OPUS
14 (2) 2023, 52-94
http://www.publishingindia.com/opus/

Role and Application of Emerging Artificial Intelligence Tools (Metaverse, Blockchain) in Learning and Development Domain of Human Resource Management

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Abstract

As digital transformation sweeps across industries, organizations seek innovative solutions to optimize learning and development methods. This study explores the transformative potential of three cutting-edge technologies: Artificial Intelligence (AI), Metaverse, and Blockchain. Building upon research published up to 2022, it examines how AI, encompassing deep learning, machine learning, and expert systems, can enhance team recruitment and development. Notably, Blockchain complements AI by providing insights into team capabilities and adaptability through continuous learning, fostering diversity and maximizing personnel exposure. This study proposes a concrete process for integrating these technologies and advocates for their widespread adoption across diverse industries. Furthermore, the study addresses the critical issue of the widening skill gap by investigating how Metaverse and Blockchain can bridge this gap in industrial training. Employing an exploratory qualitative research design utilizing surveys, questionnaires, and interviews, it identifies key factors driving the adoption of these immersive and interactive technologies, highlighting their potential to revolutionize training landscapes. Shifting focus to Human Resources, the study examines how AI, Blockchain, and Metaverse are transforming HR functions. It delves into the integration of these technologies in HR management, showcasing a range of promising applications, such as streamlined recruitment, data-driven performance management, and enhanced security and privacy. By analysing both opportunities and limitations, the study paints a comprehensive picture of how these

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technologies are shaping the future of HR, ultimately promoting a more efficient, secure, and personalized employee experience.

Keywords: *Artificial Intelligence, Training Design, Training Needs, Blockchain, Metaverse, Immersive, Transactional Learning Environment, Leadership, Management*

INTRODUCTION

Today's company processes and technologies are being disrupted and innovated at a rapid speed, necessitating the constant upskilling and flexibility of personnel in order for them to remain productive. The demands for training are growing more specific, with primary organizational needs requiring byte-sized training modules and micro learning readily available to employees as and when needed. Employee engagement, involvement, and the degree of training transfer should all be taken into consideration when designing training and development programmes. As these demands evolve, the application of AI can play a pivotal role in recognizing a firm's learnings, HR's capacity, potential, skills, ability, competency, competence, and maturity to act quickly and effectively on possibilities presented. The combination of human analytics and judgment with artificial and emotional intelligence produces more accurate outcomes and choices. The goal of this essay is to investigate if training and development procedures in businesses in the future will be managed by artificial intelligence (AI).

However, the landscape of training and development is not the only area experiencing disruption. Diverse operational areas, including operations management, sales and marketing, financial accounting, and human resource management, have seen improved organizational and process-level performance as a result of AI research (Bag, 2020) It is essential to recognize AI's impact on HR strategies and activities in human resource management (HRM) (Agarwal, 2021). According to studies, AI is more likely to have an impact on HRM strategies relating to job attrition, human-machine-AI collaboration, decision-making, development opportunities, and HRM activities like hiring, upskilling, and job evaluation. For instance, (Albert, 2019) discovered that AI is helpful in hiring new employees, particularly for vacancy prediction, job description optimization, job advertising optimization, curriculum vitae screening, etc. Yet, despite these advancements, very little research has been done on AI training/learning.

The shift towards personalized and one-on-one training needs has replaced early 20th-century batches of "mass upskilling" for employees' training and development requirements. Training and development in organizations now begin with needs assessments for training programmes and follow a scientific and structured approach toward designing and scheduling the programmes for their employees, thanks to the introduction of training models (ADDIE, Six Disciplines of Breakthrough Learning, etc.). Learning about the problems and difficulties associated with AI in learning and development (L&D) is necessary given the $320 billion global corporate training market and the rising use of AI in Learning & Development (Bersin, 2017). Artificial intelligence (AI)-based learning platforms, including chatbots, apps for remote learning and virtual machine learning, are influencing L&D-related decisions (al., 2007). This study paper's main goal is to carefully analyze the capabilities and possible uses of artificial intelligence (AI) in the context of training and development techniques.

In the quest to understand how new AI tools might transform educational and professional development processes, it is crucial to examine their specific implications and effects on learning and development activities. This includes exploring the integration of emerging AI tools with virtual reality-based recruiting tools, sensory immersion, voice biometrics, cognitive computing systems, and sentiment data in 3D digital worlds. Particular focus should be placed on how these advancements affect employee training and development in a digital workplace. Additionally, the study will delve into the utilization of deep learning computer vision techniques in the metaverse environment and how they may influence workplace technology in the future.

Through this study, we aim to fill the information vacuum that currently exists regarding artificial intelligence's (AI) potential role and uses in training and development techniques. By shedding light on their efficacy and relevance in enhancing employee training within digital work environments, we hope to pave the way for future learning methods that are more effective and efficient.

LITERATURE REVIEW

Impact of Metaverse on Learning and Development in HR

A systematic review of the impact of the metaverse on learning and development in HR was conducted, suggesting that the metaverse can

improve learning outcomes, engagement, and motivation (Al-Debei, 2022). Exploration of the potential of the metaverse for virtual reality training in HR concluded that it can enhance engagement and retention of information (Agarwal, 2021). Similarly, a conceptual framework was developed that highlights the role of the metaverse in enhancing training and development in HR (Srivastava, 2021).

Case studies and empirical studies have also demonstrated the benefits of metaverse for HR training and development. A case study that illustrates the potential of metaverse for professional development in HR was presented (Williams, 2021). The future of learning and development in HR was examined, concluding that metaverse technologies can enable personalized learning experiences (Gupta, 2020). Investigation into the use of metaverse in HR training and development was conducted, finding that it can enhance user engagement and learning outcomes (Anderson, 2020). Additionally, a conceptual review of metaverse and its implications for HR training and development was conducted, suggesting that metaverse can enhance the effectiveness of training programs, improve job performance, and reduce costs (Lee, 2019; Lee, 2018).

Blockchain and HR

Blockchain technology has also gained attention in the HR industry due to its potential to improve HR management systems. A review of blockchain in HR was conducted, proposing a research agenda for future studies (Alhadhrami, 2018). Exploration into the impact of blockchain technology on HR management in Iranian companies was carried out, finding that it can enhance transparency, security, and efficiency (Gheribi, 2019). Opportunities and challenges of blockchain for HR management were examined (Jahankhani, 2019). Additionally, implications of blockchain technology for HR management were investigated, highlighting its potential to improve the hiring process and reduce fraud (Johnson, 2018).

A primer was provided on blockchain in HR for professionals. A case study of a blockchain-based HR management system in China was presented, finding that it can enhance data security and reduce costs by (Lacity, 2018). Similarly, a systematic review of blockchain technology in healthcare was conducted, concluding that it can improve data privacy, security, and sharing (Li, 2018); (Miah, 2019). Investigation into the influence of blockchain on the HR information system was conducted, finding that it can improve the efficiency and accuracy of data management (Park, 2018). Implications of blockchain for HR and learning and

development were discussed, highlighting its potential to enable secure and transparent record-keeping (Sweeney, 2018).

A systematic literature review was conducted to investigate the diverse applications of AI in learning and development, revealing the effectiveness of AI tools and techniques in enhancing learning outcomes. Their study emphasized its importance as a valuable addition to training methodologies (Muduli, 2022). Research focused on the metaverse as a novel learning environment, highlighting its immersive nature and discussing how it can revolutionize traditional learning experiences was done (Sá, 2023). Aydın delved into the integration of AI, Virtual Reality (VR), Augmented Reality (AR), and metaverse technologies in Human Resources Management, showcasing the practical applications and benefits of these integrated approaches in optimizing HR training and development practices (Aydın, 2023). Larsson and Geijer emphasized the metaverse's potential in workforce training, highlighting its ability to provide realistic and interactive simulations and bridge the gap between theoretical learning and real-world application (Geijer, 2023). Lastly, Chamorro-Atalaya's systematic review addressed the metaverse's role in university education during the COVID-19 pandemic, illustrating how it could effectively address challenges in remote learning and serve as an alternative educational platform (Chamorro-Atalaya, 2023).

Collectively, these papers underscore the transformative potential of AI, VR, AR, and metaverse technologies in redefining learning and development practices. By synthesizing these diverse works, this literature review aims to identify gaps and opportunities for future research, paving the way for further exploration in this rapidly evolving field.

HYPOTHESIS

H_0: There is significant impact of Artificial Intelligence (Metaverse, Blockchain) in Learning and Development domain of Human Resource Department.

H_0: There is significant impact of Blockchain in improving recruiting processes, verification of job qualifications and background checks.

H_0: There is no difference in the mean perceived impact of Metaverse between the male and female groups.

H_0: There is no difference in the mean perceived impact of blockchain between the male and female groups.

H_0: There is no significant difference in the mean perceived impact of blockchain on learning and development between males and females.

H_0: There is significant impact of gender on Blockchain on learning and development.

H_0: There is no significant difference in the mean perceived impact of blockchain on learning and development across different age groups.

H_0: There is significant impact of different age groups on Blockchain on learning and development.

H_0: There is no significant difference in the mean perceived impact of metaverse on learning and development across different age groups.

H_0: There is significant impact of different age groups on metaverse on learning and development.

RESEARCH METHODOLGY

Research Design: This study uses a mixed-methods research design that includes both quantitative and qualitative data collection and analysis. The quantitative component involves a cross-sectional survey approach to collect data from a sample of employees, while the qualitative component involves semi-structured interviews with HR managers. The data collected for the study has been obtained from the primary and secondary sources. The primary data has been collected through quantitative research using a survey questionnaire. The data is collected through quantitative and close-ended questions and the data is analyzed using statistics and presented as percentages.

Since the population for this study is infinite in nature, the study uses convenience sampling method for collecting data. The online survey questionnaire was distributed using various methods such as email, social media, and other social media platforms. The survey included screening questions to ensure that participants meet the eligibility criteria. The survey has been done on more than 30 employees from around 10 organizations to analyze the role and application of emerging artificial intelligence tools (Metaverse, Blockchain) in Learning and Development domain of Human Resource Management and future scope. The questionnaire created for this study comprises different types of questions, one set of questions have the open ended questions where the respondents can provide their views and experiences regarding technology in the recruitment process, the next set of questions is provided with likert scale and the next set includes all the possible solutions.

The primary research also includes three interviews of HR professionals in different industries conducted with an open-ended

questionnaire. The questions include evolution of recruitment process in their respective organizations, impact of technology in learning and development – which includes ease, costs, implications, culture, future of HR, roles that are effected by automation in learning and development process. Secondary data for the study has been gathered by collecting information from available research reports, journal articles and data on technology trends in recruitment.

The data collected for the study has been obtained from the primary and secondary sources. The primary data has been collected through quantitative research using a survey questionnaire. The data is collected through quantitative and close-ended questions and the data is analyzed using statistics and presented as percentages.

Sampling: The target population for this study includes employees who are involved in the learning and development process in their organizations. The sample will be selected using a combination of convenience and purposive sampling techniques to ensure diversity in terms of industry, job role, and experience with AI tools in learning and development.

DATA COLLECTION

The study will utilize two primary data collection methods. First, a survey questionnaire will be developed with two parts focusing on the impact of the Metaverse and Blockchain on employee learning and development. The questionnaire will be designed based on a thorough literature review, expert opinions, and pilot testing. It will be administered online using a secure survey tool, with responses measured on a Likert Scale ranging from 1 to 5.

Second, semi-structured interviews will be conducted with HR managers. These interviews will explore the managers' experiences, perceptions, and expectations regarding the use of AI tools in learning and development. The interviews will be conducted via video conferencing or face-to-face, audio recorded, and transcribed verbatim for analysis. These methods will provide comprehensive insights into the role of emerging technologies in enhancing learning and development practices within organizations.

DATA ANALYSIS

The study will involve a meticulous analysis of data collected from various sources. Survey data will undergo thorough examination using both descriptive and inferential statistics. Descriptive statistics, including mean, standard deviation, frequency, and percentage, will be used to summarize the survey responses. Inferential statistics, such as t-tests and regression analysis, will be employed to determine relationships between different variables. This analysis will be conducted using statistical software like SPSS, ensuring accurate and reliable results. Interview data will be analyzed using thematic analysis, a qualitative method that involves identifying patterns, themes, and categories within the data. This process will help in organizing the interview findings into a coherent framework, providing a deeper understanding of the research questions. Qualitative data analysis software such as NVivo will be utilized to facilitate this analysis, allowing for a systematic and comprehensive examination of the interview data.

The study will also adhere to established guidelines for research involving human participants. This includes obtaining informed consent from participants, ensuring confidentiality of their information, and minimizing any potential harm that may arise from their participation. Participants will also be given the option to withdraw from the study at any point without facing any repercussions. Furthermore, the study will explore additional data collection methods to enhance its findings. These methods may include observation of AI tool usage, document analysis, and social media analysis. These supplementary approaches will provide further insights into the research questions and help in corroborating the findings from the survey and interview data. Overall, the study will employ a comprehensive and rigorous approach to data analysis, ensuring that the research objectives are met and the findings are robust and reliable.

DATA SUMMARY

The analysis of the demographics reveals that the sample used in the survey primarily consists of young respondents, with 48.4% falling within the age range of 22-30. Although this suggests that the sample might not entirely represent the entire population, it does provide insights into the perspectives of a younger demographic. Gender distribution in the sample is relatively equal, with 48.4% of respondents being female

and the remaining male. In terms of job levels, the sample represents a diverse range, with 45.2% working in middle management, 29% in entry management, and the remaining 25% in top management.

Regarding the metaverse, the majority of respondents express positive views about its potential benefits. A significant 83.9% believe that the metaverse can increase corporate efficiency, and other key aspects include identifying new business models and business process automation (41.9%). Respondents also believe that the metaverse will have the most significant influence on consumer participation. Immersion in the metaverse is perceived to enhance learning abilities across conceptual, procedural, and attitudinal content, as well as improve communication skills and digital competence. Additionally, a majority of respondents believe that the metaverse has positively impacted their level of social and civic competence, autonomy, self-initiative, and learning to learn.

The analysis of blockchain-related questions shows that respondents hold optimistic views about its potential benefits. An overwhelming 80.6% believe that blockchain can increase corporate efficiency, and see its utility in lowering risks. The areas where blockchain is expected to have the most significant effects on consumer engagement are asset management and contract management. Respondents perceive blockchain to have played important roles in various aspects of employee experience, recruiting processes, verification of qualifications, background checks, and strengthening security for personal and financial data.

Overall, the demographics analysis provides insights into the age, gender, job levels, and industries represented in the sample. The metaverse data reveals positive perceptions regarding its potential benefits and impact on various aspects of respondents' lives. On the other hand, the blockchain data highlights optimistic views about its potential and challenges in adoption, with significant support for industry standards to facilitate successful implementation.

COMPARING THE MEANS OF METAVERSE AND BLOCKCHAIN

We obtained the above means for Metaverse and Blockchain technology. SPSS was used to obtain the above results by calculating the average value of the responses provided by the respondents for each question on a Likert scale of 1-5.

meta_verse	block_chain
3.08	4.00
3.77	4.00
3.92	3.40
3.62	3.80
3.31	4.60
4.08	3.80
3.54	4.20
1.31	4.80
4.08	3.60
4.00	4.40
4.08	4.00
4.38	4.80
3.85	4.40
4.69	4.40
4.77	5.00
5.00	5.00
4.62	4.40
3.38	2.40
3.46	3.00
4.23	4.00
4.08	4.40
3.69	3.60
3.62	4.00
3.38	3.00
4.08	3.60
3.85	4.20

For Metaverse, we used the following questions to measure the mean:

1	The company uses appropriate methodologies to encourage the creative activity of the Metaverse.
2	I would like to carry out academic activities in the Metaverse.
3	The interaction in the Metaverse has modified my habits of organizing free time.
4	The three-dimensional visual effect (3D) of the environment and the characters of the Metaverse have favored my motivation to interact.
5	Immersion in the Metaverse has favored my ability to learn conceptual content (facts, data, and concepts).
6	Immersion in the Metaverse has favored my ability to learn procedural content (know how).

7	Immersion in the Metaverse has favored my ability to learn attitudinal content (values, attitudes, and norms).
8	Immersion in the Metaverse has improved my level of communication.
9	Immersion in the Metaverse has improved my ability to process information and digital competence.
10	Immersion in the Metaverse has improved my level of social and civic competence.
11	Immersion in the Metaverse has improved my level of competence in autonomy and personal initiative.
12	Immersion in the Metaverse has improved my level of competence in learning to learn.
13	Immersion in the Metaverse has allowed me to know and put into practice the proper use of multimedia communication tools within the teaching and learning process.

For Blockchain, the following questions were used to measure the mean:

1	I like to receive my payments through Blockchain.
2	Immersion in Blockchain has helped in learning International payroll in the form of crypto currency.
3	Blockchain has helped in strengthening security for sensitive personal & financial data.
4	Blockchain has helped in improving recruiting processes, verification of job qualifications & background checks.
5	Immersion in Blockchain has helped in enhancing employee experience with better access to benefit packages & a dynamic expense reimbursement system.
6	Immersion in Blockchain has helped in safeguarding and potentially monetizing the results of research.

RESULTS

According to the results of our research on the impact of blockchain and metaverse on learning and development in Human Resources, we utilized a Likert scale to measure the responses. The scale ranged from 1 to 5, where 5 represented the most positive impact and 1 represented negative impact. The findings indicate that the average mean for the metaverse was 3.888, and the average mean for blockchain was 4.06.

These results suggest that both blockchain and metaverse have a positive impact on learning and development in Human Resources. The average mean score for blockchain was slightly higher than that of the metaverse, indicating that blockchain may have a slightly stronger impact on learning and development compared to the metaverse.

It's worth noting that the results of this study reflect the perceptions and opinions of the respondents who participated in the survey, and may not necessarily reflect the actual impact of these technologies in practice. Additionally, the study did not explore the reasons behind the perceived impact of blockchain and metaverse on learning and development, and further research may be needed to better understand the mechanisms and processes involved.

Overall, the findings of this research provide valuable insights into the potential benefits of utilizing blockchain and metaverse technologies in Human Resources, highlighting their potential to positively impact learning and development in this field.

ADDITIONAL RESEARCH

Regression model between Do you foresee the benefits of Blockchain as eventually living up to all the hype as the dependent variable and blockchain has helped in improving recruiting processes, verification of job qualifications and background checks as the independent variable.

HYPOTHESIS

H_0: There is significant impact of Blockchain in improving recruiting processes, verification of job qualifications and background checks.

Model Summary					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	.573[a]	.329	.305	.543	2.093

a. Predictors: (Constant), Blockchain has helped in improving recruiting processes, verification of job qualifications and background checks.

b. Dependent Variable: Do you foresee the benefits of Blockchain as eventually living up to all the hype?

The model's R-squared value is 0.329, which indicates that approximately 33% of the variation in the dependent variable can be explained by the independent variable. This suggests that the independent variable has some predictive power, but there are likely other factors that also influence the dependent variable.

The model includes a constant value of 3.134, which represents the predicted value of the dependent variable when the independent variable is equal to zero. The slope of the model is -0.430, which indicates that for every one-unit increase in the independent variable, the dependent variable is predicted to decrease by 0.430 units.

Overall, it suggests that the model is 33% accurate.

T-TEST BETWEEN GENDER AND IMPACT OF METAVERSE ON LEARNING AND DEVELOPMENT

Hypothesis

H_0: There is no difference in the mean perceived impact of metaverse between the male and female groups.

Group Statistics					
	Gender	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Metaverse	Male	15	4.0718	.54039	.13953
	Female	15	3.7026	.75418	.19473

Based on the group statistics provided, the average value of mean for the male group is 4.0718 and the average value of mean for the female group is 3.7026. It appears that the male group, on average, may perceive the impact of metaverse on learning and development to be slightly more important than the female group.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Metaverse	Equal variances assumed	.095	.76	1.541	28	.134	.36923	.23956	-.12148	.85994
	Equal variances not assumed			1.541	25.377	.136	.36923	.23956	-.12377	.86223

To analyze the relationship between gender and the perceived impact of metaverse on learning and development, a t-test is conducted. The null hypothesis for the test is that there is no difference in the mean perceived impact between the male and female groups, while the alternative hypothesis would be that there is a difference.

Since the data meets the assumptions of a t-test, such as normality and homogeneity of variances, the t-test is performed using the gender variable as the independent variable and the impact of metaverse on learning and development as the dependent variable. Since the resulting p-value is more than the alpha level (e.g., 0.05), i.e. .760, then the null hypothesis is to be accepted, indicating that there is no significant difference between the groups.

T-TEST BETWEEN GENDER AND IMPACT OF BLOCKCHAIN ON LEARNING AND DEVELOPMENT

Hypothesis

H_0: There is no difference in the mean perceived impact of blockchain between the male and female groups.

Group Statistics					
	Gender	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Blockchain	Male	15	4.2400	.49106	.12679
	Female	15	3.8800	.64940	.16767

The average value of mean for the male group is 4.24 and the average value of mean for the female group is 3.88. It appears that the male group, on average, may perceive the impact of blockchain on learning and development to be slightly more important than the female group.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Block chain	Equal variances assumed	.635	.432	1.713	28	.098	.36000	.21022	-.07061	.79061
	Equal variances not assumed			1.713	26.066	.099	.36000	.21022	-.07205	.79205

To analyze the relationship between gender and the perceived impact of blockchain on learning and development, a t-test is conducted. The null hypothesis for the test would be that there is no difference in the mean perceived impact between the male and female groups, while the alternative hypothesis would be that there is a difference.

The significant value of the t-test is 0.432. It is the p-value and using an alpha level of 0.05, the p-value is greater than 0.05, then the null hypothesis would not be rejected, indicating that there is not a significant difference between the groups.

AN ANOVA BETWEEN GENDER AS THE INDEPENDENT VARIABLE AND THE IMPACT OF BLOCKCHAIN ON LEARNING AND DEVELOPMENT AS THE DEPENDENT VARIABLE

Hypothesis

H_0: There is no significant difference in the mean perceived impact of blockchain on learning and development between males and females.

ANOVA						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.972	1	.972	2.933	.098[b]
	Residual	9.280	28	.331		
	Total	10.252	29			

a. Dependent Variable: block_chain

b. Predictors: (Constant), Gender

An ANOVA was conducted with gender as the independent variable and the impact of blockchain on learning and development as the dependent variable. The obtained p-value for the ANOVA is 0.098, which is above the typical alpha level of 0.05.

The null hypothesis for the ANOVA would be that there is no significant difference in the mean perceived impact of blockchain on learning and development between males and females, while the alternative hypothesis would be that there is a significant difference.

Since the obtained p-value is greater than the alpha level of 0.05, the null hypothesis cannot be rejected. This suggests that there is no significant difference in the perceived impact of blockchain on learning and development between males and females in the sample.

REGRESSION MODEL WITH GENDER AS THE INDEPENDENT VARIABLE AND THE IMPACT OF BLOCKCHAIN ON LEARNING AND DEVELOPMENT AS THE DEPENDENT VARIABLE

Hypothesis

H_0: There is significant impact of gender on Blockchain on learning and development.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.308[a]	.095	.062	.57570

a. Predictors: (Constant), Gender.

Gender is taken as the independent variable and the impact of blockchain on learning and development as the dependent variable. The value of R squared is 0.095, which indicates that only about 9.5% of the variability in the dependent variable can be explained by the independent variable.

This suggests that gender may not be a strong predictor of the perceived impact of blockchain on learning and development. Correlation does not imply causation. While there may be an association between gender and the perceived impact of blockchain on learning and development, it does not necessarily mean that gender is causing the observed differences in perception.

Overall, the value of R squared suggests that gender alone may not be a strong predictor of the perceived impact of blockchain on learning and development.

AN ANOVA BETWEEN AGE AS THE INDEPENDENT VARIABLE AND THE IMPACT OF BLOCKCHAIN ON LEARNING AND DEVELOPMENT AS THE DEPENDENT VARIABLE

Hypothesis

H_0: There is no significant difference in the mean perceived impact of blockchain on learning and development across different age groups.

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.725	1	.725	2.131	.155[b]
	Residual	9.527	28	.340		
	Total	10.252	29			

a. Dependent Variable: Blockchain.

b. Predictors: (Constant), Age.

An ANOVA was conducted with age as the independent variable and the impact of blockchain on learning and development as the dependent variable. The obtained p-value for the ANOVA is 0.155, which is above the typical alpha level of 0.05.

The null hypothesis for the ANOVA would be that there is no significant difference in the mean perceived impact of blockchain on learning and development across different age groups, while the alternative hypothesis would be that there is a significant difference.

Since the obtained p-value is greater than the alpha level of 0.05, the null hypothesis cannot be rejected. This suggests that there is no significant difference in the perceived impact of blockchain on learning and development across different age groups in the sample.

REGRESSION MODEL BETWEEN AGE AND IMPACT OF BLOCKCHAIN ON LEARNING AND DEVELOPMENT

Hypothesis

H_0: There is significant impact of different age groups on Blockchain on learning and development.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.266[a]	.071	.038	.58331

a. Predictors: (Constant), Age.

The regression model you have described has age as the independent variable and the impact of blockchain on learning and development as the dependent variable. The value of R squared is 0.071, which indicates that only about 7.1% of the variability in the dependent variable can be explained by the independent variable.

This suggests that age may not be a strong predictor of the perceived impact of blockchain on learning and development.

Correlation does not imply causation. While there may be an association between age and the perceived impact of blockchain on learning and development, it does not necessarily mean that age is causing the observed differences in perception.

Overall, the value of R squared suggests that age alone may not be a strong predictor of the perceived impact of blockchain on learning and development.

AN ANOVA BETWEEN AGE AS THE INDEPENDENT VARIABLE AND THE IMPACT OF THE METAVERSE ON LEARNING AND DEVELOPMENT AS THE DEPENDENT VARIABLE

Hypothesis

H_0: There is no significant difference in the mean perceived impact of metaverse on learning and development across different age groups.

ANOVA						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.135	1	.135	.293	.593[b]
	Residual	12.938	28	.462		
	Total	13.074	29			

a. Dependent Variable: Metaverse.

b. Predictors: (Constant), Age.

An ANOVA was conducted with age as the independent variable and the impact of the metaverse on learning and development as the dependent variable. The obtained p-value for the ANOVA is 0.593, which is above the typical alpha level of 0.05.

The null hypothesis for the ANOVA would be that there is no significant difference in the mean perceived impact of the metaverse on learning and development across different age groups, while the alternative hypothesis would be that there is a significant difference.

Since the obtained p-value is greater than the alpha level of 0.05, the null hypothesis cannot be rejected. This suggests that there is no significant difference in the perceived impact of the metaverse on learning and development across different age groups in the sample.

REGRESSION MODEL BETWEEN AGE AND IMPACT OF METAVERSE ON LEARNING AND DEVELOPMENT

Hypothesis

H_0: There is significant impact of different age groups on metaverse on learning and development.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.102[a]	.010	-.025	.67977

a. Predictors: (Constant), Age.

The regression model you have described has age as the independent variable and the impact of the metaverse on learning and development as the dependent variable. The value of R squared is 0.10, which indicates that about 10% of the variability in the dependent variable can be explained by the independent variable.

This suggests that age may have some influence on the perceived impact of the metaverse on learning and development, but other variables may also be playing a role. Correlation does not imply causation. While there may be an association between age and the perceived impact of the metaverse on learning and development, it does not necessarily mean that

age is causing the observed differences in perception.

Overall, the value of R squared suggests that age alone may have a moderate influence on the perceived impact of the metaverse on learning and development.

RESEARCH DISCUSSION

Recruitment, payroll, performance management, and training are just a few of the HR activities that might be completely transformed by the usage of blockchain technology in HR. Using blockchain technology can improve HR processes' security, transparency, and efficiency, reduce the need for manual input, and possibly save businesses a lot of time and money. Regulatory and legal concerns, interoperability issues, and adoption barriers are only a few of the issues that still need to be resolved. Notwithstanding these obstacles, HR professionals should think about the potential advantages of blockchain technology and examine how it might help their company's HR procedures. More businesses are likely to experiment with the technology and look into its potential advantages as it develops and matures. As a result, HR professionals need to be aware of the most recent advancements in blockchain technology and think about how they might use it to streamline their processes. To fully explore the possibilities of blockchain in HR, including its effects on corporate culture and employee privacy, more research is required. The results, however, imply that blockchain has the ability to alter HR processes and how businesses manage their human resources.

HR procedures can be carried out more effectively in the metaverse thanks to virtual human resource management solutions like immersive work environments, data visualization tools and algorithms, and behavioral analytics. The cultures of legal education are changing as a result of simulations, learning, and the metaverse. Virtual skill development, tools for remote work, employee engagement, and staff retention on blockchain-based metaverse platforms are developing as new trends. The metaverse has enormous potential to change learning and growth in the HR field, in conclusion. Technology is predicted to revolutionize how we work, study, and engage in immersive and interesting environments as it continues to advance. In order to stay effective and competitive, businesses and HR professionals must keep up with the most recent trends and advancements in the metaverse.

CONCLUSION

It is clear from the research that learning, development, and HR practices are significantly impacted by the metaverse. Immersive workplaces are increasingly utilizing virtual reality, 3D modelling, and wearable biological measuring equipment, creating a special possibility for skill development and training. Frameworks and procedures for expanded human resource development must be revised to meet the needs of the metaverse era. Unprecedented prospects for HR development are provided by workplace technology, deep learning computer vision algorithms, and virtual employee training and skill development.

Blockchain technology has the potential to revolutionize human resource management. It can enhance the security, transparency, and efficiency of HR processes such as recruitment, payroll, performance management, and training. Blockchain technology is increasingly being recognized as a disruptive force that can transform various industries, including HR. The studies reviewed suggest that blockchain has the potential to improve data management, eliminate intermediaries, and reduce costs in HR processes. However, the technology is still in its early stages, and there are many technical, legal, and regulatory challenges that need to be addressed before widespread adoption can occur.

One of the main advantages of using blockchain in HR is that it can improve the accuracy and transparency of employee data. By using a decentralized ledger system, HR professionals can ensure that employee records are secure, tamper-proof, and easily accessible. This can help organizations comply with data protection regulations and avoid costly data breaches.

Another benefit of using blockchain in HR is that it can help to create more efficient and trustworthy HR processes. For example, smart contracts can be used to automate tasks such as onboarding, performance reviews, and payroll, reducing the need for manual input and potentially saving organizations significant time and money. However, there are challenges that need to be addressed such as regulatory and legal issues, interoperability, and adoption barriers. Further research is needed to explore the full potential of blockchain in HR, including its impact on organizational culture and employee privacy. Overall, the findings suggest that HR professionals should be aware of blockchain technology and its potential applications in their field.

While there are still many challenges to overcome, the research suggests that the potential benefits of blockchain in HR are significant.

As more organizations begin to experiment with blockchain technology, it is likely that we will see a growing number of use cases and success stories emerging in the future. In conclusion, HR professionals should consider the potential benefits of blockchain technology and explore how it can be used to improve their organization's HR processes. The technology can help organizations streamline their HR processes, reduce fraud and errors, and enhance trust among stakeholders. As the technology evolves and becomes more mature, it is likely that more organizations will begin to explore its potential benefits. Therefore, it is important for HR professionals to stay informed about the latest developments in blockchain technology and consider how it can be leveraged to improve their operations.

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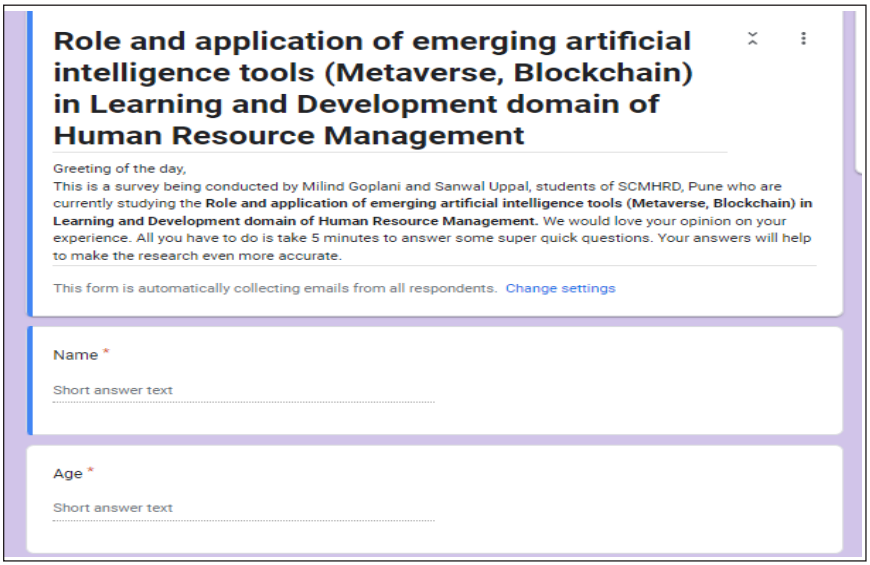
APPENDIX

Questionnaire



Role and application of emerging artificial intelligence tools (Metaverse, Blockchain) in Learning and Development domain of Human Resource Management

Greeting of the day,
This is a survey being conducted by Milind Goplani and Sanwal Uppal, students of SCMHRD, Pune who are currently studying the **Role and application of emerging artificial intelligence tools (Metaverse, Blockchain) in Learning and Development domain of Human Resource Management.** We would love your opinion on your experience. All you have to do is take 5 minutes to answer some super quick questions. Your answers will help to make the research even more accurate.

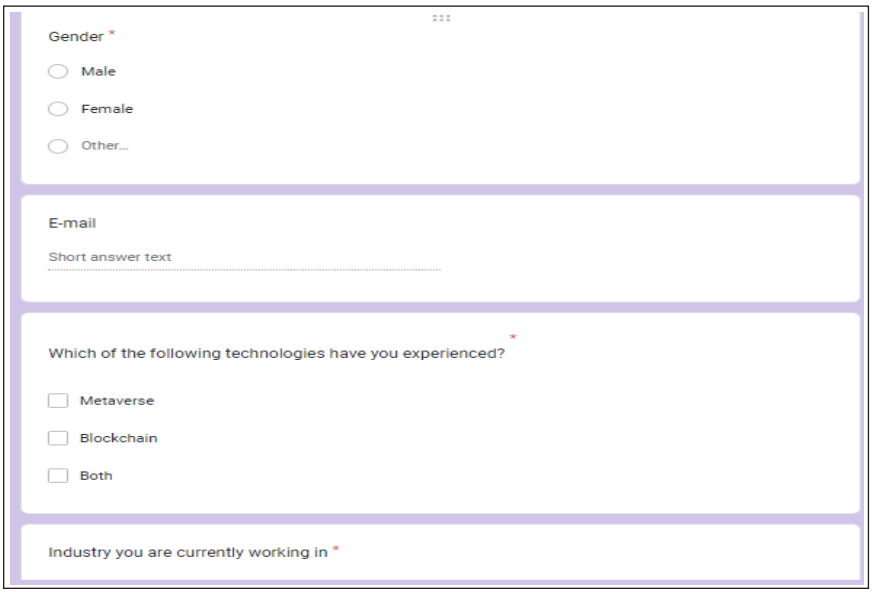
This form is automatically collecting emails from all respondents. Change settings

Name *

Short answer text

Age *

Short answer text



Gender *

- Male
- Female
- Other...

E-mail

Short answer text

Which of the following technologies have you experienced? *

- Metaverse
- Blockchain
- Both

Industry you are currently working in *

Industry you are currently working in *

Short answer text

Job Level *

- Top Level
- Mid Level
- Entry Level

What are the current learning and development techniques adopted by your organisation? *

Long answer text

What L&D processes could be automated according to you? *

Short answer text

Use of Metaverse in Learning and Development domain of Human Resource Management

What benefits specific to your organization/industry do you hope to obtain from using Blockchains? *

- Improved business efficiency
- Identifying new ways of automating business processes among partners

What benefits specific to your organization/industry do you hope to obtain from using Blockchains? *

- [ ] Improved business efficiency
- [ ] Identifying new ways of automating business processes among partners
- [ ] Better transaction integrity and visibility
- [ ] Increased transaction speed
- [ ] Better data protection provided by Blockchain's ability to eliminate points of failure in business networks
- [ ] Lower transaction cost
- [ ] Stronger working relationship with partners (via better collaboration, etc.)
- [ ] Enabling new business models (e.g., in contract management, financial transaction management, identit...
- [ ] Time savings (i.e., reducing time required for settling disputes, finding information, and verifying a transa...
- [ ] Reduction of risks (i.e., by eliminating the risk of collusion, tampering, and unintentional leakage of infor...
- [ ] Don't know
- [ ] Other (please briefly describe)
- [ ] Other...

In which domains do you see Metaverse having the most significant impact? *

- ○ Asset management
- ○ Contract management (e.g., "smart contracts", etc.)
- ○ Customer engagement
- ○ Customer verification
- ○ Dispute resolution
- ○ Financial transaction management
- ○ Procurement
- ○ Regulatory compliance
- ○ Risk management
- ○ Security
- ○ Don't know
- ○ Others (please briefly describe):
- ○ Other...

The company used appropriate methodologies to encourage the creative activity of the metaverse *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I would like to carry out academic activities in the metaverse *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The interaction in the metaverse has modified my habits of organizing free time *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The three-dimensional visual effect (3D) of the environment and the characters of the metaverse have favored my motivation to interact *

1	2	3	4	5

Immersion in the metaverse has favored my ability to learn conceptual content (facts, data, and concepts) *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Immersion in the metaverse has favored my ability to learn procedural content (know how) *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Immersion in the metaverse has favored my ability to learn attitudinal content (values, attitudes, and norms) *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

1. Immersion in the metaverse has improved my level of communication *

Immersion in the metaverse has improved my ability to process information and digital competence *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Immersion in the metaverse has improved my level of social and civic competence *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Immersion in the metaverse has improved my level of competence in autonomy and personal initiative *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Immersion in the metaverse has improved my level of competence in learning to learn *

1	2	3	4	5

Blockchain Technology in Learning and Development domain of Human Resource Management

I like to receive my payments through blockchain *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Immersion in the metaverse has allowed me to know and put into practice the proper use of multimedia communication tools within the teaching and learning process *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

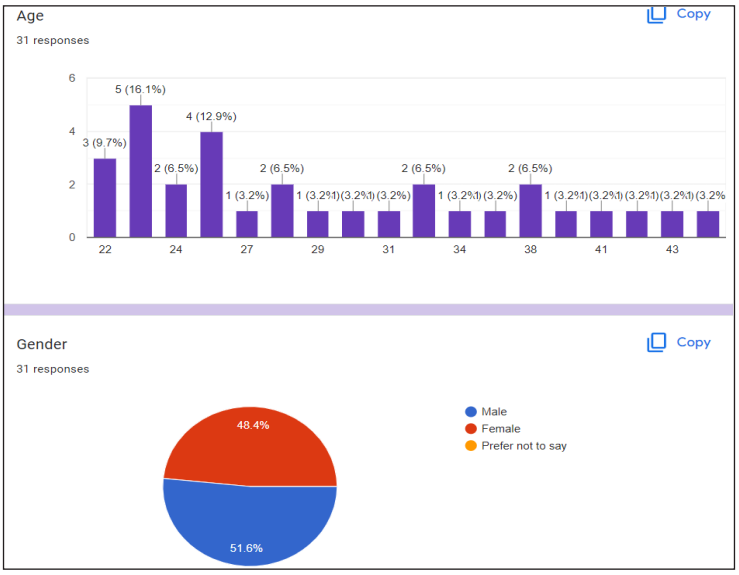
What benefits specific to your organization/industry do you hope to obtain from using Blockchains? *

- [ ] Improved business efficiency
- [ ] Identifying new ways of automating business processes among partners
- [ ] Better transaction integrity and visibility
- [ ] Increased transaction speed
- [ ] Better data protection provided by Blockchain's ability to eliminate points of failure in business networks
- [ ] Lower transaction cost
- [ ] Stronger working relationship with partners (via better collaboration, etc.)
- [ ] Enabling new business models (e.g., in contract management, financial transaction management, identit...
- [ ] Time savings (i.e., reducing time required for settling disputes, finding information, and verifying a transa...
- [ ] Reduction of risks (i.e., by eliminating the risk of collusion, tampering, and unintentional leakage of infor...
- [ ] Don't know
- [ ] Other (please briefly describe)
- [ ] Other...

In which domains do you see Blockchains having the most significant impact? *

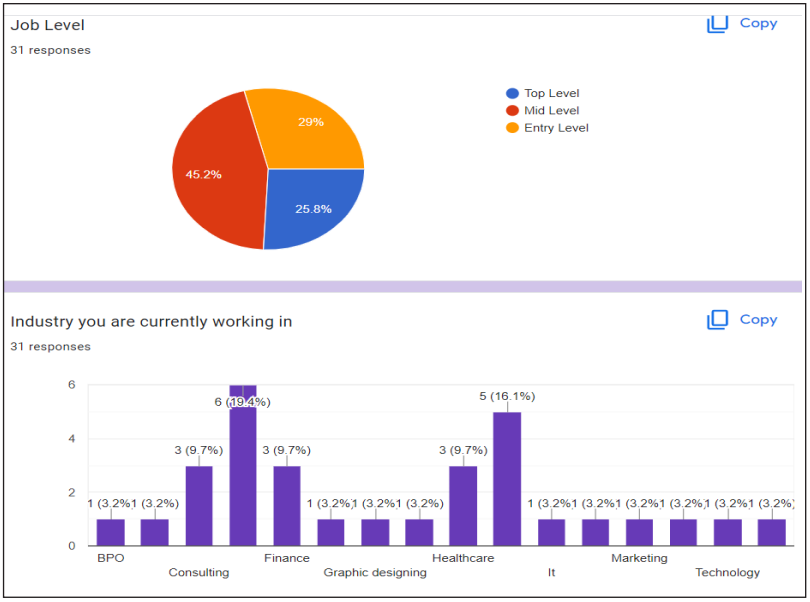
- [ ] Asset management
- [ ] Contract management (e.g., "smart contracts", etc.)
- [ ] Customer engagement
- [ ] Customer verification
- [ ] Dispute resolution
- [ ] Financial transaction management
- [ ] Procurement
- [ ] Regulatory compliance
- [ ] Risk management
- [ ] Security
- [ ] Don't know
- [ ] Others (please briefly describe):
- [ ] Other...

RESULTS AND ANALYSIS OF QUESTIONNAIRE



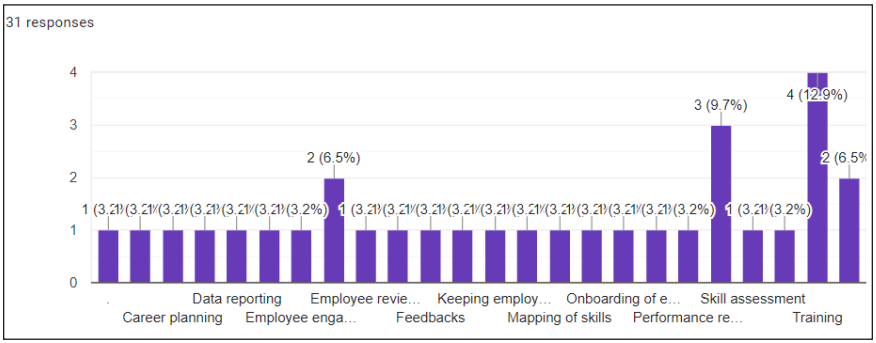
Age Range: Of the respondents, 48.4% fell within the 22–30 age range, with the remainder falling outside of this range. This implies that the sample is young and could not be entirely representative of the population.

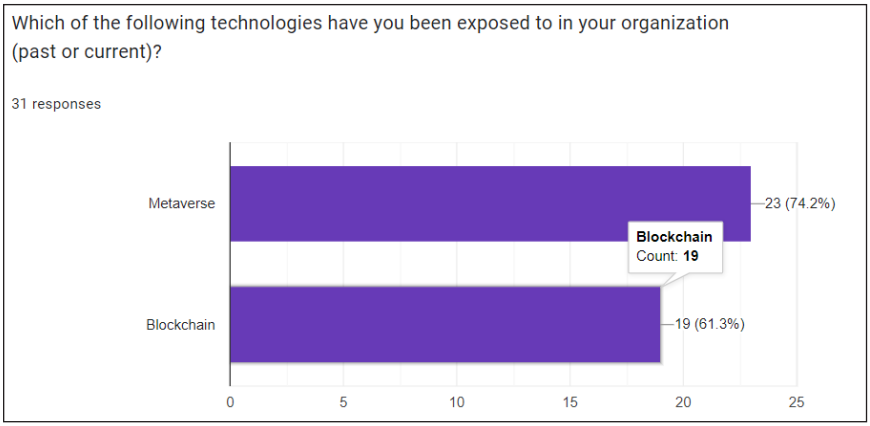
Gender: The sample had a relatively equal gender distribution, with 48.4% of respondents being female and the remaining respondents being male.



Job Levels: Of the respondents, 45.2% worked in middle management, 29% in entry management, and the remaining 75% in top management. This indicates that a wide range of job levels are represented in the sample.

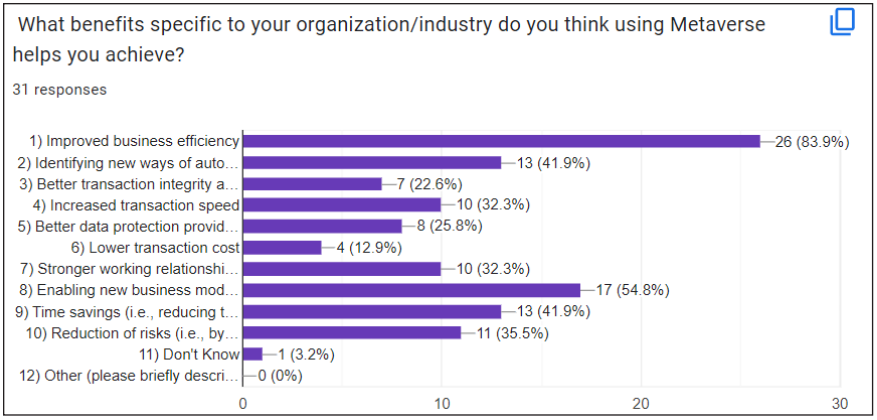
Industries: The fact that 67.8% of respondents were from the IT, finance, FMCG, consulting, and healthcare sectors suggests that these sectors may be the most interested in the survey's issues.

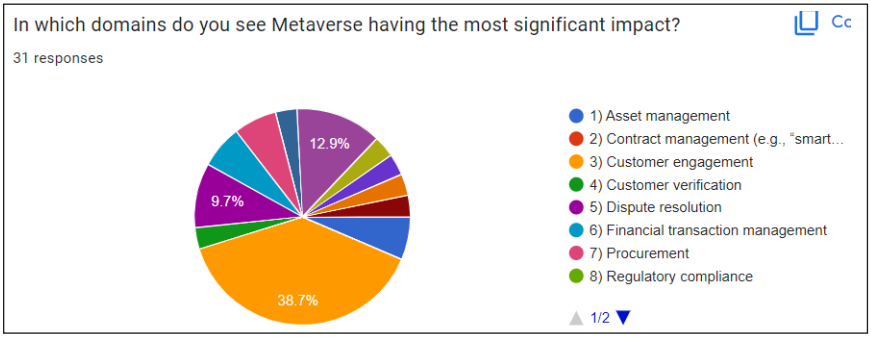




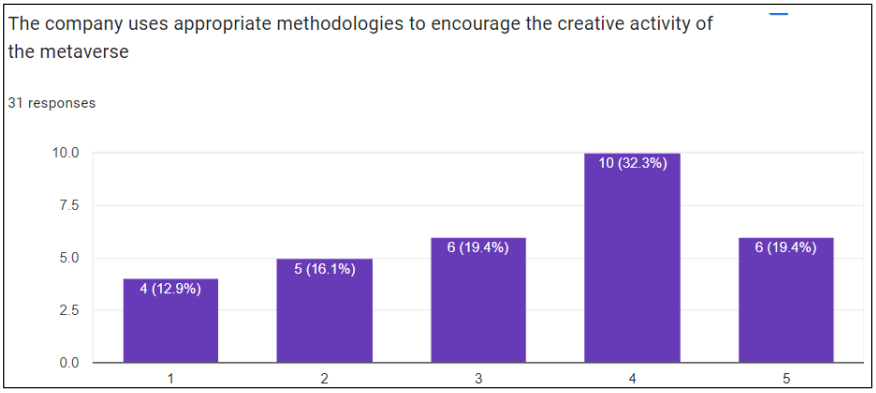
Employee Procedures: A possible interest in the automation of HR operations was indicated by the 35.6% of respondents who thought that employee onboarding, recruiting, training, and training techniques could all be automated.

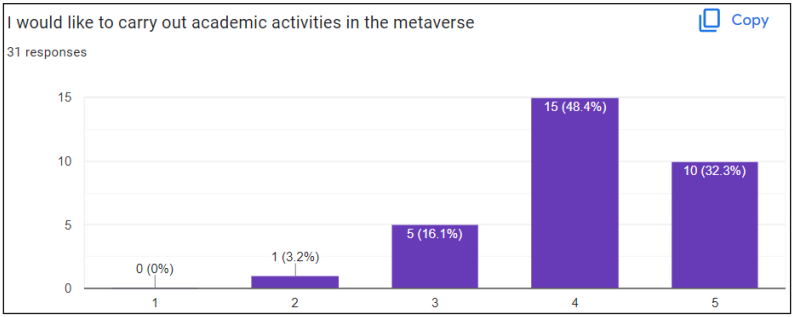
The metaverse has been used by more individuals than blockchain technology. Those who have used blockchain technology and those who have experienced the metaverse overlap. Several responders' experiences with both blockchain and the metaverse imply that there might be some eventual fusion or crossover between both technologies.





Metaverse: The belief that metaverse can increase corporate efficiency was expressed by a sizable majority of respondents (83.9%), followed by the identification of new business models (54.8%) and business process automation (41.9%). According to the majority of respondents (38.7%), the metaverse will have the biggest influence on consumer participation.



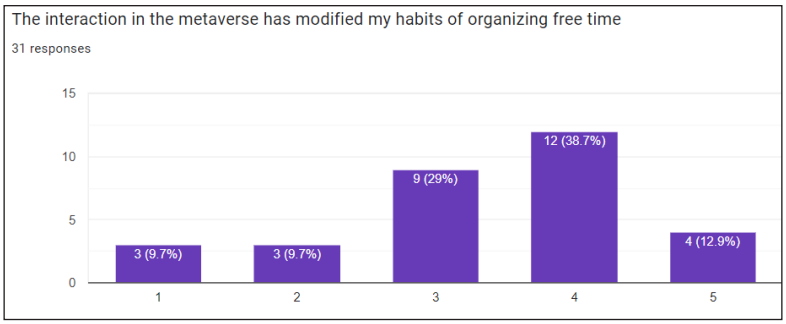


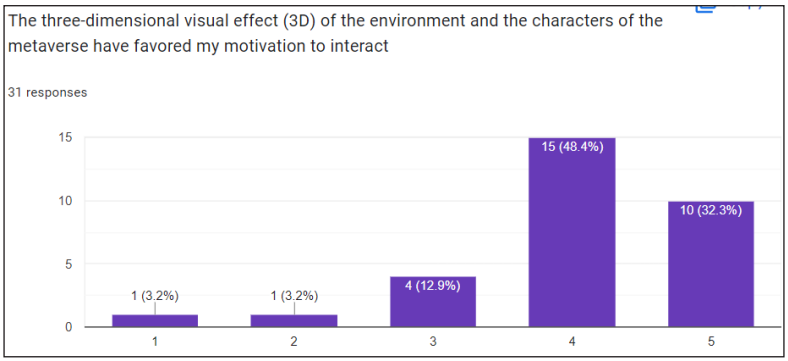
Question 1 - the company uses appropriate methodologies to encourage the creative activity of the metaverse: The majority of respondents (10 out of 31) gave a score of 4, indicating that they only marginally disagree that the business employs effective approaches to foster creative engagement in the metaverse.

Only 4 people gave the answer 1, showing a substantial disagreement with this assertion.

Question 2 - I would like to carry out academic activities in the metaverse: 25 out of the 31 respondents gave a score of 4 or 5, signifying agreement or strong agreement with this statement.

Only one respondent, who marked 2, disagreed only slightly with this assertion.

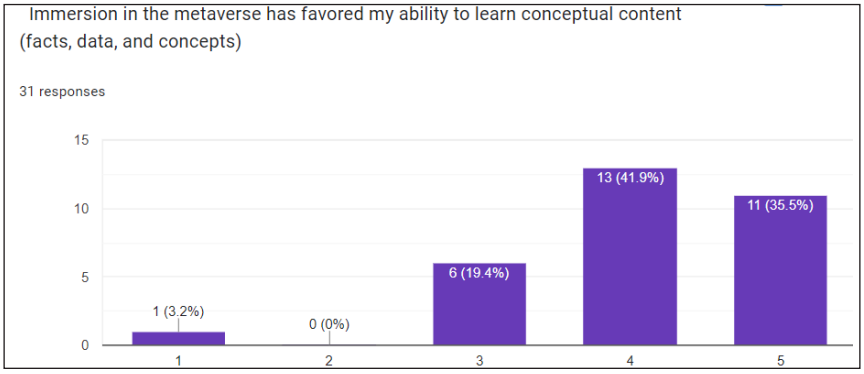


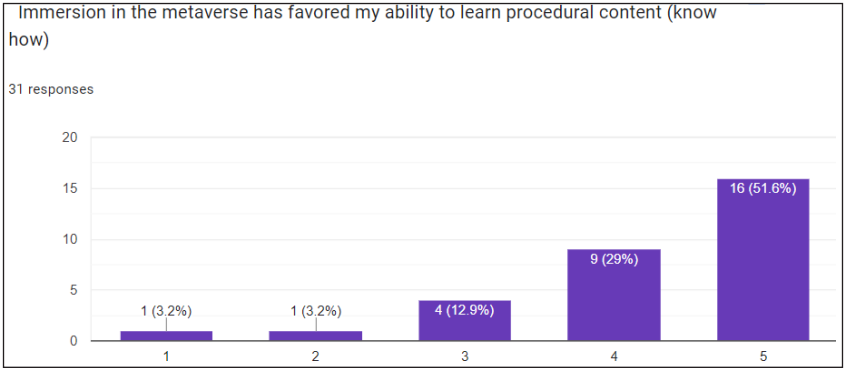


Question 3 - The interaction in metaverse has modified my habits of organizing my free time: The majority of responders (26 out of 31) gave a score of 4 or 5, indicating that they agree or strongly agree that the interaction in the metaverse has altered their routines for managing free time.

Only 3 people gave the answer 1, showing a substantial disagreement with this assertion.

Question 4 - The three-dimensional visual effect (3D) of the environment and the characters of the metaverse have favored my motivation to interact: 25 out of the 31 respondents gave a score of 4 or 5, signifying agreement or strong agreement with this statement. Just 2 respondents said they strongly disagreed with this statement by marking 1.



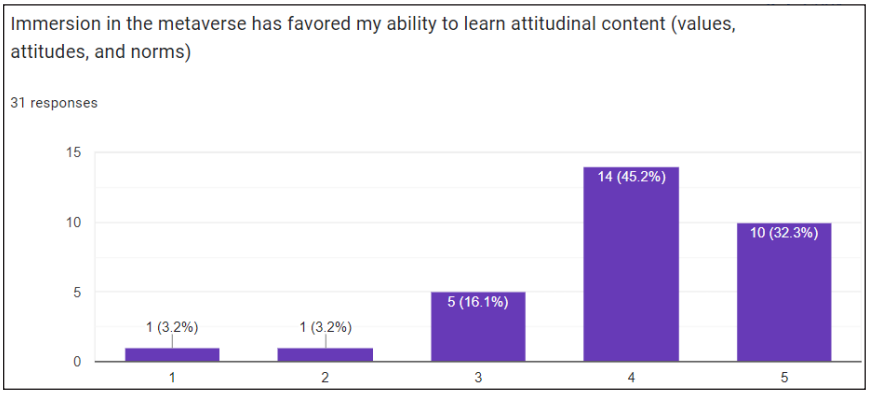


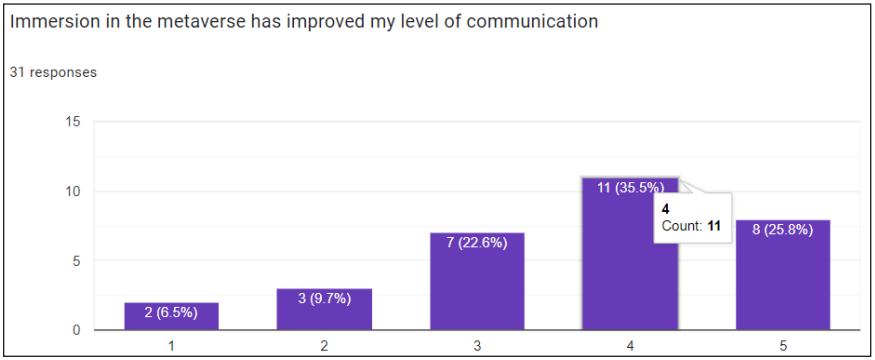
Question 5 - Immersion in the metaverse has favored my ability to learn conceptual content (facts, data, and concepts): 24 out of the 31 respondents gave a score of 4 or 5, signifying agreement or strong agreement, with this statement.

Only 1 respondent chose 1, expressing their vehement disagreement with this assertion.

Question 6 - Immersion in the metaverse has favored my ability to learn procedural content (know how): 25 out of the 31 respondents gave a score of 4 or 5, signifying agreement or strong agreement with this statement.

Just 2 respondents said they strongly disagreed with this statement by marking 1.



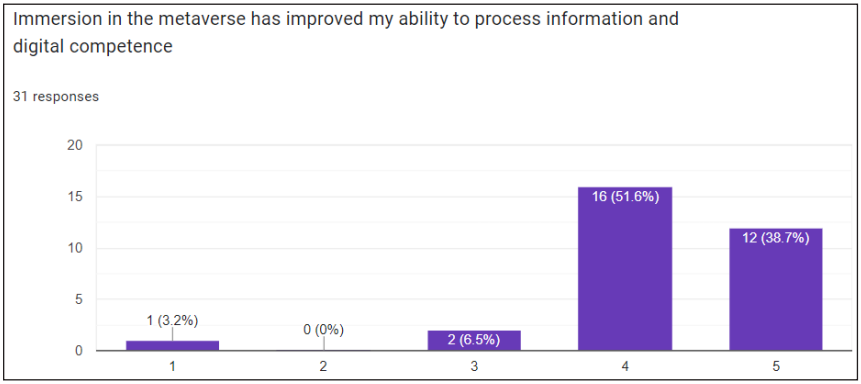


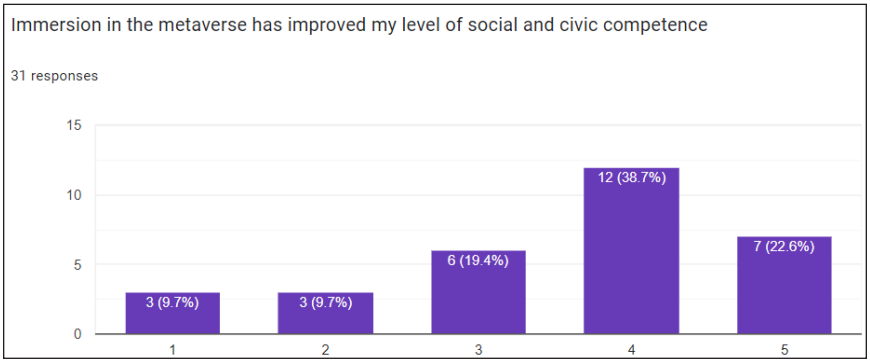
Question 7 - Immersion in the metaverse has favored my ability to learn attitudinal content (values, attitudes, and norms): 24 out of the 31 respondents gave a score of 4 or 5, signifying agreement or strong agreement, with this statement.

Just 2 respondents said they strongly disagreed with this statement by marking 1.

Question 8 - Immersion in the metaverse has improved my level of communication: 19 out of the 31 respondents gave a score of 4 or 5, indicating agreement or strong agreement with this statement.

Only 5 respondents indicated that they disagreed with this statement somewhat or strongly by marking 1 or 2.



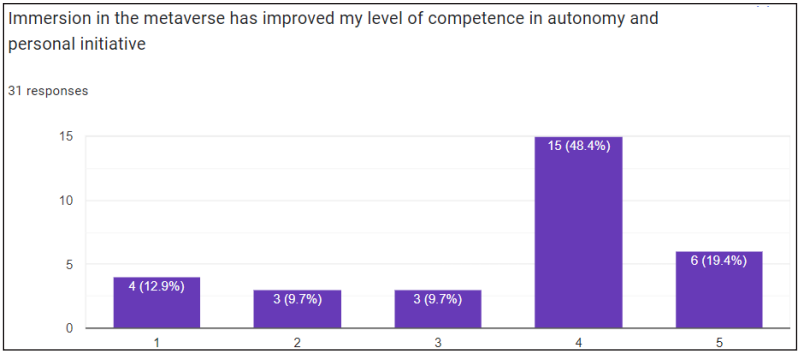


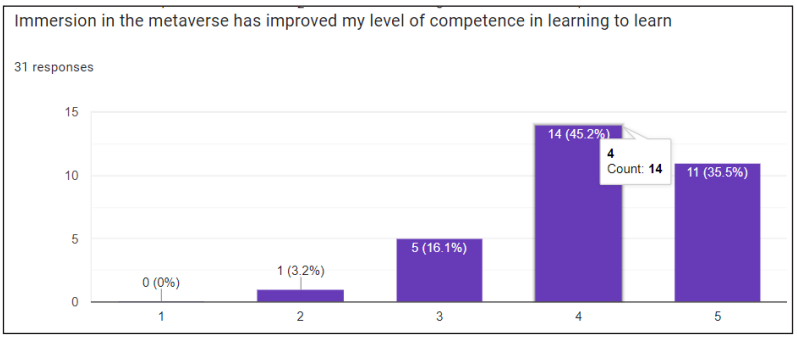
Question 9 - Immersion in the metaverse has improved my ability to process information and digital competence: The majority of respondents (28 out of 31) marked 4 or 5, indicating that they agree or strongly agree with this statement.

Only 1 respondent marked 1, indicating that they strongly disagree with this statement.

Question 10 - Immersion in the metaverse has improved my level of social and civic competence: 26 out of the 31 respondents (or the majority) gave this statement a 4 or 5, indicating their agreement or strong agreement.

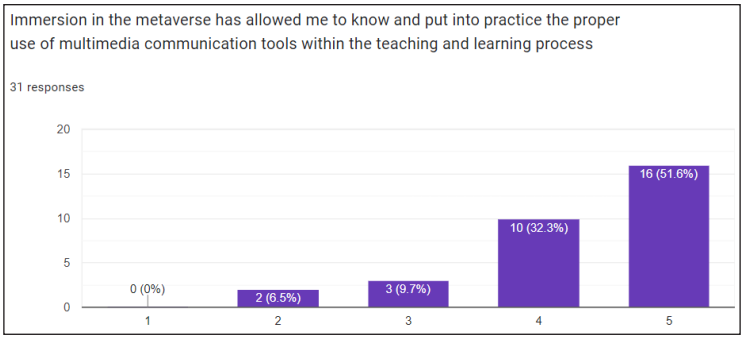
Six respondents, or 1 or 2, said that they disagreed with this statement only somewhat or strongly.





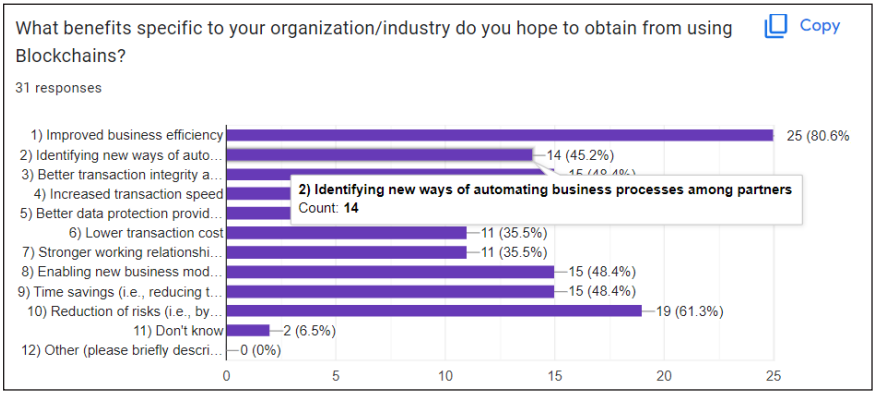
The majority of respondents (21 out of 31) to Question 11 marked either 4 or 5, indicating that they agree or strongly agree that engaging in the metaverse has increased their level of competency in autonomy and self-initiative. Yet, a small number of responders (7 out of 31) still indicated that they disagree or strongly disagree with this statement by marking either 1 or 2.

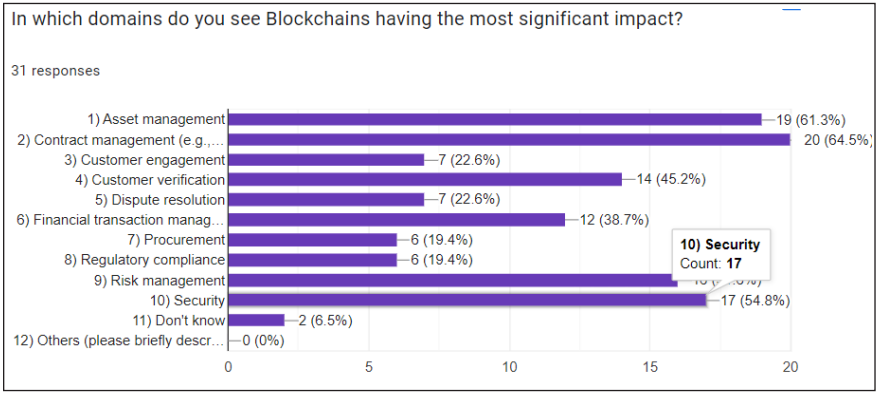
The majority of respondents (25 out of 31) to Question 12 marked either 4 or 5, indicating that they agree or strongly agree that immersion in the metaverse has increased their level of competency in learning to learn. Only one respondent chose option 2, signifying only a little disagreement, while the other five chose option 3, and signifying neutrality.



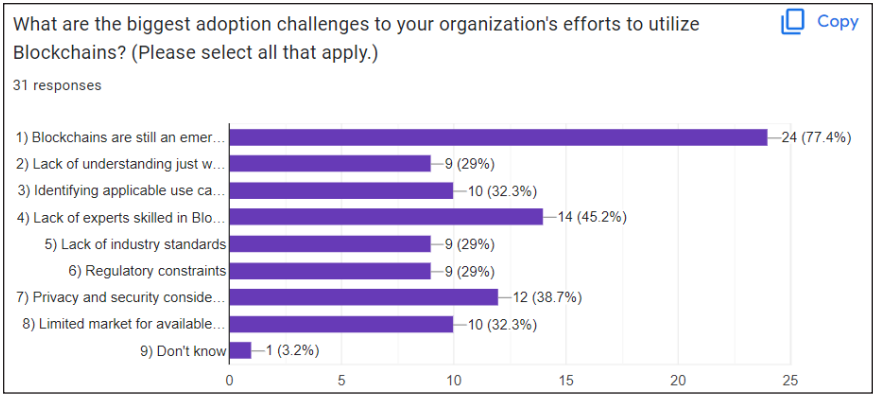
The majority of respondents (26 out of 31) to Question 13 marked either 4 or 5, indicating that they agreed or strongly agreed that being immersed in the metaverse had given them the knowledge and practical experience necessary to use multimedia communication tools effectively during the teaching and learning process. Only two respondents chose option 2, signifying a little disagreement, while the other three chose option 3, and signifying neutrality.

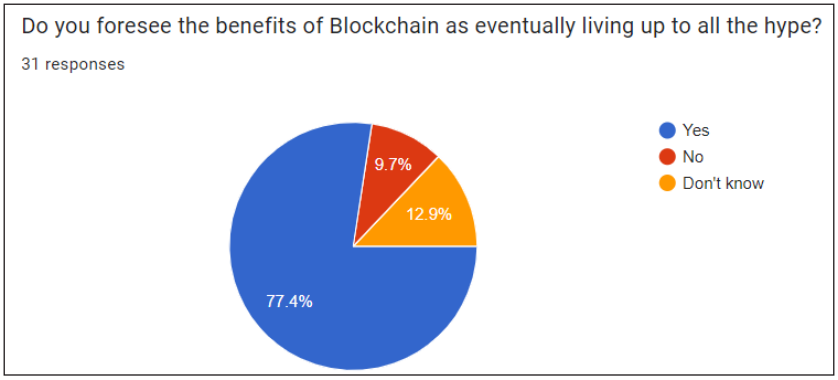
BLOCKCHAIN





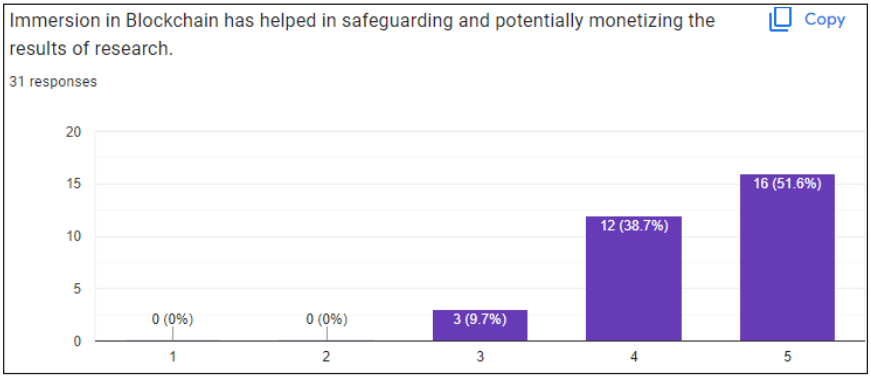
Blockchain: A sizable majority of respondents (80.6%) think it will increase corporate efficiency, with its utility in lowering risks coming in second (61.3%). The majority of respondents (61.3% and 64.5%, respectively) think that the areas of asset management and contract management will have the biggest effects on consumer engagement due to blockchain.



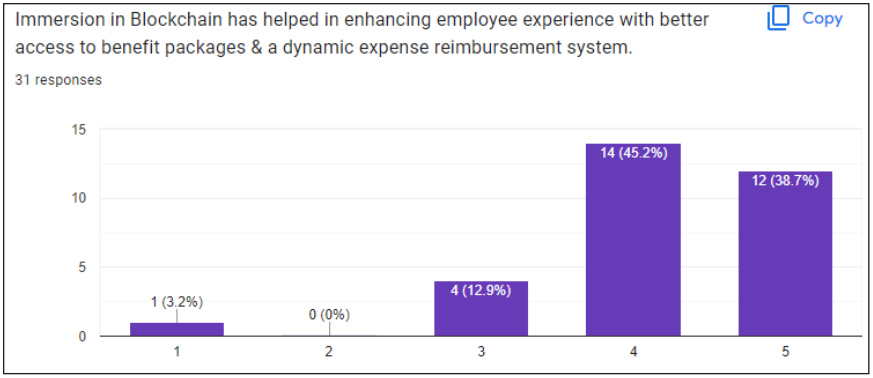


Challenges with Adoption: According to 77.4% of respondents, the largest obstacle to firms using blockchain is that it is a relatively new technology.

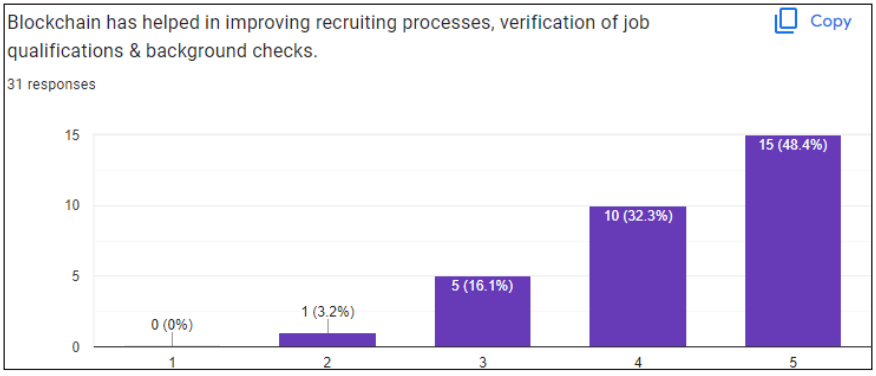
Blockchain Hype: A sizable majority of respondents (77.4%) think that the excitement surrounding blockchain technology will be justified.



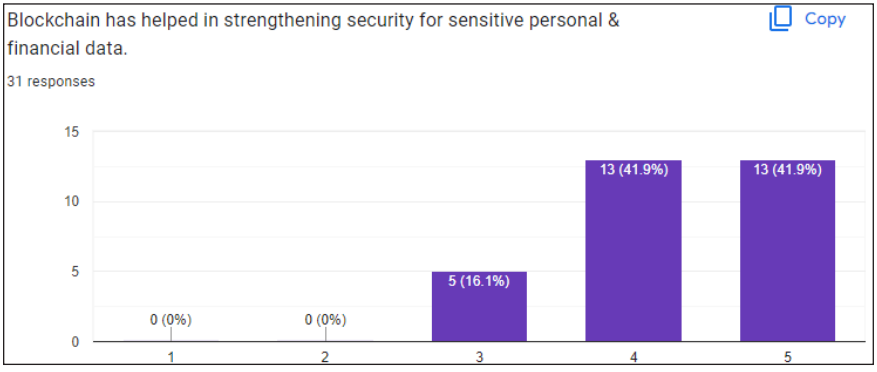
Around 16 respondents, i.e. 52% of the sample believes that blockchain has helped in safeguarding and potentially monetizing the results of research.



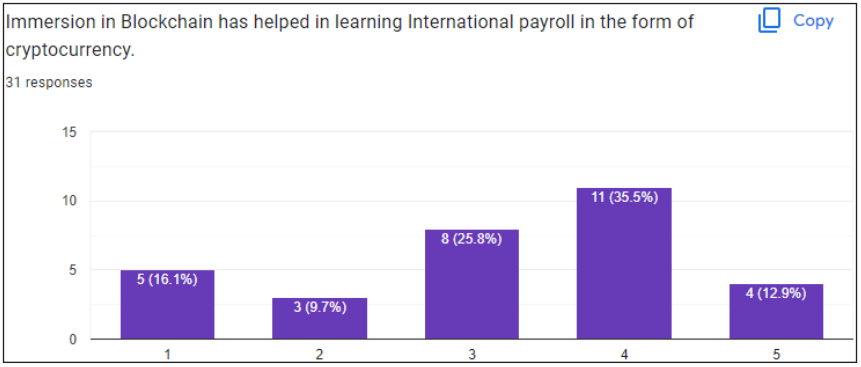
The majority of respondents (45.2% and 38.7%, respectively) believe that blockchain has played a very important role in enhancing employee experience with better access to benefit packages & a dynamic expense reimbursement system.



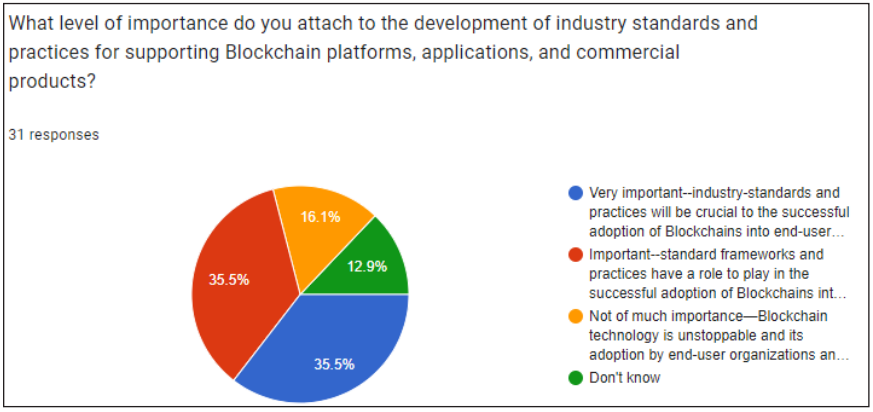
Around 25 respondents (15, 48.4% and 10, 32.3% respectively) believe blockchain has played a very important role in improving recruiting processes, verification of job qualifications & background checks.



Around 26 respondents (13, 41.9% and 13, 41.9% respectively) believe blockchain has played a very important role in strengthening security for sensitive personal & financial data



Around 15 respondents (11, 35.5% and 4, 12.9% respectively) believe blockchain has played an important role in learning International payroll in the form of crypto currency.



Around 71% of the sample believes that it is important for the development of industry standards and practices to supporting Blockchain platforms, applications, and commercial products as industry-standards and practices will be crucial to the successful adoption of Blockchain into end-user organizations and commercial enterprises and also standard frameworks and practices have a role to play in the successful adoption of Blockchain into end-user organizations and commercial enterprises.