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Unveiling the Workforce Renaissance: How Hybrid Work Models, Employee Engagement, and Technology 4.0 Shape Employee Performance

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During the COVID-19 pandemic, most businesses adopted hybrid work arrangements, adapting to changing workplace demands. This study explores how Technologies 4.0 (advanced technologies) and employee motivation affect the link between hybrid work models and the performance of younger workers (millennials and Gen-Z) in Kerala's IT sector. Based on a survey of 155 employees, the study shows that the hybrid work model has a significant impact on performance. While basic technologies do not have a major role, the study emphasizes that employee engagement is a key factor. As hybrid work options become more common, they will continue to shape the future of work.

Keywords: hybrid mode, employee performance, employee engagement, Technology 4.0, Generation Z, future of jobs

Introduction

The COVID-19 pandemic has exerted a substantial influence on the lives of numerous individuals over the past few years. The pandemic has brought about extensive changes in the realm of employment, resulting in a substantial number of vacant office spaces due to the implementation of remote work policies aimed at mitigating the transmission of the virus (International Labour Organization, 2020a). Thus, the pandemic has brought about a significant shift in work pattern, with remote work becoming the norm for many employees. The COVID-19 pandemic, initially perceived as a transient phenomenon, led to the prolonged cessation of many brick-and-mortar workplaces. It has prompted numerous organizations and their staff to contemplate the implementation of hybrid and remote work arrangements. The pandemic has effectively brought to light the advantages, disadvantages, and deficiencies associated with this practice, which were already present before the outbreak (Williamson, Colley, & Hanna-Osborne, 2020).

The hybrid work, which integrates remote and in-person work, has gained substantial attention for its potential benefits in flexibility, productivity, and work-life balance. This new way of working has the potential to improve employee satisfaction, reduce attrition rates, and increase productivity. However, it also poses several

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challenges, including managing work demands, ensuring employee engagement, and addressing mental health concerns. In this context, it is important to examine the effect of the hybrid mode of working on employee productivity and well-being.

Hybrid work allows employees to have more flexibility in managing their work and personal lives (Vyas, 2022). This can result in improved work-life balance, reduced stress levels, and increased job satisfaction, which can positively impact employee performance. Some employees may find they are more productive when working remotely, as they can avoid office distractions and tailor their environment to their preferences. On the other hand, in-person work can facilitate collaboration, brainstorming, and immediate feedback, which can also boost productivity. The combination of both modes can allow employees to capitalize on the benefits of each and potentially enhance overall performance (Grant et al., 2019). Conversely, certain employees encountered challenges in accomplishing their tasks remotely due to the presence of family members and/or children at home, leading to frequent distractions (Gibbs, Mengel, & Siemroth, 2021). Hybrid work can introduce communication and collaboration challenges, especially when team members are physically separated. Miscommunication, delays in response, and difficulties in building rapport might occur. These factors can negatively impact teamwork, coordination, and overall performance (Vyas, 2022). Successful hybrid work often relies on robust technological infrastructure, including reliable internet connectivity, collaboration tools, and cybersecurity measures. The adoption of digital technology experienced a notable acceleration during the course of the pandemic because of the hybrid work mode (Vargo, Zhu, Benwell, & Yan, 2020). If employees face issues with technology or inadequate resources, it can hinder their productivity and performance. Hybrid work can affect employee engagement and motivation differently. Some employees may feel more engaged and motivated when given the freedom and autonomy of remote work, while others may thrive in an in-person environment. Employers need to consider individual preferences and find ways to foster engagement and motivation in both settings to maintain optimal performance.

Managing a hybrid workforce presents unique challenges for supervisors and managers. The absence of clear working objectives and output expectations poses a difficulty in determining the extent of employee engagement in hybrid mode of working (ILO, 2020b). Some of the other challenges that organizations have faced in adopting to hybrid mode of working are the lack of digitized documentation, concerns regarding the confidentiality of information, and the absence of established protocols and guidelines within these organizations (ILO, 2020c).

Ensuring equitable treatment, setting clear expectations, and maintaining regular communication with remote and in-person employees require additional effort. If these challenges are not effectively addressed, it may lead to decreased performance and engagement. It’s important to note that the impact of the hybrid mode of working can vary across industries, job roles, and individual preferences. Organizations should carefully assess their specific circumstances and consider implementing strategies to maximize the benefits and mitigate potential challenges to support employee performance. Despite the advantages associated with hybrid work, certain sectors within organizations have not fully embraced this practice. These sectors raise concerns regarding the effectiveness and productivity of this work mode as a viable arrangement for completing tasks. There exists a body of research that posits the notion that remote working has the potential to diminish employee motivation and foster a culture of idleness (Bessa & Tomlinson, 2017).

Since the pandemic, around 90% of organizations have adopted a variety of hybrid work models that enable workers to work remotely for some or most of the time from off-site locations (including home). Organizations need to give structure and assistance to the tasks that are best carried out face-to-face or remotely. “True hybrid” organizations can set themselves out as desirable workplaces by keeping open to the full range of possibilities for employees’ work schedules, locations, and methods of communication, including a resetting of performance standards.

The primary purpose of this study is to address the existing gap in knowledge regarding the effect of hybrid work arrangements on employee performance. There is a paucity of scholarly literature pertaining to this particular topic. The present study aims to examine the correlation between the hybrid work model and employee performance, while considering the potential moderating influences of Technologies 4.0 and employee engagement. This study focuses specifically on employees who are part of the millennial and Generation Z, within the context of the post-pandemic era.

Review of Literature

Hybrid Mode of Working

According to the recent definition proposed by Beno, Hvorecky, and Caganova (2021), hybrid working refers to a combination of remote work from home and working from a designated workspace, such as a cubicle. Thus, a hybrid mode of working refers to a work arrangement that combines both physical office presence and remote work (Cook, Mor, & Santos, 2020). It is commonly referred to as a “blended system”. Grzegorczyk, Mariniello, Nurski, and Schraepen (2021) proposed a comparable definition, wherein a hybrid model allows employees to engage in teleworking for a portion of their predetermined work hours, subject to the constraints of bargained work agreements. This phenomenon typically arises in circumstances where there exists a requirement to achieve a fair and just equilibrium between two distinct sets of demands in order to prevent any potential discord or confrontation. The hybrid system is a strategic approach implemented to address the unique requirements of the stakeholders involved in a given system or organization. In the event of encountering distinct demands, a hybrid model should be considered as a viable resolution to address the issues of geographical constraints, spatial separation, financial considerations, resource accessibility, and administrative oversight. People who spend one day per week in the office and the balance of the week working remotely are included in this configuration of working. Hybrid work mode can be considered as a byproduct of technological progress. Important advantages of the hybrid mode that comes with remote work include flexibility in the workplace, decreased labour costs, improved employee engagement, and enhanced environmental experiences (Trede, Markauskaite, McEwen, & Macfarlane, 2019).

Employee Performance

Studies have shown that hybrid work environments can enhance positivity, effectiveness, and productivity (Beno et al., 2021). Organisations that adopt hybrid work models may experience reduced costs, increased productivity, and enhanced technological progress (“Hybrid Working in Ghanaian Public and Private Sector: To Continue or Terminate?”, 2023) The literature on the hybrid workplace model has yielded varying findings regarding its impact on employee job performance. These findings have been inconclusive, with some studies suggesting positive effects, others indicating negative effects, and some showing no discernible impact. Choudhury, Foroughi, and Larson (2020) indicated an improvement in the productivity of the firm with a

hybrid work pattern. Multiple research studies have indicated that the implementation of a hybrid work model can afford individuals greater autonomy in their employment and the flexibility to work remotely, ultimately resulting in elevated levels of productivity (Sekhar & Patwardhan, 2023; Gajendran, Harrison, & Delaney-Klinger, 2015).

Numerous studies have indicated that implementing hybrid mode may not necessarily enhance productivity. This is primarily attributed to the negative effects it can have on familial relationships, resulting in disruptions and social detachment. Additionally, the model can impede effective communication and collaboration among coworkers, as they are not working in synchrony (Campo, Avolio, & Carlier, 2021; Jackson & Fransman, 2018). Accessing essential employment resources such as tasks and interactions with others is made more difficult by the hybrid work mode (Liu, Wan, & Fan, 2021) showing the negative impact of hybrid work mode on employee performance. Wöhrmann and Ebner (2021) emphasised that hybrid work arrangements may lead to the erosion of boundaries between personal and professional life which adversely affects their job performance. In the realm of hybrid work environments, workplace design plays a critical role in employee well-being and productivity. Factors such as work methods, leadership styles, and social interactions have been linked to the well-being of hybrid workers (Lindeberg, 2023). Moreover, the concept of hybrid work is seen as offering the advantages of both remote and office work, necessitating employees and managers to acquire new skills and competencies to adapt to this evolving work structure (Chafi et al., 2021).

Employee Engagement

According to Rothbard (2001), employee engagement can be defined as the psychological state in which an individual demonstrates involvement, attention, and cognitive availability toward their role. This encompasses the employee's active thinking about their responsibilities and the level of intensity with which they focus on their role. Engaged employees demonstrate a holistic perspective of the organization, taking into account their purpose, role, and alignment within the broader context. In recent years, the concept of engagement has emerged as a highly significant construct within the field of management. Most existing research agrees that work engagement can improve job performance (Saks, 2019; Byrne, Albert, Manning, & Desir, 2017; Bakker, Tims, & Derks, 2012).

The literature suggests that there is a positive relationship between engagement and job performance (Bal & De Lange, 2014; Kane-Frieder, Hochwarter, & Ferris, 2013; Wang, Lu, & Siu, 2015; Koroglu & Ozmen, 2021). The flexibility associated with hybrid work can have a positive impact on work-life balance and employee engagement (Harunavamwe & Kanengoni, 2023; Yang et al., 2021). Additionally, engagement has been found to be positively associated with organizational-level performance (Barrick, Thurgood, Smith, & Courtright, 2015). Gerards et al. (2018) asserted that a hybrid mode of working enhances employee work engagement. On the other hand, Sardeshmukh, Sharma, and Golden (2012) demonstrated that hybrid work has a detrimental impact on employee engagement due to diminished support and feedback from colleagues, consequently resulting in a decline in work engagement. Naqshbandi, Kabir, Ishak, and Islam (2023) observed that hybrid work mode positively impacts job performance and employee engagement significantly mediates this relationship.

Technology 4.0

Digital technologies, specifically Cyber-Physical Systems (CPSs), have been suggested as a means to enhance operational efficiency by minimising set-up times, reducing labour and material expenses, and

optimising processing durations. This, in turn, leads to increased productivity (Jeschke et al., 2016). As employees acclimatise to evolving automated technologies, they undergo improvements in their productivity. The aforementioned technologies comprise a diverse array of tools, including wearable devices, performance-enhancing equipment, telepresence and telemanipulation devices, remote work tools, and cognitive computing devices (Brown, 2018). According to the International Labour organization (ILO, 2020b), hybrid work mode has expedited the trend of digitization and the implementation of Industry 4.0 technologies. This development holds the potential for a promising future characterized by enhanced flexibility and sustainability, which can empower employees to handle their work responsibilities more effectively. In their study, Javaid et al. (2020) also provided an elucidation on the utilization of various Industry 4.0 technologies, including big data, artificial intelligence, holography, internet of things, virtual reality, cloud computing, 3D printing, autonomous robot, 3D scanning and biosensors, for the effective management of hybrid work mode. The study by Rachman and Nuraeni (2020) indicates that such advances in information technology significantly influences employee performance. The adoption and utilization of technologies by employees can be attributed to their contribution in fulfilling human objectives, enhancing the social environment, and promoting the interests of individuals and social collectives. In accordance with this, the technologies associated with Industry 4.0 have been extensively embraced and extensively utilized by employees subsequent to the emergence of the COVID-19 pandemic, as they effectively meet the automation needs of various stakeholders. The concept of digital work connectivity refers to the utilization of electronic devices, such as embedded software and online applications (e.g., Zoom, Skype, WeChat), by individuals within an organization to interact with their colleagues or engage in work-related activities (Richardson & Benbunan-Fich, 2011). Thus Industry 4.0 has the potential not only to decrease expenses, enhance adaptability, accelerate processes, and enhance quality, but also to mitigate the inherent conflicts among these crucial operational objectives potentially, thus exerting an impact on overall performance (Olsen & Tomlin, 2020). Narayanamurthy and Tortorella (2021) discussed the moderating role of Industry 4.0 technologies on employee performance during the COVID-19 outbreak, emphasizing the importance of technological advancements in influencing employee performance, which could extend to the hybrid mode of working where technology plays a crucial role.

Though the initial perception of Technology 4.0 may be that staying connected is innocuous, the true impact is multifaceted and lacks thorough investigation. The researchers Karr-Wisniewski and Lu (2010) conducted a study examining the phenomenon of technology overload, which refers to the negative impact of excessive technology usage on productivity. The researchers discovered that the primary factors leading to decreases in productivity in technology-based settings are information overload, communication overload, and system feature overload. In China, it is important to note that a significant proportion of employees currently use the smartphone application WeChat as their primary means of communication for work-related matters. According to a survey conducted by Steelcase (2016), despite the continued use of digital technology for professional endeavours, engagement levels among Chinese employees have declined significantly. Chadee, Ren, and Tang (2021) carried out a study in the hospitality industry and found that digital work connectivity has the potential to diminish self-control, leading to disengagement from work and subsequently impacting job performance.

The incorporation of technology in hybrid work modes can have a transformative impact on performance by improving efficiency, facilitating innovative approaches, and enhancing overall operations. By leveraging technology effectively within hybrid work environments, organizations can optimize their processes and potentially boost employee performance and engagement.

In light of this context and in an effort to obtain a deeper understanding, our study extends prior research by incorporating employee work engagement and Technology 4.0 as mediating factors in the association between the hybrid workplace and job performance and the following hypothesis has been framed:

H1: Hybrid mode of working has a significant impact on employee performance

H2: Base technologies moderate the relationship between the hybrid mode of working and employee performance.

H3: Employee engagement moderates the relationship between hybrid mode of working and employee performance.

Here the independent variable is the hybrid mode of working (HMW) and the dependent variable is the employee performance (EP). The moderating variables are Technology 4.0 and employee engagement (EE).

Based on the thorough literature review and hypothesis development, a conceptual model was proposed (Figure 1).

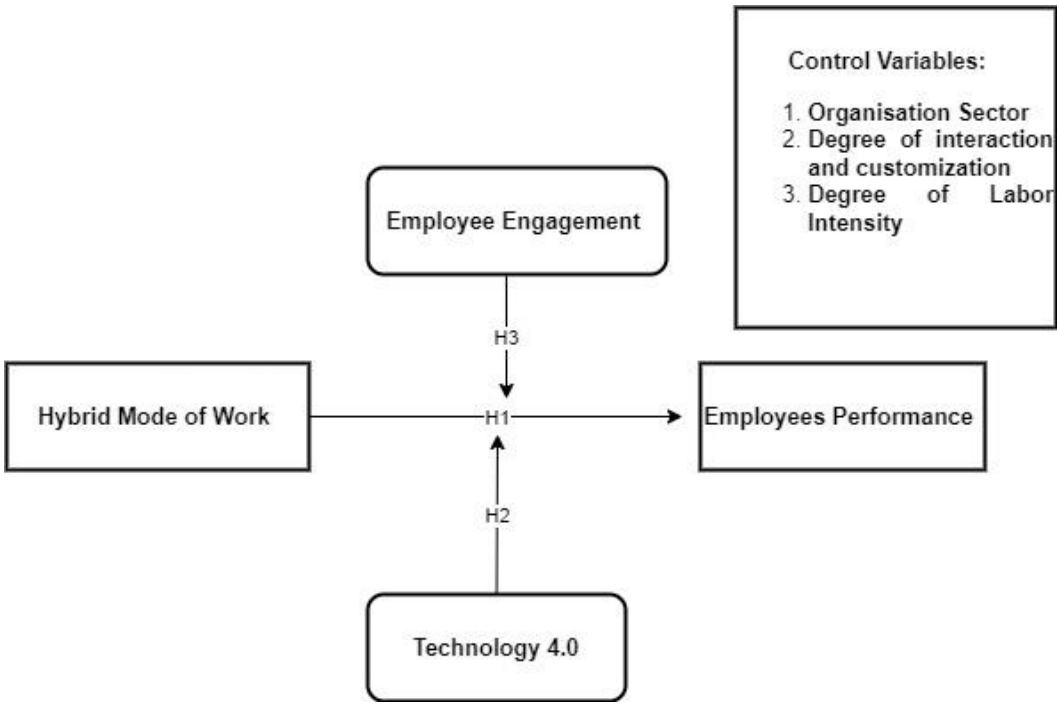

Figure 1. Conceptual model.

Research Methodology

The study was conducted on a sample population of 155 employees belonging to the "millennial" and "Z" generations, specifically employed in an IT company located in the state of Kerala. The age distribution of the population does not exceed 35 years, with the respondents falling within the age range of 20 to 30 years. The sample technique used is convenience sampling. Primary data relevant to the study's objectives were collected by administering a meticulously designed questionnaire consisting of 90 closed-ended questions to customers. The study encompassed the measurement and analysis of all variables within the time frame spanning from November to March 2023. The majority of the questions are formulated utilising the five-point Likert scale with the following response options: 1—strongly agree, 2—agree, 3—neutral, 4—disagree, and 5—strongly disagree. The survey was distributed via Google Forms online. The researchers employed the structural equation modelling

(SEM) technique in order to examine and confirm the validity of the model. The analysis was conducted using the statistical package WarpPLS, while Descriptive Statistics were performed using Statistical Package for the Social Sciences (SPSS).

Results and Discussion

The demographic profile of the 155 consumers is given in Table 1. In the sample of 155 participants, 82 individuals self-identified as female, while the remaining 73 participants identified as male. Therefore, it can be deduced that 52.90% of the participants were classified as females, while 47.10% of the participants were classified as males. Approximately 74.19% of the individuals involved in the study fell within the age bracket of 18-24, while the remaining 25.81% belonged to the age group of 25-34. Furthermore, 71% of the respondents held positions as supervisors, with the remaining participants in managerial roles. A significant proportion of the participants (78.1%) possess fewer than five years of professional experience. A majority of the respondents (84.5%) reported being employed in private organizations characterized by a workforce size of less than 5,000 employees (61.90%). According to the collected data, a significant proportion of the participants, specifically 38.10%, are employed in the Finance sector. Additionally, 25.20% of the respondents work in the Personal Services industry, while 18.10% are engaged in Distribution Services. A smaller percentage, 11.60%, is employed in Infrastructure Services, with the remaining individuals working in Government Services. The majority of participants were employed in transnational organizations, accounting for 60.60% of the total sample. These organizations were characterized by a significant level of labor intensity, as reported by 75.50% of the respondents. Furthermore, a substantial proportion of participants, specifically 81.90%, indicated that their organizations exhibited a high degree of interaction and customization.

The reliability statistics for the variables were computed using the Statistical Package for the Social Sciences (SPSS), and the corresponding outcomes are presented in Table 2. A reliability value exceeding 0.6 is considered indicative of reliability. In our study, it is important to note that all variables employed exhibit high reliability, as indicated by their reliability coefficients surpassing the threshold of 0.9, which is widely regarded as optimal. In the conducted study, the hybrid style of working exhibited a coefficient of 0.991. Similarly, employee performance was found to have a coefficient of 0.987, while employee engagement shown a coefficient of 0.982. Conversely, the coefficient for technology was determined to be 1.0, indicating a lack of significant impact. From Table 2, it can be observed that all variables exhibit a composite reliability exceeding 0.7. The hybrid mode of working exhibits the highest composite reliability, with a value of 0.991. Following this, employee performance demonstrates a composite reliability of 0.988, while employee engagement exhibits a composite reliability of 0.983. Hence, it can be inferred that the survey exhibits satisfactory reliability across all constructs. It has been observed that the average variance extracted (AVE) of all the variables exceeds 0.5. The AVE for employee engagement is 0.732, for employee performance, it is 0.780, and for the hybrid mode of working it is 0.761. Hence, it can be inferred that all the variables meet the criteria for convergent validity based on the values of average variance extracted. The inferential statistics analysis was conducted using the software WarpPLS 7.0.

The criterion for establishing discriminant validity is that the diagonal elements of the square root of the average variance extracted (AVE) should exhibit the highest values. In the present context, the diagonal elements are indicative of the highest values; however, the variables beneath each factor exhibit values that are comparatively lower than the variable connected with said factor (Table 3). We can see that neither of the latent variables is loading with other variables. Instead, they are all loading with the other variables. Thus, it can be

asserted that the survey form meets the criteria for reliability, composite reliability, convergent validity, and discriminant validity. Thus, it can be posited that the set of questions can be deemed acceptable, valid, and reliable, thereby enabling the collection of relevant data.

Table 1

Socio-Demographic and Organizational Characteristics of Respondents

Demography	Frequency	Number	Percentage
Gender	Male	73	47.10
	Female	82	52.9
Age	18-24	115	74.2
	25-34	40	25.8
Role	Supervisor/coordinator	110	71
	Manager	45	29
Experience	<5 years	121	78.10
	>5 years	34	21.9
Organization size	<5,000 employees	96	61.90
	>5,000 employees	59	38.10
Organisation ownership	Public	24	15.50
	Private	131	84.50
Organisation sector	Financial services	59	38.10
	Government services	11	7.10
	Distribution services	28	18.10
	Personal services	39	25.20
	Infrastructure services	18	11.60
Organisation degree of interaction and customisation	Low	28	18.10
	High	127	81.90
Organisation degree of labour intensity	Low	38	24.50
	High	117	75.50
Organisation type	Transnational	94	60.60
	National	61	39.40

Source: Primary data.

Table 2

Demographic Statistics

Variable	Cronbach's alpha coefficient	Composite reliability	Average variance extracted (AVE)
EE	0.982	0.983	0.732
EP	0.987	0.988	0.780
HWM	0.991	0.991	0.761

Source: Warp PLS output.

Table 3

Discriminant Validity of the Variables

Constructs	**1**	**2**	**3**
Hybrid mode of work	**0.872**		
Employee performance	0.827	**0.883**	
Employee engagement	0.874	0.836	**0.856**

Note. The square root of the average variance extracted (AVE) (in bold) and correlations between constructs (off-diagonal). Source: Computed data.

The IBM SPSS Version 26 software was employed for conducting descriptive statistics analysis, which yielded the mean and standard deviation values. All factors were assessed using a five-point scale, with mean values ranging from 3.89 to 4.11 (Table 4). The small standard deviation of the variables indicates that the data points are closely clustered around the mean value. The study employed structural equation modelling (SEM) to examine the underlying structural link among the variables.

Table 4

Descriptive Statistics

Variables	Mean	Minimum	Maximum	Standard deviation
HWM	3.8951	1	5	0.93605
EE	3.9914	1	5	0.8971
EP	4.0951	1	5	0.91135
TT	4.1161	1	5	1.0928

The path model (Figure 2) will elucidate the interplay between the dependent variable, the independent variable, and the potential influence of moderating variables. The nature and the magnitude of the relationship between the variables are evaluated through this model. When there is unit variation in the hybrid mode of working, the performance changes by 0.64. ($\beta = 0.64$). The association between employee performance and the hybrid method of working is moderated by employee engagement. As employee engagement levels rise by one unit, there is an increase of 0.14 in the impact of the hybrid way of working on employee performance ($\beta = 0.14$). Since $\beta = -0.12$, for each unit increase in Technology 4.0 results in a corresponding decrease in employee performance.

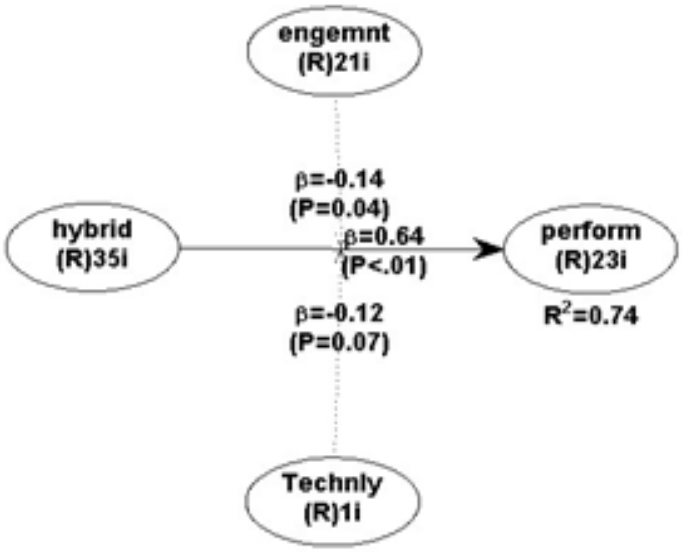

Figure 2. Path model.

Note. Hybrid = hybrid work mode; perform = employee performance; engemnt = employee engagement; techny = Technology 4.0.

When a model is properly fitted, the resulting conclusions exhibit a higher degree of precision. The model fit metrics and indicators were calculated using the WarpPLS programme. When analysing the average path coefficient, we find that it has a value of 0.298, which is deemed significant because the p-value is less than 0.05, and the hypothesis is accepted. The average R-squared value is 0.743%, which is statistically significant, and the

p-value is less than 0.05, so the hypothesis is accepted. Similarly, the average adjusted R squared (AARS) value of 0.738 is significant, the value is less than 0.05, and the value is accepted. The average block VIF (AVIF) value is 6.520, which is lower than the threshold limit of 3.3 and therefore falls within the acceptable range. Average Full Collinearity VIF (AFVIF) has a value of 5.336, which is less than the threshold value of 3.3 and falls within the acceptable range. The value of Tenenhaus goodness of fitness (GOF) is 0.808. In this instance, the goodness of fitness is considered to be modest, as its value is greater than 0.01. Therefore, it fits well. The Simpson's Paradox Ratio (SPR) has a value of 1.000 and is optimum because its value is greater than 0.7. The R Squared Contribution Ratio (RSCR) has a value of 1.00 and is optimum because it is greater than 0.90. The Statistical Suppression Ratio (SSR) value of 1.000 is acceptable because it is greater than 0.70. The Nonlinear Bivariate Casualty Direction Ratio (NLBCDR) has a value of 1.000, which is acceptable because it is greater than 0.70. According to the results obtained from the WarpPLS software, we can conclude that this model has a reasonable fit (Figure 3).

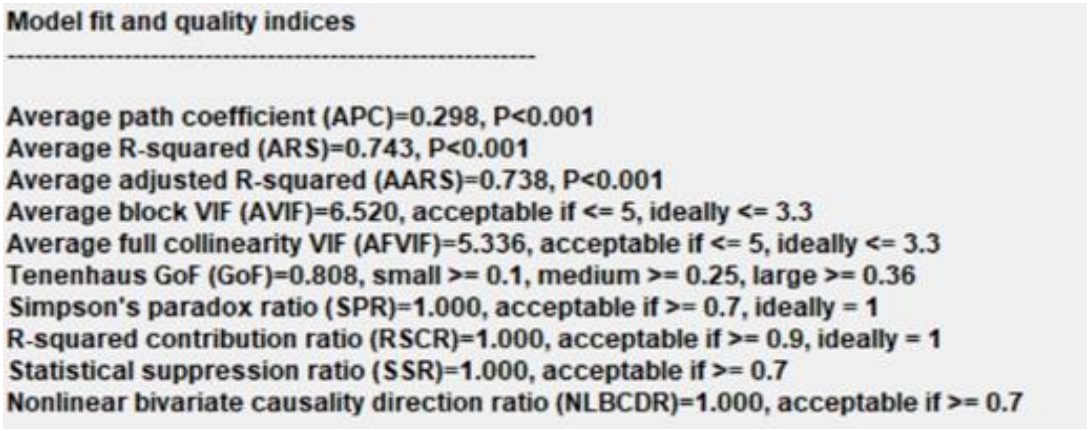

Figure 3. Model fit of the path model.

The path coefficient value for the relationship between the hybrid mode of working and employee performance was found to be 0.64, and the p-value was less than 0.01. Therefore, we accept the H1 at a significance level of 1%. Employee engagement moderates the relationship between the hybrid mode of working and employee performance with -0.14 path coefficients. As the p-value is 0.04, H3 is accepted at a significance level of 5%. But base technologies will not moderate the relationship between the hybrid mode of working and employee performance. From the model, we can say that the relation between the hybrid mode of working and the employee performance moderated by the base technologies is not accepted. Therefore, H2 is not accepted as the p-value is equal to 0.07; we will fail to reject the null hypothesis (Table 5).

Table 5

Hypothesis Testing Results

Hypothesis	Path coefficient	P values	Hypothesis testing results
H1: Hybrid mode of working positively impacts employee performance	0.64	<0.01	Accepted
H2: Base technologies moderate the relationship between Hybrid working and employee performance	-0.12	0.07	Not accepted
H3: Employee engagement moderates the relationship between hybrid working and employee performance	-0.14	0.04	Accepted

Source: Computed data.

Limitations and Suggestions

The online nature of the survey indicates a substantial amount of bias. Also, the study was confined to IT industry in Kerala, and the findings may not apply to other regions of the nation. There is a scope for extending the research to various service organisations as well. Subsequent investigations may consider the inclusion of measures pertaining to organisational performance and broaden the scope of study to encompass the entire organisation. This approach would facilitate a wider application of findings and a more inclusive strategy. Longitudinal empirical research is highly suggested as a method for observing the long-lasting repercussions of the pandemic. The findings of this study have also demonstrated that service organisations possess a multitude of prospects for the application of Technology 4.0. It is advisable to implement comprehensive digitization initiatives within the service industry's operations and practices to effectively address and capitalize on the work implications associated with hybrid work arrangements. Finding the right mix of on-site and remote work can have a significant impact on an organization's ability to attract talent, increase productivity, and improve work-life balance. Routine evaluation is also suggested to direct the team in reviewing their configurations of technologies and refining them to suit their capacities and demands better. The necessity to research the difficulties of managing a hybrid team is urgent. In the "State of Organizations Survey" conducted by McKinsey & Company, more than half of respondents stated that their team leaders are either uncomfortable or marginally comfortable managing remote and hybrid teams. For the employees who work in the hybrid mode, it is vital to review the performance requirements and set new performance standards.

Conclusions

The COVID-19 pandemic has resulted in the adoption of a hybrid work model in numerous service organisations, particularly within the IT sector. As a result, the daily routines and tasks of employees have been significantly impacted. Simultaneously, the emergence of Industry 4.0 (I4.0) has brought forth novel technologies that have the potential to enable and alleviate the consequences of the COVID-19 pandemic. In order to examine the effects of a hybrid work model on employee performance during the post-pandemic period, data were collected from employees of various IT firms in Kerala who were operating in a hybrid mode following the pandemic. This data collection was conducted to provide answers to the formulated research queries. Our findings indicate that the hybrid mode of working has a significant impact on employee performance, and as employee engagement increases, so does the impact of the hybrid mode of working on employee performance. This is in accordance with results obtained by Narayanamurthy and Tortorella (2021). Agarwal, Arya, and Bhasin (2022) asserted that post-pandemic work culture has a significant impact on the performance of employees which is mediated by employee engagement. De Lucas Ancillo, Gavrila, and del Val (2023) also observed that any change in the hybrid/remote work mode significantly impacts employee engagement, which in turn affects the productivity of the firm.

But Diamantidis and Chatzoglou (2019) suggested that the impact of working environment on an individual employee's performance variability is minimal. However, the predominant factors influencing this outcome are primarily contingent upon individual employee characteristics like versatility and motivational drives. Graves and Karabayeva (2020) also observed the difficulties of virtual work and their deleterious impact on employee stress, well-being, and performance. Virtual work environments can have a negative impact on employee performance due to elevated stress, lack of infrastructure, exaggerated performance targets, and poor interaction

with colleagues. According to Hartmann and Lussier (2020), adopting a hybrid work mode can negatively affect the performance of business-to-business (B2B) sales workers.

The present investigation reveals that there is no significant moderation of base technologies on employees' performance in the hybrid work mode following the pandemic which is against the results obtained by Narayanamurthy and Tortorella (2021) and Kusiak (2020). Contrary to expectations, the aforementioned negative interactions are consistent with the results reported by Tortorella, Cawley Vergara, Garza-Reyes, and Sawhney (2020), who found that the implementation of I4.0 technologies may yield more advantages for organisations at the organisational level rather than at the individual level. According to Frank, Dalenogare, and Ayala (2019), there is a need for further improvement in the understanding of the base technologies of Industry 4.0. This is because managers tend to be more knowledgeable about the smart features and applications of Industry 4.0, rather than the underlying technologies that support them. This observation provides an explanation for the adverse moderation of base technologies.

Thus, gaining a deeper comprehension of these relationships can assist managers, practitioners, and organisations in their endeavours to formulate successful strategies for the continued improvement of employee engagement (EE) and employee performance (EP) within a post-pandemic environment.

The analysis suggests that hybrid work arrangements allow employees the autonomy to select their preferred location and approach to executing high-quality work. Moreover, such arrangements cultivate a sense of trust between employers and employees, so fostering loyalty, job satisfaction, and heightened productivity among the workforce. Additionally, it increases the number of individuals engaged in working for the company and attracts more talent. Numerous studies and research are currently being conducted, and their findings will undoubtedly contribute to the post-pandemic period.

"Base technology plays no significant role in the performance of IT professionals working in hybrid mode" can involve considering several factors and providing a rationale. Here are potential justifications:

Standardization of Technology

In a hybrid work environment, IT professionals may have access to standardized and well-established base technologies. If the technology infrastructure is consistent and reliable across various work settings, the performance impact might not significantly vary based on the underlying technology.

Remote Work Tools

The tools and technologies used for remote work may be independent of the specific base technology. Communication platforms, collaboration tools, and project management software, commonly used in hybrid settings, may not heavily rely on the underlying technology as long as it meets basic compatibility requirements.

Skill Homogeneity

IT professionals often possess similar skill sets and competencies, irrespective of the base technology. If the workforce is adequately trained and skilled in adapting to different technological environments, the impact of the base technology on performance may diminish.

Focus on Task Execution

Hybrid work primarily emphasizes the flexibility to choose the work location rather than the specific technology used. If the focus is on completing tasks efficiently, the choice of the base technology may become less critical compared to the overall execution of responsibilities.

Advanced Technologies for Specific Tasks

IT professionals may rely on more advanced or specialized technologies for specific tasks, which might not be influenced significantly by the choice of the base technology. The performance impact could be more closely tied to task-specific tools rather than the foundational technology.

Technology Neutrality

The study might have found that the performance of IT professionals is less influenced by the base technology due to a certain level of technology neutrality. In a hybrid work setup, the emphasis could be on the ability to seamlessly integrate and operate within different technology environments.

Mitigation of Technology-Related Issues

The study may have considered factors such as effective technical support, troubleshooting mechanisms, and technology resilience. If issues related to the base technology are efficiently addressed, their impact on overall performance might be minimized.

User Preferences and Adaptability

IT professionals might adapt easily to different base technologies based on their preferences or experiences. The study could have found that individual preferences and adaptability play a more significant role in performance than the specific base technology.

It's essential to review the methodology of the study, the context in which it was conducted, and the specific metrics used to measure performance to provide a comprehensive justification for the finding.

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