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Impact of Novel Technologies for Business Excellence: A Case Study on Metaverse

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Abstract

Business excellence banks on the strategical approach for its growth, even in critical times. COVID-19 has created a challenging environment and enforced to explore novel methods for business sustainability. In this scenario it has become prime factor to engage futuristic technologies as part of the business model.

Metaverse is an evolving technology across globe, which promises higher return on investments (ROI) while offering state-of-the-art facilities to customers. It is found, during a study about impact of Metaverse as novel technology and how it can impact the life of human beings. The study also included to assess the business opportunities for developers and investors apart from benefit to the users. The research highlights the factors influencing future of Metaverse and prediction about its full pledged implementation in the industries. It is to state that the study covered across the globe and India for the responses with a spread over different age groups and knowledge levels about the future technology.

The responses show that such novel technologies need to made available at affordable price and lot of awareness to be created among the users for better impact and utilisation. This paper presents the diversity of data collection, responses, analysis and summarises the prediction of Metaverse as business opportunity with time lines.

Keywords: Metaverse, Novel Technology, Business Continuity, Sustainability, Data Analysis

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Introduction

Emerging technologies have proved to have a positive impact on lifestyle, education, and career goals. The development of technologies for remote work culture and applications has been impacted by COVID-19 throughout the world. This increased the comfort levels for end users while providing the developers with excellent commercial and job options. Additionally, it made Web 3.0 platforms more competitive for the advancement of augmented reality, virtual reality, and artificial intelligence.

Together, AI, AR, and VR make up the Metaverse. Metaverse is a technology to create an alternate and virtual world to perform the activities that can be done in real world and in real time with parallel actions. But because it's new, it needs to be properly evaluated before being put into practice. The goal of this research is to shed light on the Metaverse and its business opportunities with a forecast for its future. A survey of investors, promoters, and potential technology users was undertaken.

Literature review

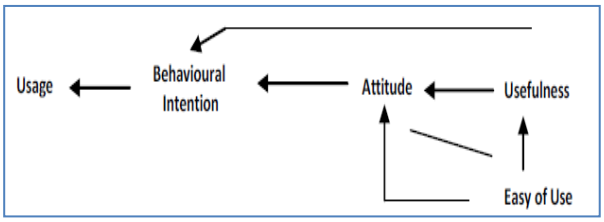
COVID-19, despite being a pandemic for humanity, has encouraged many, if not the entire planet, to think creatively, invent new technology, and delve into self-sufficiency. This transformation and exploratory movement resulted in the establishment of start-ups and the flourishing of fresh technology.

According to Maria-Elena (2015), people behave differently when it comes to accepting or rejecting novel technologies. She also defined "Technophilia" as "acceptance of technology" and "Technophobia" as "reluctance to accept new technology."

Giuseppa et al. (2020) investigated and introduced the notion of "Positive Technology," which will have a significant impact on people's acceptance of emerging technology. It describes the potential of positive technologies and their goals, which have an impact on user psychology. They also indicated that the success of these positive technologies will be determined by the following factors: emotional quality, engagement and actualization, and connectivity.

Maria-elena (2015) described how people get addicted to IOT and gaming owing to certain comfort criteria. She did, however, mention an approach in which individuals either embrace or reject a technology.

Fig 1: Technology acceptance model, as quoted by Maria-Elena (2015)



As seen in Figure 1, a technology is approved based on the criteria of ease of use, utility, which is determined by the individual's attitude, and intention of use. This article also examines the causes of "technophilia" and "technophobia."

Giuseppa et al. (2020), on the other hand, have examined the elements impacting good technologies. It is also proposed that unique technologies be developed and applied as soon as possible in order to reach the people and serve the purpose; else, the technologies may suffer rejection. Strumsky et al. (2015) published their research on approaches for detecting novelty in new technology. They also examined the concepts of "technological novelty taxonomy" and "de novo" creation in order to identify technological innovations.

In their discussion, Pezzoni et al (2021) concentrated on estimating the life of innovative technologies and their derivatives. The authors of this study

analyzed over 10,000 "trajectories" or derivatives to determine the take off time impact various technology. The authors developed a system for evaluating patents in order to comprehend the technological impact and established a threshold value to be evaluated. They looked at patents for new technologies from 1985 to 2015, which resulted in over 10,000 inventions and over 2,000,000 technology variants. According to the analysis, the technologies with the highest impact factor and the longest take off time are shown. The patent data did not cover all of the innovations, which is one of the study's weaknesses. Another story in the Times Of India on May 14, 2022 stated that "CCMB scientists develop India's first mRNA vax tech" to combat CORONA and other illnesses. This paper also suggests that such unique technologies are extremely required for society and have an economic influence while also having a psychological impact. Ajay Sudhir bale et al. (2022) have conducted study on Metaverse and assessed the pros and cons of the technology. They have concluded that despite of cons of Metaverse, like any other technology, Metaverse may create an impact due to technological advancement in recent times and in future as well.

Deloitte (2022) review article describes that Metaverse is a promising technology and one needs to acts first to grab the business. It is also advised to explore every opportunity for its business model and implementation.

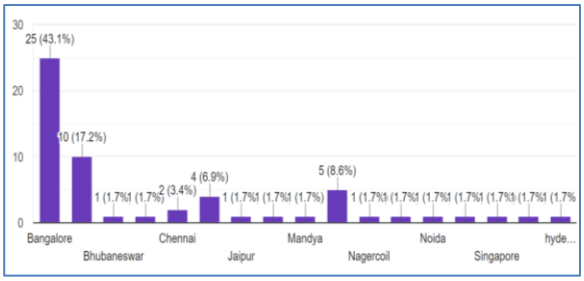
In view of the above literature review, studies were conducted to determine the need for critical technologies and their applications, but they did not focus on how these technologies reach end users and how much awareness is required to ensure the true impact of such technologies. As a result, the following sections have examined the identification of a crucial technology and the technique used.

Methodology and Strategy

The future of any new business and technology depends on market survey and data analysis. In view of this, a methodology is adopted to collect data strategically across the globe from different gender and age groups. It is also ensured to collect the data from investors, developers and end users with various knowledge levels of Metaverse.

A questionnaire is prepared and circulated among different social media platforms and collected responses. The data is collected from demographically diversified respondents.

Fig 2: Demographical spread of respondents



The figure 2 shows that major contribution of the responses is from Bengaluru, however the responses covered were from major cities, tier 2 cities of India and outside India as well, viz., Singapore, USA etc., The questionnaire was classified into two categories viz., Impact factors and Social factors.

Table 1: Questions and classification

Variable No.	Questions	Classification
1	Helpfulness to users	Impact factors
2	Profit making for investor	
3	Profit making for Developer	
4	Comfort in using Metaverse	
5	Awareness required for utility and features of Metaverse	social factors
6	Affordability of technology	

The responses were measured on a scale of 1 to 5 for strongly disagree to strongly agree, respectively. The responses were planned to analyse for data adequacy and interdependency studies by using Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity. It is also planned to conduct Principal Component Analysis (PCA) to check the communality and variance of data.

Data Collection and Analysis

As mentioned in the previous section,the data is collected across the globe, gender, age groups and knowledge levels.

The table 2 shows that 58 responses were received for the questionnaire shared. The figures 3 and 4 shown that out of total responses majority of responses are from male and aged above. The figure 5 shows that the most of the respondents are beginners of Metaverse usage or learners.

Table 2: details of responses and questionnaire

Gender	Age in the range of	Place / City Name	How Metaverse is connected to you	Knowledge level about Metaverse	How many more years needed for Metaverse to be implemented in major sectors/ industries	How much helpful it is for common people	How much profit making it is for an investor	How much profitable it is for a developer	Comfort level of using/ working in Metaverse	Awareness for its utility and features is needed	Should such technologies be made available at affordable price
Male	41 - 50	Bengaluru	I am a promoter / Investor	Beginner	3-5	4	5	5	4	5	5
Male	41 - 50	Bangalore	I am a promoter / Investor	Beginner	1-2	1	3	3	2	3	3
Male	51 and above	Mumbai	Not connected	Beginner		1	1	1	3	5	5
Female	20 - 30	Jaipur	I am a User	Beginner	3-5	5	4	4	4	4	4
Male	41 - 50	Noida	Service	Middle level	3-5	3	3	3	2	4	5
Prefer not to say	31 - 40	Bangalore	I am a User	Beginner	6-10	1	4	3	3	5	5
Male	31 - 40	Nagercoil	I am a User	Beginner	6-10	3	4	5	4	4	5
Male	31 - 40	Chennai	I am a User	Beginner	3-5	4	5	5	4	5	5
Male	41 - 50	Bengaluru	I am a User	Beginner	3-5	3	2	2	4	4	4
Female	41 - 50	Bangalore	I am a User	Middle level	3-5	3	4	4	3	4	4
Male	41 - 50	Bangalore	I am a promoter / Investor	Middle level	1-2	3	3	3	2	5	5
Male	41 - 50	Bangalore	..	Beginner	3-5	3	5	4	3	3	5
Male	41 - 50	Bangalore	I am a User	Middle level	1-2	2	3	4	3	3	3
Male	41 - 50	Bangalore	Not connected	Middle level	3-5	2	4	2	3	4	4
Male	51 and above	Bangalore	I have seen demos	Beginner	6-10	3	3	2	3	3	5
Male	41 - 50	Hyderabad	Human Resource	Middle level	3-5	3	4	4	3	3	4
Male	51 and above	Hyderabad	Beginner	Beginner	1-2	4	3	4	4	5	5
Male	51 and above	hyderabad	I am a User	Beginner	6-10	4	4	4	3	4	5
Female	41 - 50	Bangalore	I am a User	Beginner	3-5	3	4	3	3	4	4
Male	51 and above	Mumbai	Not yet a user	Beginner	3-5	2	2	2	1	5	5
Male	41 - 50	Bangalore	Not user	Beginner		1	1	1	1	3	3
Male	51 and above	Hyderabad	I am a User	Beginner	3-5	4	4	4	2	2	5
Male	41 - 50	Bengaluru	I am a User	Middle level	12-15	3	5	4	3	4	5
Male	41 - 50	Jalandhar	I am a User	Beginner	3-5	4	5	5	2	5	5
Male	51 and above	Bangalore	Not connected	Beginner		3	3	3	1	4	4
Male	51 and above	Pune	I am a User	Beginner	3-5	3	5	3	3	5	5
Male	41 - 50	Singapore	Evaluation	Beginner	3-5	2	2	3	3	3	3
Male	31 - 40	Hyderabad	I am a User	Middle level	1-2	4	4	4	3	3	4
Male	41 - 50	Bangalore	I am a User	Beginner	3-5	2	5	5	2	2	3
Male	41 - 50	Mandya	I am a User	Middle level	3-5	2	3	3	3	3	4
Male	31 - 40	Sydney	I am a User	Beginner	3-5	3	4	3	3	1	5
Male	51 and above	Bangalore	I am a User	Beginner	6-10	2	3	1	3	5	5
Male	41 - 50	Chennai	Trainer	Beginner	3-5	4	5	4	4	5	5
Male	41 - 50	Bangalore	Not yet used	Rookie or not used at all	6-10	2	2	2	1	3	5
Male	41 - 50	Bangalore	I am a User	Middle level	3-5	4	4	4	4	5	5
Male	41 - 50	Bangalore	I am a User	Beginner	3-5	4	3	3	2	3	5
Male	51 and above	Bengaluru	Technology and domain SME	Middle level	1-2	3	3	2	3	4	5
Male	41 - 50	Bengaluru	Recruiter	Beginner	3-5	4	4	4	4	4	5
Male	51 and above	Bangalore	Educator	Middle level	3-5	2	3	2	3	3	4
Male	41 - 50	California	Metaverse consultant	Middle level	1-2	1	3	5	4	3	2
Female	41 - 50	Bangalore	I am a User	Beginner	3-5	3	3	3	3	3	5
Female	20 - 30	Mumbai	I am a User	Beginner	3-5	4	5	5	5	5	5
Male	20 - 30	Mumbai	I am a User	Beginner	6-10	3	3	3	2	3	5
Male	20 - 30	Bangalore	I am a User	Beginner	3-5	2	5	5	5	5	5
Male	20 - 30	Bangalore	I am a User	Beginner	1-2	3	3	3	3	3	3
Male	20 - 30	Bangalore	I am a User	Beginner	1-2	4	3	4	3	5	5
Male	20 - 30	Bengaluru	I am a User	Beginner	3-5	3	5	5	5	5	5
Male	31 - 40	Mumbai	I am not directly connected	Beginner	3-5	2	3	3	1	5	5
Female	20 - 30	Bangalore	I am a User	Beginner	3-5	4	4	4	4	4	4
Male	41 - 50	Bangalore	I am a User	Beginner	3-5	5	5	3	4	5	3
Male	51 and above	Bangalore	Ptofessor	Almost gnorant	6-10	2	1	1	1	5	4
Male	31 - 40	Bengaluru	I am a User	Beginner	6-10	1	1	3	2	1	5
Female	31 - 40	Bangalore	I am a User	Beginner	6-10	3	4	3	2	1	5
Female	41 - 50	Bengaluru	I am a User	Beginner	3-5	5	5	5	3	5	5
Female	20 - 30	Bengaluru	I am a User	Beginner	3-5	2	3	4	3	5	5
Male	41 - 50	Bengaluru	Believer	Beginner	3-5	2	4	3	3	4	5
Female	41 - 50	Bhubaneswar	I am a User	Beginner	6-10	3	2	4	4	3	5
Male	20 - 30	Nagpur	I am a User	Beginner	6-10	4	5	5	4	5	5

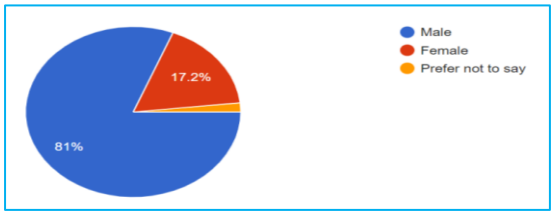


Fig 3: Gender share of respondents

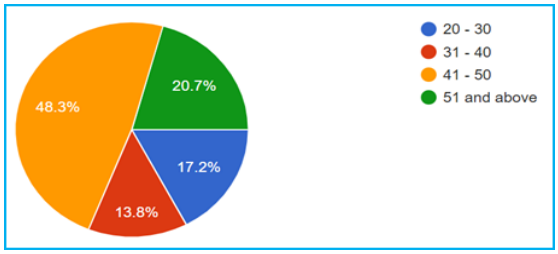


Fig 4: Age category of respondents

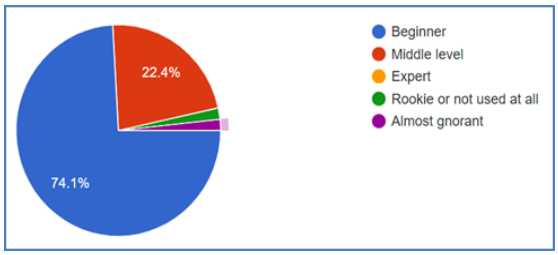


Fig 5: Knowledge level of respondents about Metaverse

The data is analysed by using SPSS tool for the KMO adequacy, Bartlett's test and PCA, as mentioned in the previous section. It is evident from the table 3 that KMO is 0.752 signifies data adequacy, as it should be higher than 0.5. Hence the data passes sample adequacy test. The Bartlett's test results show a high value to depict that variables are interdependent and there is a good amount of correlations.

Table 3: KMO and Bartlett's Test results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.752
Bartlett's Test of Sphericity	Approx. Chi-Square	96.808
	df	15
	Sig.	0

The PCA study shows, from the table 4, that Variable 3 , 2 and 5 are showing top 3 communalities i.e., profit for investors, developers and affordability of the technology are higher compared to other variables listed in the table 1.

Table 4: PCA results

	Communalities	
	Initial	Extraction
VARIABLE 1	1	0.579
VARIABLE 2	1	**0.761**
VARIABLE 3	1	**0.781**
VARIABLE 4	1	0.57
VARIABLE 5	1	0.548
VARIABLE 6	1	**0.705**

Table 5: PCA results for variance comparison

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
VARIABLE 1	2.796	46.603	46.603	2.796	46.603	46.603	2.548	42.467	42.467
VARIABLE 2	1.148	19.137	65.74	1.148	19.137	65.74	1.396	23.272	65.74
VARIABLE 3	0.802	13.368	79.108						
VARIABLE 4	0.527	8.792	87.899						
VARIABLE 5	0.455	7.59	95.489						
VARIABLE 6	0.271	4.511	100						

Table 5 shows that two factors are explaining 65.74 % of variance, which depicts that the variables under consideration are valid and have good impact in answering the research objectives.

Table 6: PCA results for Component Matrix

Component Matrix[a]		
	Component	
	1	2
VARIABLE 1	0.755	
VARIABLE 2	0.854	
VARIABLE 3	0.802	
VARIABLE 4	0.728	
VARIABLE 5		0.586
VARIABLE 6		0.767
Extraction Method: Principal Component Analysis.		
a. 2 components extracted.		
The variables considered are valid based on the above results, as they are above 0.5		

With reference to the above tables and analysis it is to be inferred that factors, helpfulness, profitability and comfort have shown 65% explorative nature, while awareness and affordability are not.

Results and Discussions

The current section details the results from the data collected for the questionnaire. The figure 6 and figure 7 shows that the Metaverse is going to be profit making for developers as well as for investors, though the majority have responded as can't say.

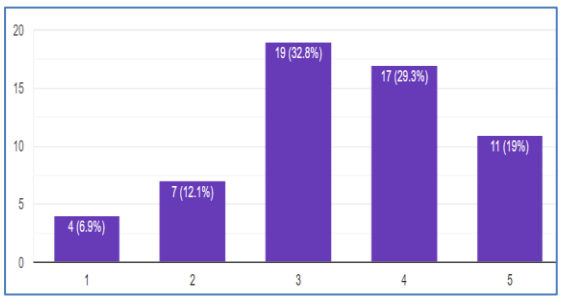


Fig 6: Profit making for developers

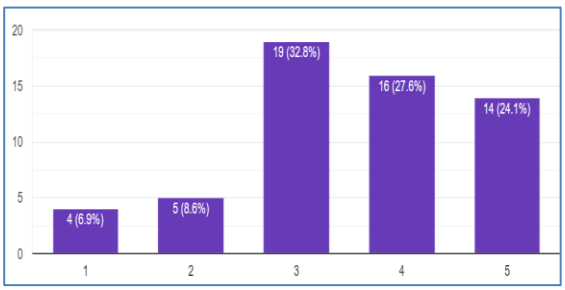


Fig 7: Profit making for investors

The figure 8 depicts the results for helpfulness of Metaverse for the users. It is evident from the figure that most of them, 34.5%, have stated don't know and similarly from figure 9 it can be stated that the comfort level of Metaverse is also not known, with 43.1%, to the respondents.

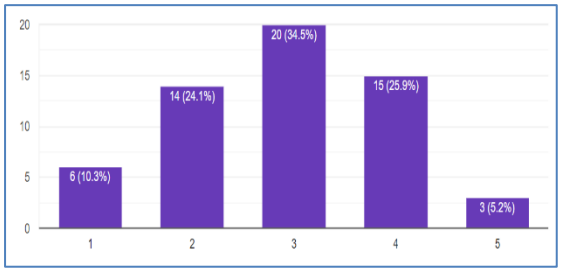


Fig 8: Helpfulness to users

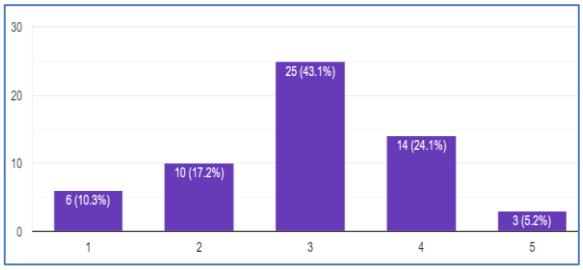


Fig 9: Comfortable to work in Metaverse

When it comes to the affordability and awareness requirement, the respondents have replied with strongly agreed, which replicates the need of creating awareness about the new technology and indicates the need of making it affordable to common people.

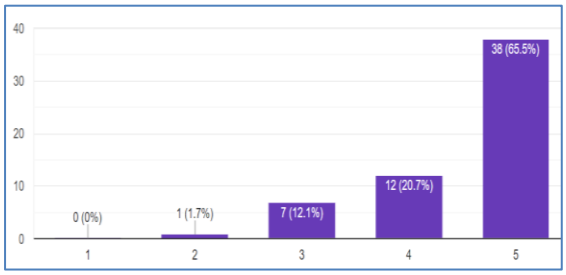


Fig 10: Affordable price requirement

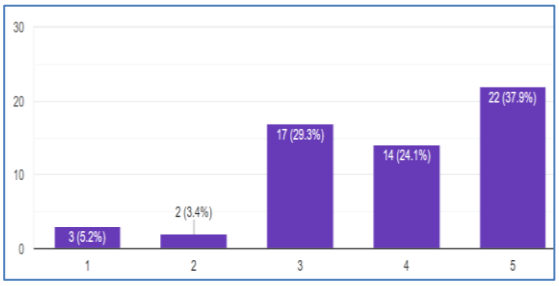


Fig 11: Awareness requirement

However the novelty of technology and its applications, the respondents have expressed that the Metaverse may take 3-5 years more time to influence the society and business, as depicted in the figure 12.

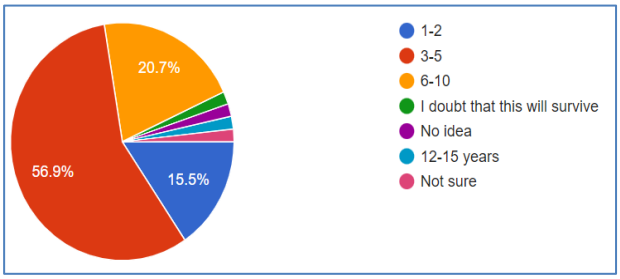


Fig 12: How Many more Years does Metaverse take to influence

Conclusions

The paper discussed about the need of novel technologies for business sustainability in this competitive world. Metaverse, as it is one of the upcoming technologies going to influence world as a new business avenue to provide comfortable and affordable work and well as living space in an alternate world. From the data collected, it can be understood that users are not yet well versed with the Metaverse, hence the neutral responses for some of the questions.

From the responses it may be inferred that, Metaverse being a new technology need to be created awareness among the communities for better implementation. It also can be concluded that such new technologies shall be made available at affordable price, for successful inception of it. However, it is predicted that the Metaverse may take another 5 years to establish business across the globe.

References

- Giuseppa Riva, Fabrizia Mantovani, Brenda K. Wiederhold (2020) Positive Technology and COVID-19, Cyber psychology, Behaviour and Social Networking, volume 23, Number 9, 2020, DOI: 10.1089/cyber.2020.29194.gri
- Alexis Megan Votto, Rohit Valecha, Payman Najafirad, H. Raghava Rao (2021), Artificial Intelligence in Tactical Human Resource Management: A Systematic Literature Review, International Journal of information Management Data Insights, www.elsevier.com/locate/jjimei.
- Maria-Elena Osiceanu (May 2015), Psychological Impact of Modern Technologies: "Technofobia" versus "Technophilia",Procedia.Social Behavioural Sciences, 180 (2015) 1137-1144.
- Deborah Stumsky, Jose Lobo, (2015), Identifying the sources of technological novelty in the process of invention, Vol. 44 , issue 8, October 2015, pages: 1445-1461
- Michele Pezzoni, Reinhilde Veugelers, Fabiana Visentin (2021), How fast is this novel technologies going to be a hit? Antecedents Predicting follow-on inventions,Elsveir, https://doi.ors/10.1016/j.respol.2021.104454
- Times of India newspaper, dated: 13th May 2022, Bengaluru
- Times of India newspaper, dated: 14th May 2022, Benglauru
- Ganapuram Venu (2022), Qualitative Research Assessment
- Ganapuram Venu (2022), Literature Review Report Assessment
- Ganapuram Venu (2022), Quantitative Research Assessment

https://en.wikipedia.org/wiki/Metaverse,

Zvarikova, K., Cug, J., and Hamilton, S. (2022). "Virtual Human Resource Management in the Metaverse: Immersive Work Environments, Data Visualization Tools and Algorithms, and Behavioral Analytics," Psychosociological Issues in Human Resource Management 10(1): 7–20. doi: 10.22381/pihrm10120221.

- Wiggers, K. (2022), "How the Metaverse could transform upskilling in the enterprise", VentureBeat, 26 January, available at: https://venturebeat.com/2022/01/26/how-the-Metaverse-could-transformupskilling-in-the-enterprise/ (accessed 2 February 2022
- Mark Purdy (2022), "How the Metaverse could change work", Harvard Business Review,5thApril2022, https://hbr.org/2022/04/how-the-Metaverse-could-change-work
- Arushi Bhattacharya, Elena Blanchard, Ishan Jindal (2022, "Collaborating With Emtech: The Future of HR", Kingsley Partners, https://www.kingsleygate.com/the-future-of-hr/Images/The-Future-of-HR.pdf
- https://www.thompsoncoburn.com/news-events/news/2022-07-13/the-thompson-coburn-brand-enters-the-Metaverse
- https://www.linkedin.com/pulse/hr-Metaverse-which-processes-convert-first-peoplehum-1f/
- https://thepeoplemanagement.com/why-Metaverse-is-important-aparna-sharma-consulting-editor-the-people-management/
- Peoplhum,(2022), https://www.peoplehum.com/blog/hr-in-the-Metaverse
- MashableIndia(2022), https://in.mashable.com/tech/28254/humans-will-live-in-Metaverse-soon-claims-mark-zuckerberg-what-about-reality
- https://www.linkedin.com/posts/agustinborra_hodl-activity-6882011138473635840-wYHW/
- Stamford, (2022) "Gartner predicts 25% of people will spend at least one hour per day in the Metaverse by 2026", Conn., 7 February,2022, https://www.gartner.com/en/newsroom/press-releases/2022-02-07-gartner-predicts-25-percent-of-people-will-spend-at-least-one-hour-per-day-in-the-metaverse-by-2026

- https://www.linkedin.com/pulse/hr-Metaverse-which-processes-convert-first-peoplehum-1fs
- Ajay Sudhir Bale, Naveen Ghorpade,Muhammed Furqan Hashim, Jatin Vaishav and Zahra Almaspoor (2022), A Comprehensive Study on Metaverse and Its Impact on Humans, Hindawi, Advances in Human-Computer Interaction, Volume 2022, Article ID 3247060, 11 pages, https://doi.org/10.1155/2022/3247060

Deloitte, (2022), The Metaverse Overview: Vision, Technology and Tactics, https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/technology-media-telecommunications/deloitte-cn-tmt-metaverse-report-en-220304.pdf