategic and proactive approach, effective communication, collaboration among team members, and an understanding the legal and regulatory frameworks that apply to these types of workers.

In conclusion, the extended workforce ecosystem is rapidly evolving and becoming a significant part of businesses in the digital age. With the emergence of intelligent bots and freelancers with employee ID cards, the traditional workplace model is being challenged, and companies must adapt to keep pace. This article has explored the benefits and challenges of such ecosystems and provided a roadmap for organizations to successfully navigate the transition to hybrid and fully remote working models.

The study has shown that the success of this journey largely depends on the attitude of all those involved in the extended workforce ecosystem towards education and learning. Based on the insights from the MML-TGI observational study, it is clear that there is a need for upskilling and reskilling the extended workforce to keep up with the rapidly evolving demands of the modern workplace. The study reveals a very positive attitude towards education and learning among the 60–69 and 70–79 age cohorts. This finding is particularly important given that many individuals in these age groups are facing extended working lives due to increases in retirement age in many countries, including the planned increase to approximately 68 years of age in this country. The affinity index for educational content adoption for these age cohorts was found to be 106 and 123, respectively, indicating a strong willingness to engage with learning materials. However, the study also uncovered a negative attitude towards knowledge and learning among the 30–39 and 40–49 age categories, with affinity indexes of 90 and 86, respectively.

The article has provided comprehensive and research-based state-of-the-art information for organizations, facilitating the transition from ad hoc remote work arrangements to a more sustainable and effective approach to hybrid work. It is hoped that this study serves as a bridge to the future by helping organizations transition from reactive ad hoc remote work arrangements to a more strategic and intentional approach to hybrid working models that are better suited to the needs of both employees and the organization.

The extended workforce ecosystem is an exciting and rapidly developing area that presents both opportunities and challenges. By embracing new technologies and being willing to adapt to changing work environments, organizations can create a more efficient, sustainable, and effective workforce that meets the needs of all stakeholders.

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