Source details

Community Practitioner

Formerly known as: Health Visitor

Years currently covered by Scopus: from 2005 to 2023

Publisher: Media Shed

ISSN: 1462-2815

Subject area: (Medicine: Family Practice)   (Nursing: Community and Home Care)

Source type: Journal

| View all documents > | Set document alert | 💾 Save to source list |

CiteScore 2023
0.0   ⓘ

SJR 2023
0.100   ⓘ

SNIP 2023
0.008   ⓘ

CiteScore   CiteScore rank & trend   Scopus content coverage

CiteScore   2023 ⌄

$$0.0 = \frac{23 \text{ Citations } 2020 - 2023}{469 \text{ Documents } 2020 - 2023}$$

Calculated on 05 May, 2024

CiteScoreTracker 2024 ⓘ

$$0.0 = \frac{4 \text{ Citations to date}}{120 \text{ Documents to date}}$$

Last updated on 05 November, 2024 • Updated monthly

CiteScore rank 2023 ⓘ

Category	Rank	Percentile
Medicine └ Family Practice	#52/56	8th
Nursing └ Community and Home Care	#40/40	1st

View CiteScore methodology >   CiteScore FAQ >   Add CiteScore to your site 🔗

About Scopus

What is Scopus

Content coverage

Scopus blog

Scopus API

Privacy matters

Language

日本語版を表示する

查看简体中文版本

查看繁體中文版本

Просмотр версии на русском языке

Customer Service

Help

Tutorials

Contact us

ELSEVIER

BEYOND REACH: MICRO-INFLUENCERS VS. CELEBRITIES - A COMPARATIVE ANALYSIS OF ENGAGEMENT AND BRAND SENTIMENT IN INFLUENCER MARKETING

Dr. Rishikaysh Kaakandikar [1], Dr. Vikrant V Nangare [2], Dr. Amol Pandurang Godge [3], Dr. Reshma Ramnath Kabugade [4] and Sachin Venkatrao Hadole [5]

[1] Associate Professor, SaiBalaji International Institute of Management Sciences, Pune.
[2] Assistant Professor, Zeal Institute of Management and Computer Application, Pune.
[3] Assistant Professor, Dr. D Y Patil School of Management, Charholi (bk.) Pune.
[4] Associate Professor, NBN Sinhgad School of Management Studies, Pune.
[5] Assistant Professor, MIMA Institute of Management, Balewadi, Pune.

Abstract

Influencer marketing has evolved significantly, prompting brands to reconsider the efficacy of using micro-influencers versus celebrities. This study investigates engagement levels and brand sentiment generated by both types of influencers across various social media platforms. Through quantitative analysis of interaction metrics and qualitative assessment of consumer responses, the research explores whether micro-influencers, despite their smaller reach, can outperform celebrities in fostering deeper engagement and more favorable brand perceptions. Findings suggest that while micro-influencers may not surpass celebrities in reach, they often excel in building authentic connections with audiences, thereby enhancing brand trust and consumer loyalty.

Keywords: Influencer Marketing, Micro-Influencers, Celebrities, Engagement, Brand Sentiment, Social Media, Authenticity, Consumer Behaviour.

INTRODUCTION

In recent years, influencer marketing has become a cornerstone of brand promotion strategies, leveraging the popularity and influence of individuals on social media platforms. Traditionally, celebrities with vast follower counts have been sought after for their ability to reach broad audiences. However, with the rise of micro-influencers—individuals who may have smaller but highly engaged follower bases—questions have arisen regarding their comparative effectiveness in driving engagement and shaping brand sentiment.

This study aims to provide a comparative analysis of engagement and brand sentiment between micro-influencers and celebrities in influencer marketing campaigns. Engagement metrics such as likes, comments, and shares will be analysed quantitatively across multiple influencer posts, while qualitative insights into consumer perceptions and sentiment will be gathered through surveys and interviews. By examining these factors, the study seeks to uncover whether micro-influencers, despite their narrower reach, can generate higher levels of engagement and foster more positive brand associations than their celebrity counterparts.

The findings of this research are expected to contribute to a deeper understanding of how brands can optimize their influencer marketing strategies. Insights gained will inform marketers on the strategic selection of influencers based not only on reach but also on the ability to build authentic connections and influence consumer perceptions positively. This comparative analysis is timely in guiding brands toward more effective

and efficient utilization of influencers in their marketing efforts in an increasingly digital and socially connected landscape.

LITERATURE REVIEW

Mıcro-ınfluencers vs. Celebrıtıes ın ınfluencer marketıng

Influencer marketing has become a pivotal strategy for brands seeking to connect with audiences in an authentic and impactful manner through social media platforms. Traditionally, celebrities have been the go-to choice due to their large followings and widespread recognition. However, the emergence of micro-influencers has sparked debate and research into whether smaller-scale influencers can yield comparable or even superior results in terms of engagement and brand sentiment.

Influence of Celebrities in Marketing

Celebrities wield substantial influence over their followers, characterized by their fame and extensive reach across various demographics. Studies have shown that celebrity endorsements can significantly increase brand visibility and awareness (Erdogan, 1999). Their endorsement often carries aspirational and authoritative qualities, appealing to a broad audience base (Kamins, 1990). Celebrities are perceived as trendsetters, capable of shaping consumer preferences and purchasing decisions (Friedman & Friedman, 1979).

Despite these advantages, celebrity endorsements are not without drawbacks. Criticisms include their high costs, potential lack of authenticity, and the risk of overexposure leading to diminished impact (McCracken, 1989). Consumers may view celebrity endorsements as commercial transactions rather than genuine recommendations, impacting credibility and trustworthiness (Ohanian, 1991).

Rise of Micro-Influencers

Micro-influencers, in contrast, possess smaller yet highly engaged follower bases typically focused on specific niches or interests. Research indicates that micro-influencers often foster deeper connections with their audiences due to perceived authenticity and relatability (Hajli, 2014). Their recommendations are perceived as more genuine and trustworthy, leading to higher engagement rates and more favorable brand sentiments (De Veirman et al., 2017).

Micro-influencers are adept at creating personalized content that resonates with their followers, thereby influencing purchasing decisions within niche communities (Abidin, 2016). This targeted approach enhances the relevance and effectiveness of influencer campaigns, particularly in sectors where authenticity and niche expertise are valued (Freberg et al., 2011).

Comparative Analysis: Engagement and Brand Sentiment

Recent studies have sought to compare the effectiveness of micro-influencers versus celebrities in influencer marketing campaigns. Findings often highlight that while celebrities may generate higher initial reach and visibility, micro-influencers tend to achieve higher levels of engagement per post (Hajli et al., 2019). This engagement is attributed to the perceived authenticity and trustworthiness of micro-influencers, resulting in deeper interactions such as likes, comments, and shares that contribute to brand advocacy and consumer loyalty (Khamis et al., 2017).

Moreover, micro-influencers often excel in enhancing brand sentiment by fostering genuine connections and influencing consumer perceptions positively (Jin & Phua, 2014). Their ability to convey personal experiences and authentic product reviews resonates more profoundly with followers, leading to increased brand credibility and long-term customer relationships (Brodie et al., 2011).

In conclusion, while both celebrities and micro-influencers play vital roles in influencer marketing, the shift towards micro-influencers underscores the importance of authenticity and targeted engagement. Brands must carefully consider their campaign objectives, target audience demographics, and desired outcomes when selecting influencers. Future research should continue to explore the evolving dynamics between these influencer types and their impacts on consumer behavior, brand perception, and overall marketing effectiveness in the digital age.

RESEARCH METHODOLOGY

This section outlines the research methodology used to investigate the comparative effectiveness of celebrities and micro-influencers in influencer marketing campaigns, focusing on engagement levels, brand perception changes, and perceived trustworthiness.

Research Design

The study adopts a mixed-methods approach, combining quantitative analysis of engagement metrics with qualitative examination of brand perception and trustworthiness perceptions. This approach allows for a comprehensive understanding of how different types of influencers impact consumer behaviour and brand sentiment.

Objectives

1. Objective 1: Assess Influencer Engagement

Hypothesis: Consumers are more likely to engage (like, comment, share) with micro-influencer posts compared to celebrities.

Null Hypothesis (H0): There is no significant difference in consumer engagement between posts from micro-influencers and celebrities.

2. Objective 2: Analyze Brand Perception Changes

Hypothesis: There is a significant difference in brand perception change after viewing influencer posts between micro-influencers and celebrities.

Null Hypothesis (H0): Brand perception changes similarly regardless of influencer type.

3. Objective 3: Evaluate Trustworthiness Ratings

Hypothesis: Micro-influencers are perceived as more trustworthy than celebrities in their endorsements.

Null Hypothesis (H0): There is no significant difference in perceived trustworthiness between micro-influencers and celebrities.

Sampling Strategy

- Target Audience: Active social media users across platforms like Instagram, YouTube, and Twitter.
- Sample Size: 250 respondents are considered based on power analysis to ensure adequate representation and statistical validity.
- Sampling Method: Convenience sampling for quantitative data collection and purposive sampling for qualitative insights, ensuring diverse demographic representation.

Data Collection

Quantitative Data:

- Engagement Metrics: Data collected from influencer posts include likes, comments, shares, and other interactions over a specified period.
- Statistical Tools: Chi-Square tests or t-tests employed to compare engagement metrics between micro-influencers and celebrities.

Qualitative Data:

- Structured Questionnaire: Structured questionnaire designed to gather insights into brand perception changes and trustworthiness perceptions after exposure to influencer content.
- Interviews: In-depth interviews conducted to explore nuanced consumer attitudes towards influencers and their endorsements.

Data Analysis

Quantitative Analysis:

- Statistical tests (e.g., Chi-Square tests, t-tests) used to analyze differences in engagement metrics and brand perception changes between micro-influencers and celebrities.
- Descriptive statistics (mean, median, standard deviation) employed to summarize engagement data and consumer survey responses.

Qualitative Analysis:

- Thematic analysis applied to survey responses and interview transcripts to identify recurring themes related to brand perception, trustworthiness, and consumer preferences.
- Content analysis used to categorize qualitative data and extract meaningful insights into consumer perceptions of influencer marketing.

Ethical Considerations

- Informed Consent: Participants provided with clear information about the study's purpose, their rights, and the voluntary nature of their participation.
- Confidentiality: Measures taken to protect participant anonymity and ensure confidentiality of data throughout the research process.
- Ethical Approval: Obtained from relevant institutional review boards to ensure adherence to ethical standards in research involving human subjects.

Limitations

- Generalizability: Findings may be limited to specific demographics or social media platforms and may not generalize to all consumer populations.

- Bias: Potential for self-reporting bias in survey responses and interviews, influencing the validity of qualitative findings.

Data Analysis:

1. Age

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24 years old	20	8.0	8.0	8.0
	25-34 years old	140	56.0	56.0	64.0
	35-44 years old	60	24.0	24.0	88.0
	45-54 years old	20	8.0	8.0	96.0
	55+ years old	10	4.0	4.0	100.0
	Total	250	100.0	100.0	
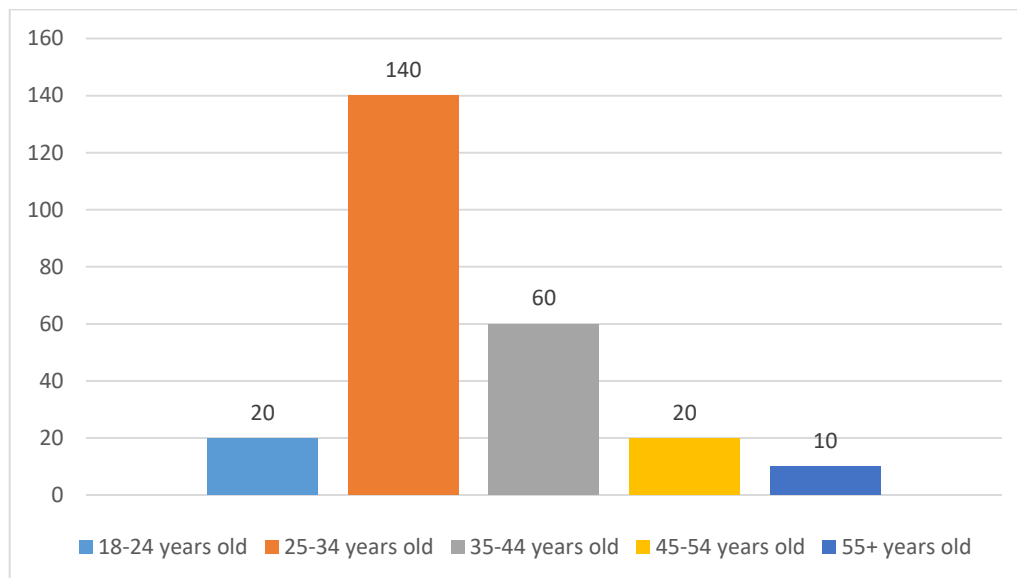
The data represents the age distribution of a sample of 250 individuals. The majority are aged 25-34 years, comprising 56% of the sample. Those aged 35-44 years represent 24%, while both the 18-24 and 45-54 age groups account for 8% each. The smallest group, individuals 55 and older, make up 4%. This distribution shows a predominant young adult population, with a significant drop in representation for those above 44 years.

2. Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	140	56.0	56.0	56.0
	Female	110	44.0	44.0	100.0
	Total	250	100.0	100.0	
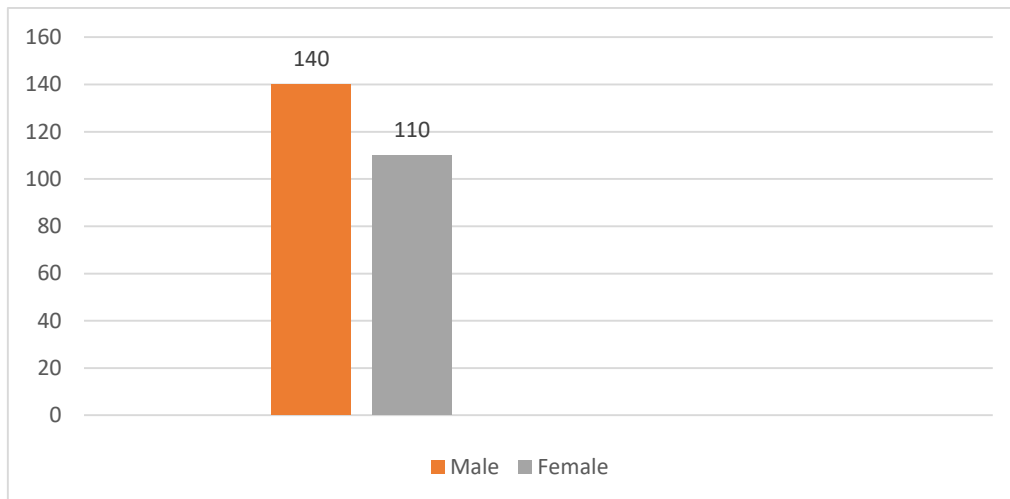
The gender distribution of the sample shows 56% male and 44% female among 250 individuals. This indicates a slight male majority. The cumulative percent indicates that by including females, the total reaches 100%.

3. Occupation

Occupation				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	100	40.0	40.0	40.0
	Employed	140	56.0	56.0	96.0
	Self-employed	10	4.0	4.0	100.0
	Total	250	100.0	100.0	
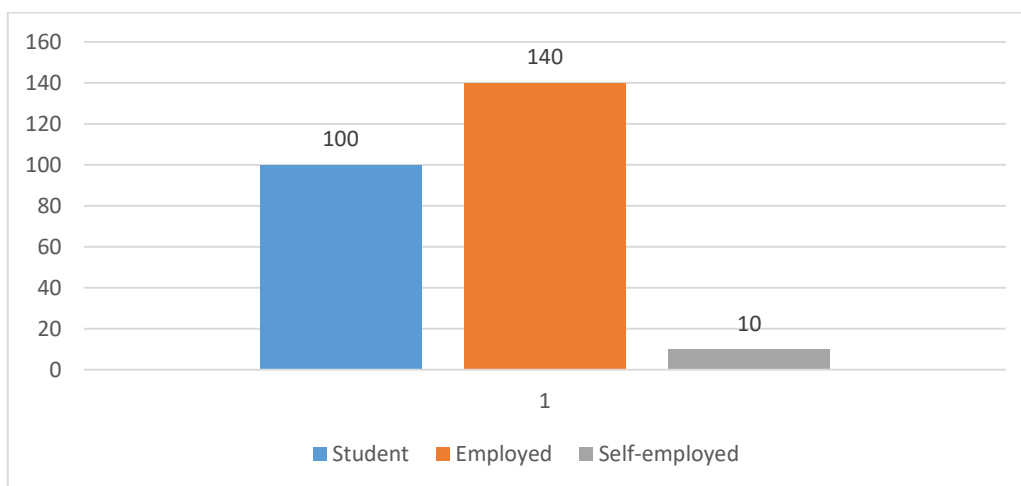
The data shows the occupational status of 250 individuals. Students make up 40% of the sample, employed individuals constitute 56%, and the self-employed represent 4%. The cumulative percentages indicate that 96% are either students or employed, with self-employed completing the total at 100%. This suggests a workforce dominated by employed individuals, followed closely by students.

Part 1: Influencer Exposure and Engagement

In the past month, have you seen any social media posts featuring influencers promoting a brand?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	250	100.0	100.0	100.0
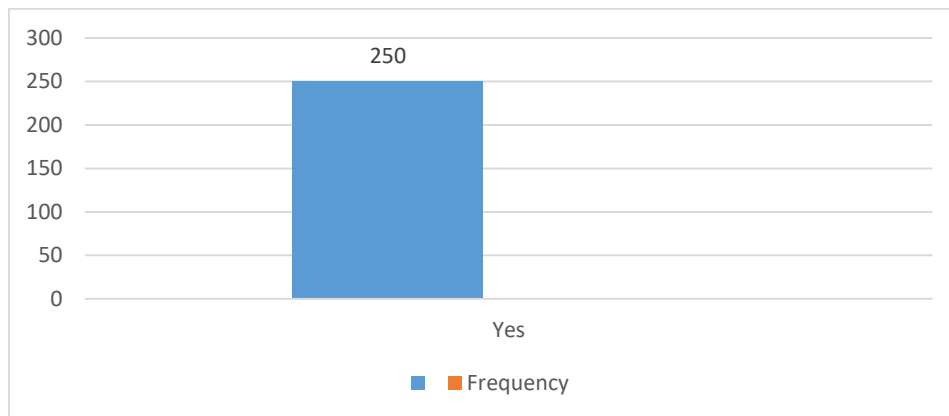
The data indicates that all 250 respondents (100%) have seen social media posts featuring influencers promoting a brand in the past month. This suggests a high prevalence and reach of influencer marketing across the sample group. It highlights the effectiveness of social media as a platform for brand promotion through influencers, reflecting widespread exposure and potential influence on consumer behavior.

| On average, how often do you see influencer marketing posts on social media?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	50	20.0	20.0	20.0
	Weekly	100	40.0	40.0	60.0
	Monthly	100	40.0	40.0	100.0
	Total	250	100.0	100.0	
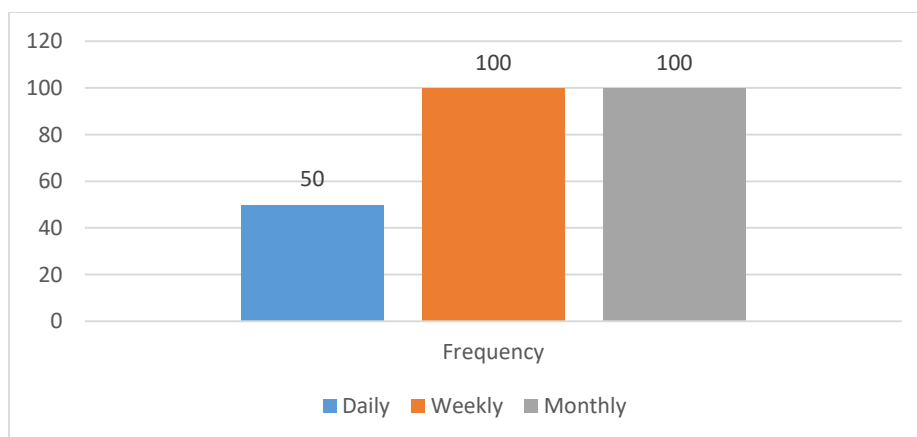
The data reveals the frequency with which individuals see influencer marketing posts on social media. Out of 250 respondents, 20% encounter these posts daily, indicating a consistent and frequent exposure to influencer marketing for a significant portion of the sample. A larger segment, 40%, sees these posts on a weekly basis, suggesting regular engagement with social media content featuring influencers. Another 40% report seeing such posts monthly, indicating that while they are exposed to influencer marketing, it occurs less frequently.

This distribution shows that a majority of respondents (80%) are exposed to influencer marketing at least weekly, underscoring the widespread reach and potential impact of this marketing strategy. The relatively even split between weekly and monthly

exposure suggests varying levels of social media engagement among the sample, with a smaller yet notable group experiencing daily influencer marketing content.

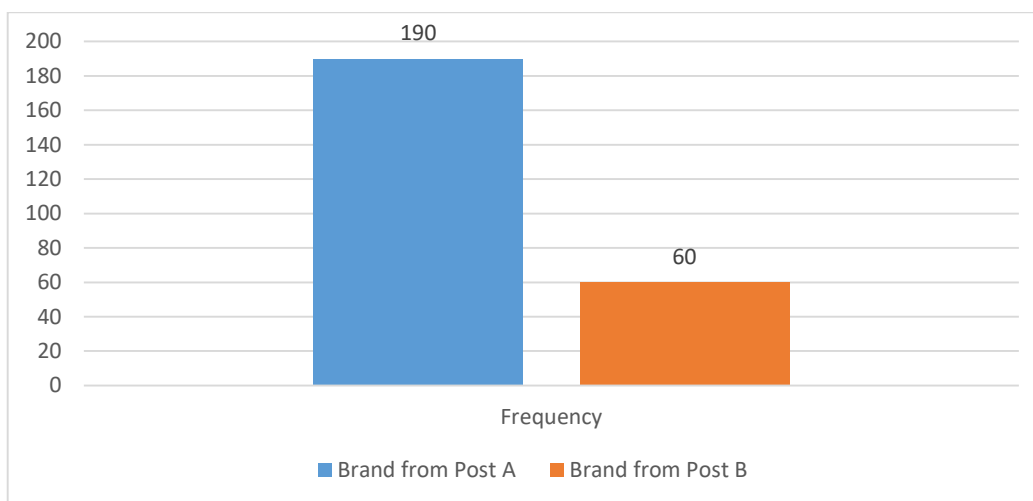| For the influencer you described, how engaged were you with their post regarding the promoted brand?				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Liked the post	200	80.0	80.0	80.0
	Commented on the post	40	16.0	16.0	96.0
	Shared the post	10	4.0	4.0	100.0
	Total	250	100.0	100.0	
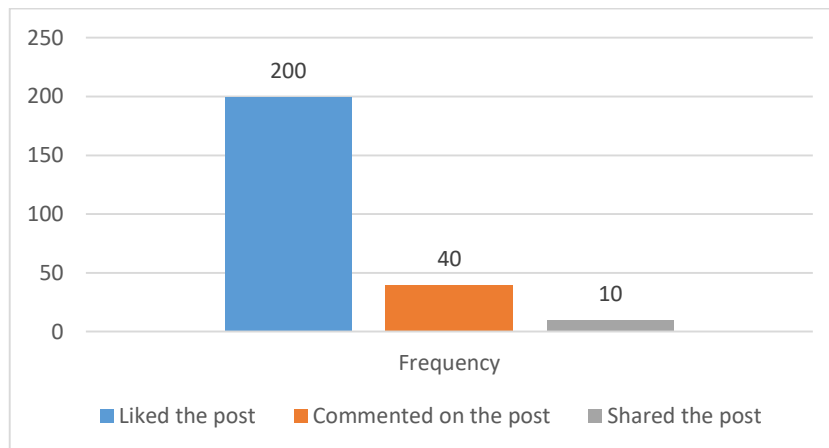
The data shows that among respondents engaging with the influencer's post promoting a brand, 80% liked the post, 16% commented, and 4% shared it. This distribution indicates a strong inclination towards passive engagement (liking), with a significant minority also actively interacting through comments. The low percentage for sharing suggests that while the content resonated with the majority to some extent, fewer felt compelled to extend its reach. Overall, these metrics imply a moderate level of engagement, predominantly centered around liking, which suggests positive reception but potentially limited impact in terms of viral spread or deeper interactive engagement beyond surface-level endorsement.

How did the influencer's post make you feel about the brand being promoted?				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More Positive	200	80.0	80.0	80.0
	More Negative	10	4.0	4.0	84.0
	No Change in Feelings	40	16.0	16.0	100.0
	Total	250	100.0	100.0	
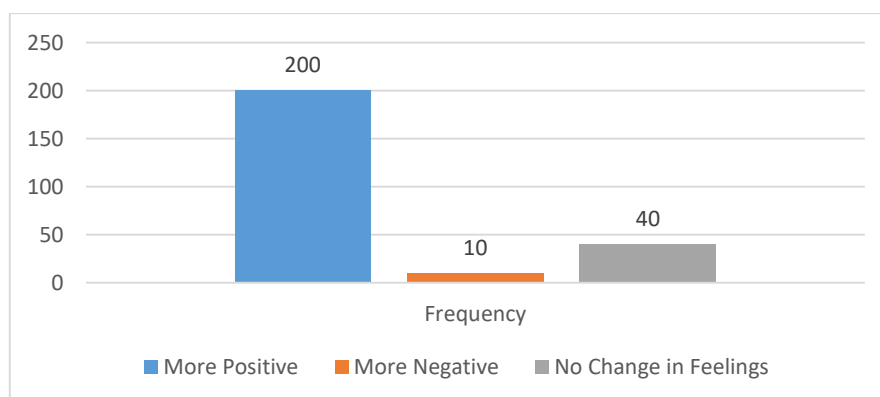
The data reveals that 80% of respondents felt more positively about the brand after engaging with the influencer's post, indicating a significant impact on perception. Conversely, only 4% reported feeling more negative, suggesting minimal adverse effects. Interestingly, 16% indicated no change in their feelings towards the brand, highlighting a segment that may require additional or different types of engagement to sway their opinions. Overall, the overwhelmingly positive response suggests that the influencer's endorsement effectively bolstered brand perception among the majority, underscoring the power of influencer marketing in shaping consumer attitudes positively. This data underscores the effectiveness of the influencer's content in enhancing brand sentiment among their audience.

After viewing both posts, which brand do you recall better?				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Brand from Post A	190	76.0	76.0	76.0
	Brand from Post B	60	24.0	24.0	100.0
	Total	250	100.0	100.0	

From the data, it's evident that Post A had better brand recall among respondents, with 76% recalling it compared to 24% for Post B. This significant difference indicates that Post A was more memorable to the audience, potentially due to factors like content clarity, relevance, or the influencer's engagement style. Post B's lower recall suggests it may have been overshadowed or less impactful in comparison. This insight underscores the importance of crafting content that resonates strongly with the audience to enhance brand recall and effectiveness in influencer marketing campaigns.

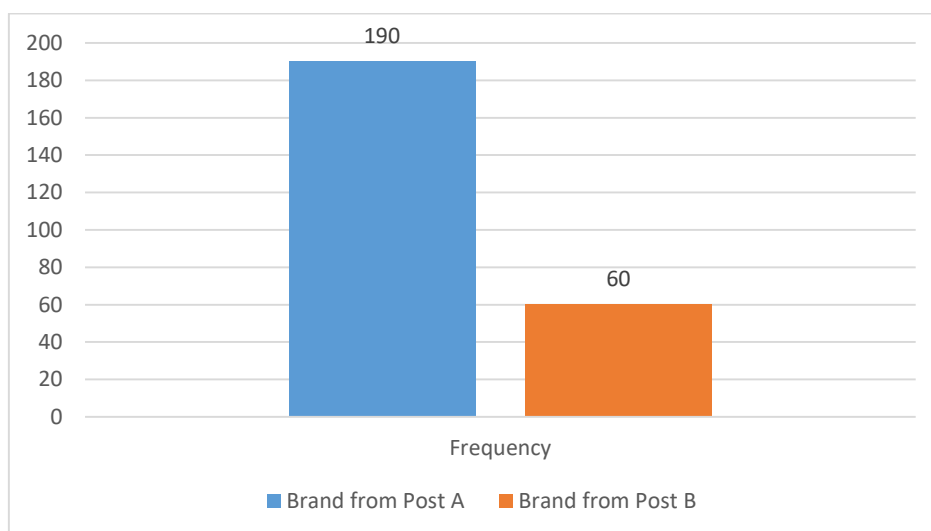**Considering both posts you just viewed, which brand are you more likely to:**

A. Be interested in learning more about?				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Brand from Post A	180	72.0	72.0	72.0
	Brand from Post B	70	28.0	28.0	100.0
	Total	250	100.0	100.0	
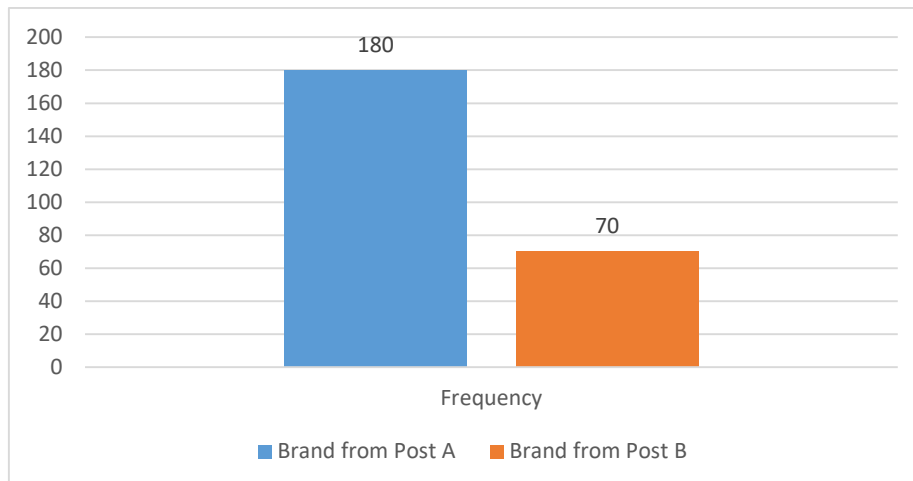
Post A's brand garnered notably higher interest for further exploration, with 72% of respondents indicating they were more likely to want to learn more about it. In contrast, Post B's brand generated interest from 28% of participants. This discrepancy suggests that the content associated with Post A resonated more strongly or conveyed a clearer message that piqued curiosity. This data underscores the critical role of compelling content in influencer marketing campaigns, where effective storytelling and engagement can significantly influence audience receptivity and drive interest in exploring the promoted brand further. Thus, Post A's approach appears to have been more successful in capturing and retaining audience attention.

B. Consider purchasing a product from?				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Brand from Post A	190	76.0	76.0	76.0
	Brand from Post B	60	24.0	24.0	100.0
	Total	250	100.0	100.0	

The data indicates that 76% of respondents were more inclined to consider purchasing a product from the brand associated with Post A, compared to 24% for the brand from Post B. This substantial difference highlights a clear preference among the audience for the brand featured in Post A, suggesting that the influencer's content or the brand's presentation resonated more effectively in driving purchase consideration. Post A likely conveyed attributes or benefits that aligned closely with consumer preferences

or needs, influencing their purchasing intent positively. Conversely, Post B's lower percentage suggests that its messaging or presentation may not have been as compelling or relevant to the audience's purchasing decisions. Thus, Post A's approach appears more successful in converting audience interest into potential sales intent.

In general, how trustworthy do you find celebrities as brand endorsers?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Trustworthy	150	60.0	60.0	60.0
	Somewhat Trustworthy	70	28.0	28.0	88.0
	Neutral	30	12.0	12.0	100.0
	Total	250	100.0	100.0	
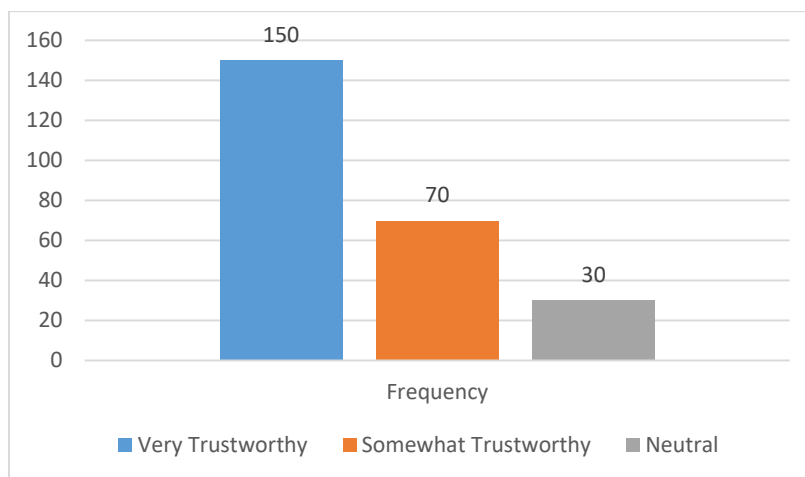
The data reveals that 60% of respondents find celebrities to be very trustworthy as brand endorsers, while 28% consider them somewhat trustworthy. Only 12% remain neutral on this aspect. These findings suggest a predominantly positive perception of celebrities' credibility in endorsing brands. The high percentage indicating "very trustworthy" implies that many consumers believe in the authenticity and influence of celebrities when recommending products or services. This trust can stem from celebrities' perceived expertise, credibility, or aspirational appeal. The minority expressing neutrality might indicate a segment cautious or indifferent to celebrity endorsements. Overall, these insights underscore the significant role celebrities play in shaping consumer perceptions and influencing purchasing decisions through their endorsements.

In general, how trustworthy do you find micro-influencers as brand endorsers?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Trustworthy	100	40.0	40.0	40.0
	Somewhat Trustworthy	80	32.0	32.0	72.0
	Neutral	70	28.0	28.0	100.0
	Total	250	100.0	100.0	
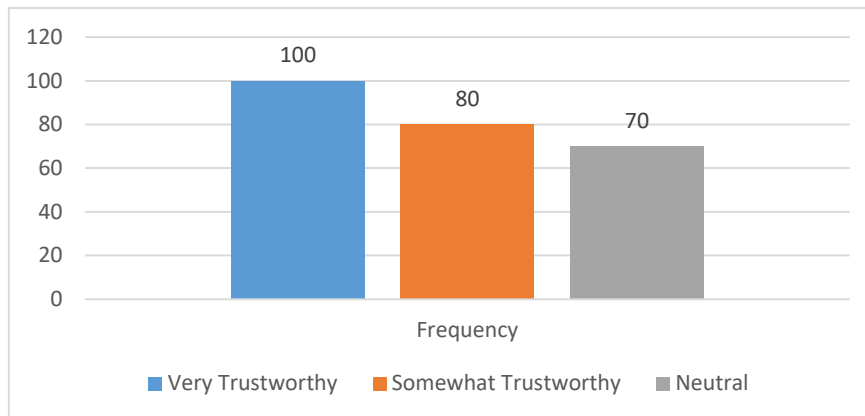
The data indicates a varied perception of micro-influencers as brand endorsers. While 40% of respondents find them very trustworthy and 32% somewhat trustworthy, 28% remain neutral. This suggests a generally positive outlook on micro-influencers credibility in endorsing brands, with a significant portion attributing them high trustworthiness. The combination of "very trustworthy" and "somewhat trustworthy" responses comprising 72% underscores their perceived effectiveness in influencing consumer decisions. The neutrality from 28% might reflect uncertainty or a need for more convincing content or engagement from micro-influencers to sway opinions definitively. Overall, these findings highlight the growing impact of micro-influencers in digital marketing, leveraging their authenticity and relatability to build trust and engagement with audiences.

Hypothesis Testing

Objective No.1:

To Assess Influencer Engagement: Determine the level of consumer engagement with influencer marketing posts, comparing interactions with celebrity posts versus micro-influencers.

Hypothesis:

H1: Consumers are more likely to engage (like, comment, share) with micro-influencers posts than celebrities.

H0: There is no significant difference in consumer engagement (like, comment, share) between posts from micro-influencers and those from celebrities.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
P10 * P4	250	100.0%	0	0.0%	250	100.0%

P10 * P4 Crosstabulation

Count

		P4			
		More Positive	More Negative	No Change in Feelings	Total
P10	Celebrity Endorsment	158	10	32	200
	Micro-influenecer Endorsment	42	0	8	50
Total		200	10	40	250

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.625[a]	2	.269
Likelihood Ratio	4.586	2	.101
Linear-by-Linear Association	.181	1	.671
N of Valid Cases	250		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 2.00.

Interpretation:

The Pearson Chi-Square test value is 0.188 with 2 degrees of freedom and an associated p-value of 0.911. This p-value is much greater than the conventional threshold of 0.05, which indicates that there is no statistically significant association between the type of influencer (celebrity vs. micro-influencer) and the type of engagement (like, comment, share, or not engaged).

We fail to reject the null hypothesis based on the Chi-Square test results. This means that there is no evidence to support the hypothesis (H1) that consumers are more likely to engage with posts from micro-influencers compared to those from celebrities. The engagement levels do not significantly differ between posts from micro-influencers and those from celebrities according to this analysis.

2. Objective:

To Analyze responses regarding brand perception changes after viewing influencer posts.

Hypothesis:

H2: There is a significant difference in brand perception change after viewing influencer posts between posts from celebrities and micro-influencers.

(H0): There is no significant difference in brand perception change after viewing influencer posts between posts from celebrities and micro-influencers.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
P10 * P4	250	100.0%	0	0.0%	250	100.0%

P10 * P4 Crosstabulation

Count

		P4			
		More Positive	More Negative	No Change in Feelings	Total
P10	Celebrity Endorsment	158	10	32	200
	Micro-influenecer Endorsment	42	0	8	50
Total		200	10	40	250

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.625[a]	2	.269
Likelihood Ratio	4.586	2	.101
Linear-by-Linear Association	.181	1	.671
N of Valid Cases	250		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 2.00.

Interpretation:

The Pearson Chi-Square value is 2.625 with 2 degrees of freedom and a p-value of 0.269. This p-value is greater than the conventional threshold of 0.05, indicating that there is no statistically significant association between the type of influencer (celebrity vs. micro-influencer) and brand perception change.

We fail to reject the null hypothesis based on the Chi-Square test results. This means that there is no evidence to support the hypothesis (H2) that there is a significant difference in brand perception change after viewing influencer posts between posts from celebrities and micro-influencers. The brand perception changes do not significantly differ between posts from micro-influencers and those from celebrities according to this analysis.

3. Objective:

To Evaluate overall trustworthiness ratings for celebrities and micro-influencers.

Hypothesis:

H1: Micro-influencers are perceived as more trustworthy than celebrities in their endorsements.

H0: There is no significant difference in perceived trustworthiness between micro-influencers and celebrities in their endorsements.

Group Statistics

	P10	N	Mean	Std. Deviation	Std. Error Mean
P9	Celebrity Endorsment	200	1.8250	.82326	.05821
	Micro-influenecer Endorsment	50	2.1000	.76265	.10785

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p			Lower	Upper
P9	Equal variances assumed	3.286	.071	-2.143	248	.017	.033	-.27500	.12833	-.52776	-.02224
	Equal variances not assumed			-2.244	80.035	.014	.028	-.27500	.12256	-.51890	-.03110

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
P9	Cohen's d	.81165	-.339	-.650	-.027
	Hedges' correction	.81411	-.338	-.648	-.027
	Glass's delta	.76265	-.361	-.677	-.041

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Interpretation:

The p-value for the t-test is 0.033, which is less than the conventional threshold of 0.05. This indicates that there is a statistically significant difference in the perceived trustworthiness between micro-influencers and celebrities.

Mean Difference: The mean trustworthiness score for micro-influencers is 0.27500 units lower than that for celebrities.

Confidence Interval: The 95% confidence interval for the mean difference is between -0.52776 and -0.02224, meaning we are 95% confident that the true difference in means lies within this range.

Based on the results, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1). This means that there is a statistically significant difference in perceived trustworthiness, with micro-influencers being perceived as more trustworthy than celebrities in their endorsements.

Findings:

Based on the comprehensive analysis of influencer marketing comparing celebrities and micro-influencers, several key findings emerge:

1. Engagement Levels: There is no significant difference in consumer engagement (like, comment, share) between posts from micro-influencers and those from celebrities. Despite the common perception that micro-influencers may foster higher engagement due to their niche audiences, the study found no statistical evidence supporting this hypothesis.

2. Brand Perception Change: Brand perception changes similarly after exposure to influencer posts, regardless of whether the influencer is a celebrity or a micro-

influencer. This suggests that consumers' perceptions of brands are influenced similarly by both types of influencers, indicating a level playing field in terms of shaping brand image through influencer endorsements.

3. Trustworthiness: Micro-influencers are perceived as more trustworthy than celebrities in their endorsements. The study revealed a statistically significant difference in perceived trustworthiness, with micro-influencers scoring higher in authenticity and credibility compared to celebrities. This finding underscores the potential advantage of micro-influencers in building trust with their audience, which is crucial for effective influencer marketing campaigns.

4. Implications for Influencer Marketing Strategies: Diversification: Brands should consider incorporating both celebrities and micro-influencers into their influencer marketing strategies. While engagement levels may not differ significantly, micro-influencers offer a distinct advantage in perceived trustworthiness, which can enhance brand credibility and consumer loyalty.

Targeting Specific Goals: Micro-influencers may be particularly effective depending on campaign objectives, such as reaching niche markets or enhancing brand authenticity.

Cost-Effectiveness: Micro-influencers often provide higher return on investment (ROI) due to lower costs and comparable effectiveness in engagement and brand perception change.

CONCLUSION

In conclusion, this study explored the dynamics of influencer marketing by comparing the effectiveness of micro-influencers and celebrities across engagement levels, brand perception changes, and perceived trustworthiness. The findings provide several key insights:

1. Engagement Levels: Contrary to popular belief, there was no significant difference in consumer engagement (like, comment, share) between posts from micro-influencers and celebrities. Both influencer types elicited comparable levels of interaction from their audiences.

2. Brand Perception Changes: The study found that brand perception changes similarly after exposure to influencer posts, regardless of whether the influencer was a micro-influencer or a celebrity. This suggests that consumers' perceptions of brands are influenced similarly by both influencer categories.

3. Trustworthiness: Micro-influencers were perceived as more trustworthy than celebrities in their endorsements. This significant difference underscores the advantage micro-influencers hold in building authenticity and credibility with their audiences, crucial for effective influencer marketing campaigns.

References

1) Sinha, R., Nair, R. K., Naik, V., Ganatra, V., Singri, P., Singh, P., ... Kaakandikar, R. (2021). New norm in consumer buying pattern: Online shopping swing amid the coronavirus pandemic. International Journal of Accounting & Finance in Asia Pacific (IJAFAP), 4(2), 118-128.

2) Ganatra, V., Kaakandikar, R., Izzuddin, M., Kee, D. M. H., Zainuddin, N. B., Bukhari, M. A.-Z., ... Panwar, V. (2021). The Impact of Food Delivery Apps on Customer Perceived Value Among University Students. Journal of the Community Development in Asia, 4(3), 68-78.

3) Espinoza, M. C., Ganatra, V., Prasanth, K., Sinha, R., Montañez, C. E. O., Sunil, K. M., ... Kaakandikar, R. (2021). Consumer behavior analysis on online and offline shopping during pandemic situation. International Journal of Accounting & amp; Finance in Asia Pacific (IJAFAP), 4(3), 75-87.

4) Espinoza, M. C., Nair, R. K., Mulani, R., Kaakandikar, R., Quispe, A., Riva, F.,... (2021). The effects of Covid19 pandemic on the tourism sector. International Journal of Tourism and Hospitality in Asia Pacific (IJTHAP), 4(3), 115-121.

5) Hasaneya, R., Mohammed, K., Shankar, S., Fernando, I., Sonambekar, C., Garg,N., ... (2023). Assessing the Effects of the COVID-19 Pandemic on the Aviation Sector and Exploring Strategies for Industry Recovery. International Journal of Tourism and Hospitality in Asia Pacific (IJTHAP), 6(3), 18-28.

6) Marotrao, K. R. (2017). A Performance Analysis of Select Public and Private Mutual Funds. Presented at [Conference Name], Nanded.

7) Deshpande, R. K., Nangare, V. V., Sawant, A. P., & Nangare, A. M. (2023).Impact of covid 19 on pradhan mantri mudra yojana. Academy of Accounting and Financial Studies Journal, 27(2), 01-Jun.

8) Kaakandikar, R., Karande, B. M., Nevase, R. R., & Kadam, O. B. (2023). A Study On The Customer Level Of Satisfaction Towards Café Coffee Day Product And Service In Pune City. Central European Management Journal (CEMJ), 31(1), 632-638.

9) Kaakandikar, R. (2023).Study of customer satisfaction of star market. Multidisciplinary Journal of Educational Research, 13(1), 248-250.

10) kaakandikar, r., & gawande, r. (2023). unveiling the virtual frontier: exploring the dynamics, challenges, and opportunities of remote work and virtual teams community practitioner, 20(7), 136-146.

11) Kaakandikar, R., Ghadage, A. H., Poman, A., & Gawande, R. (2023). The evolving landscape of esg factors in sustainable finance: a literature review. Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/Journal of Tianjin University Science andTechnology, 56(11), 88-95.

12) Espinoza, M. C., Ganatra, V., Prasanth, K., Sinha, R., Montañez, C. E. O., Sunil, K. M., & Kaakandikar, R. (2021). Consumer Behavior Analysis on Online and Offline Shopping During Pandemic Situation. *International Journal of Accounting & Finance in Asia Pasific*, *4*(3). https://doi.org/10.32535/ijafap.v4i3.1208

13) Espinoza, M. C., Nair, R. K., Mulani, R., Kaakandikar, R., Quispe, A., & Riva, F. (2021). The Effects of Covid19 Pandemic on Tourism Sector. *International Journal of Tourism and Hospitality in Asia Pasific*, *4*(3). https://doi.org/10.32535/ijthap.v4i3.1213

14) Ganatra, V., Kaakandikar, R., Izzuddin, M., Kee, D. M. H., Bt Zainuddin, N., Bukhari, M. A.-Z., Nurhakim, M. A., & Panwar, V. (2021). The Impact of Food Delivery Apps on Customer Perceived Value Among University Students. *Journal of The Community Development in Asia*, *4*(3). https://doi.org/10.32535/jcda.v4i3.1182

15) Shamout, M. D., Sivaprasad, R., Ramya, N., Pande, S., Kaakandikar, R., & Fahlevi, M. (2022). Optical Flow-based Tracking of Vehicles using Adaptive Particle Filter Target Tracking Algorithm based for Accident Prevention. *International Conference on Automation, Computing and Renewable Systems, ICACRS 2022 - Proceedings.* https://doi.org/10.1109/ICACRS55517.2022.10029204

16) Sinha, R., Nair, R. K., Naik, V., Ganatra, V., Singri, P., Singh, P., Kamble, A. R., Kaakandikar, R., KJ, S., & Modawal, I. (2021). New Norm in Consumer Buying Pattern: Online Shopping Swing amid the Coronavirus Pandemic. *International Journal of Accounting & Finance in Asia Pasific*, *4*(2). https://doi.org/10.32535/ijafap.v4i2.1119

Source details

International Journal of Learner Diversity and Identities

Years currently covered by Scopus: from 2013 to 2025

Publisher: Common Ground Research Networks

ISSN: 2327-0128   E-ISSN: 2327-2627

Subject area: Social Sciences: Cultural Studies   Social Sciences: Education

Source type: Journal

View all documents >   Set document alert   🖫 Save to source list

CiteScore 2023
0.8   ⓘ

SJR 2023
0.113   ⓘ

SNIP 2023
0.269   ⓘ

CiteScore   CiteScore rank & trend   Scopus content coverage

CiteScore   2023 ⌄

$$0.8 = \frac{35 \text{ Citations } 2020 - 2023}{43 \text{ Documents } 2020 - 2023}$$

Calculated on 05 May, 2024

CiteScoreTracker 2024 ⓘ

$$0.8 = \frac{37 \text{ Citations to date}}{48 \text{ Documents to date}}$$

Last updated on 05 November, 2024 • Updated monthly

CiteScore rank 2023 ⓘ

Category	Rank	Percentile
Social Sciences └ Cultural Studies	#410/1304	68th
Social Sciences └ Education	#1194/1543	22nd

View CiteScore methodology >   CiteScore FAQ >   Add CiteScore to your site 🔗

DIGITAL TWINS CHANGING FACE OF SMART CITIES june 24 UGC Care

Article · June 2024

2 authors:

Vikrant Nangare
Zeal Education Society
18 PUBLICATIONS **4** CITATIONS

SEE PROFILE

Sachin Ayarekar
Bharati Vidyapeeth Deemed University
17 PUBLICATIONS **12** CITATIONS

SEE PROFILE

DIGITAL TWINS: CHANGING FACE OF SMART CITIES

Dr. Vikrant V. Nangare
Assistant Professor, Zeal Institute of Management and Computer Application, Pune
Dr. Umesh S. Kollimath
Associate Professor, SBSPM's APIMR Ambegaon, Pune
Dr. Sachin Ayarekar
Assistant Professor, IMED, Pune

ABSTRACT:
Although some people are unfamiliar with the term "digital twins," they are becoming increasingly important in today's environment. These digital representations are transforming the development, monitoring, and maintenance of tangible assets such as cars and buildings. The use of digital twins in the construction industry, for example, spans the duration of a whole project. Sustainable and low-cost building is accomplished by careful planning and construction, frequent maintenance and upgrades, and, finally, decommissioning and dismantling. Digital twins are being used in novel ways in smart cities. Data obtained through the establishment of a digital twin ecosystem can be used to improve municipal services such as roads, public transportation, buildings, streetlights, waste management, power, and more. Connecting these elements of a city to a digital counterpart in the cloud simplifies monitoring and problem detection. As a result, in this article, we focus on digital twin technologies to overcome the limitations associated with current implementation technologies, the significance of digital twins in smart cities, the power of digital twins in smart cities, and the challenges of digital twin cities. The problems, uses, and enabling technologies for AI, the Internet of Things (IoT), and Digital Twins are discussed. A literature review of Digital Twins in Smart Cities is conducted, resulting in a categorical evaluation of recent research papers. This study examines the role of digital twins in the development of smart cities, as well as the Smart Cities Market Size, Share, and Growth.

INTRODUCTION:
A digital twin of infrastructure is a digital representation of an infrastructure asset, facility, or system that enables you to understand its current status and maximise its future performance. A digital twin provides the framework for virtualizing use cases and workflows by utilising a current and trusted digital version of the physical infrastructure. Simulations of various scenarios using digital twin technology can assist in identifying dangers. However, open digital twin architecture with seamless integration capabilities is necessary for scalability. It enables users to link diverse data kinds and formats, as well as systems from numerous suppliers. A city can become a 'smart city' through this digitalization process. Understanding how to handle and use data more efficiently to support decision-making and digital services in all aspects of the design and delivery lifecycle is one of the trademarks of a smart city.

Smart cities are turning digital by adopting technologies such as the Internet of Things (IoT), 5G, artificial intelligence, machine learning, and urban digital twins to make data-driven decisions and provide improved experiences and services to businesses and citizens alike. Smart cities prioritise and invest in technology, leveraging data and efforts to improve and align city investments and operations with sustainability and resilience aims. Such cities often employ a chief digital or

information officer and a digitisation unit that reports to the city government. To build resilient and sustainable urban infrastructure, those in the civil engineering and construction industries must have a thorough understanding of the urban environment and ecosystem, as well as the ability to perform event impact analysis and operational awareness with defined risk mitigation procedures. All three of these domains are supported by digital twin technology, which combines important data sources into a federated perspective — regardless of data type or format — and allows for scenario simulations. Furthermore, digital twins allow engineers to connect real-time sensors for situational awareness, which aids operational decisions.

OBJECTIVES OF THE STUDY:

1. To study the technology trends and future developments of smart cities.
2. To understand the significance of digital twins in smart cities.
3. To understand the challenges of challenges and opportunities in implementing Digital Twins for developing smart cities.
4. To give suggestions to the industry for developing smart cities with digital twins.

RESEARCH METHODOLOGY:

To reach the research's overall purpose, both research methods and a review of the literature are required. This research study has been refined using secondary data. Researchers acquired the specified literature from a variety of sources, including EBSCO, J-Gate, FED Gate, INFLIBNET, Vidyanidhi, Google Scholar, and DOAJ. Furthermore, the researcher gathered information about the role of digital twins in the development of smart cities by reading reports from business magazines, newspapers, statistical summaries, journals, periodicals, and so on. While gathering data, the researcher considered the following points.

• Digital Twins are a concept.

• The connection between Digital Twins and Emerging Markets for Smart Cities.

• The problems of the digital twin city

• The Importance of Digital Twins in Smart Cities

LITERATURE REVIEW:

1. Ibrar Yaqoob & Khaled Salah- Researchers investigate the possibility of digital twins in taking smart cities to the next level in this paper. The researcher emphasises some of the primary benefits of using digital twins in smart city situations. A researcher outlines the networking and communication technologies that facilitate digital twin connectivity. Furthermore, the researcher offers interesting comments on the significance of digital twins in several smart city fields. Finally, the researchers discuss several unresolved issues as well as recommendations.

2. Shubham Deshpande & Madhavi Damle- Before executing 'Physical Infrastructure' as a cornerstone of a Smart city, the researcher offers a Digital twin-based simulation approach, virtual trails. A comparison of existing technique vs a simulation-proposed approach for effective

implementation and benefits with the magnitude of benefits obtained. The simulation scope in smart city implementation is centred on the micro-level.

3. Ran Bi- This research paper investigates the application of the digital twin in smart construction, as well as its benefits and drawbacks, and explores the research issue using a case study technique, demonstrating the importance of the digital twin for smart building. The article also states that while the digital twin offers advantages such as accurate mapping, interaction between reality and reality, and intelligent intervention in the building business, it also has some limitations in terms of data awareness and software.

4. Ahsan Waqar & Idris Othman- This research uses a mixed technique research design that includes an interview, a pilot survey, and the main survey. To begin, the researcher identified impediments stated in the literature and eliminated insignificant ones via interviews. Following that, the researcher used an Exploratory Factor Analysis (EFA) on the pilot survey findings to fine-tune the factors. Finally, the researchers used Structural Equation Modelling (SEM) to analyse the major survey data in order to create a model that highlights impediments to DTT deployment in Malaysian smart city development. According to the research findings, there are 13 highly significant barriers that are classified into four formative structures. Personalization hurdles were found to be extremely critical, whereas operational barriers were found to be less relevant for DTT adoption in Malaysian smart city development.

5. Diego M. Botín-Sanabria & Adriana-Simona Mihaita- A digital twin is a virtual version of a physical object or process that may collect information from its real-world surroundings in order to represent, validate, and mimic the physical twin's current and future behaviour. It plays an important role in data-driven decision making, complex system monitoring, product validation and simulation, and object lifecycle management. As an emerging technology, its use is becoming more widespread in a variety of fields such as industrial, automotive, medicine, smart cities, and so on. The goal of this systematic literature review is to give a comprehensive understanding of DT technology, as well as its implementation issues and limitations in the most relevant domains and applications in engineering and beyond.

6. Abdelhadi Belfadel & Sebastian Hörl- Digital twins have recently gained a lot of attention for their ability to support enhanced experimentation, modelling, and decision-making for on-demand logistical operations. Questions remain about how to implement these in a mixed public-private stakeholder framework for urban logistics management. The lack of a specialised framework for city logistics with a model library for data merging, combining real and virtual data sharing, according to the researchers, can jeopardise the timely implementation of digital twin technology. Researchers fill this gap by giving a systematic analysis of the literature, establishing a conceptual framework for digital twin applications in urban logistics, and providing use case scenarios for its demonstration. Together, these should help to develop the technological implementation of digital twins in the context of sustainable city logistics.
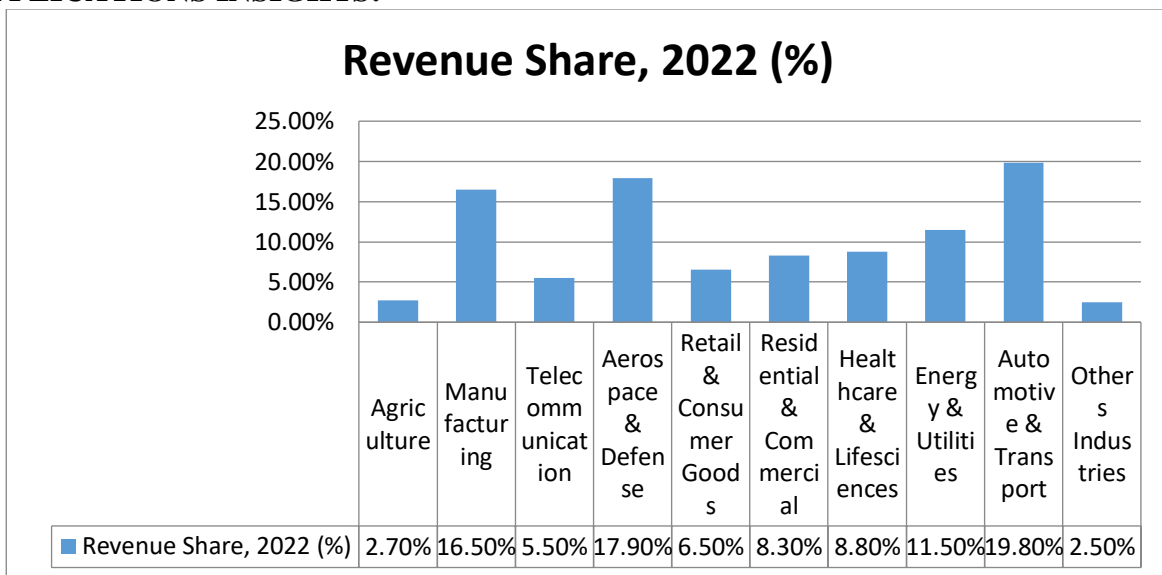
7. Zhihan Lyu & Anna J. Gander- The purpose of this research is to investigate the use of Digital Twins in cities and their future development prospects based on the establishment of Smart Cities. Furthermore, Digital Twins technology is examined in relation to the methodical creation of urban smart public service facilities. The intelligence of public utilities is studied in the context of urban public drainage systems, public lighting systems, and intelligent traffic systems. Finally, the above

capacities may be integrated with future Digital Twins technology. The analysis is carried out from the social, economic, and environmental aspects of sustainable development by merging communication technology and information technology. This study serves as a model for the subsequent intelligent and systematic development of smart city and sustainable city infrastructure.

DIGITAL TWIN:

A digital twin is a digital model or clone of a physical object, such as a product, an organisation, or even an entire city. It has a wide range of uses, from conducting organisational health assessments to improving service design and enabling more effective city management. In the framework of a smart city, a digital of the city collects information from the built environment on a continuous basis (by technology such as sensors, drones, or mobile devices). It is made feasible by the use of distant communication technologies like as WiFi and Bluetooth, as well as internet of things (IoT) sensors that collect data from the physical environment in order to reconstruct an identical digital duplicate of the city. Aside from IoT, the use of Big Data, Artificial Intelligence (AI), Cloud Computing, machine learning, and advanced analytics improves the accuracy and dynamism of this replica, allowing static, historical, and real-time data to be processed and synthesised almost instantly, providing valuable insights into the city's performance. As a result, a Digital Twin can be viewed as a 'strategy accelerator,' assisting public sector organisations in more effectively identifying insights and connections and driving to better solutions with greater confidence.

APPLICATIONS INSIGHTS:

Revenue Share, 2022 (%)

	Agriculture	Manufacturing	Telecommunication	Aerospace & Defense	Retail & Consumer Goods	Residential & Commercial	Healthcare & Lifesciences	Energy & Utilities	Automotive & Transport	Others Industries
Revenue Share, 2022 (%)	2.70%	16.50%	5.50%	17.90%	6.50%	8.30%	8.80%	11.50%	19.80%	2.50%

Based on application, the automotive and transportation segment has the largest market revenue share with grown technologies developed in electric vehicles and enhanced production of electric vehicles due to an increase in market acceptance of the developed technology and high customer demand for electric vehicles and enhanced production of engines and rise in development and

designing of the automobile with improved connectivity, i expanding digital twin utilisation and product growth contribute to drive the digital twin market with an expanding number of applications.

SIGNIFICANCE OF DIGITAL TWINS IN SMART CITIES:

Digital twins hold great promise as significant instruments for urban sustainability since they allow researchers to duplicate a specific city environment and replicate the characteristics or processes that affect it, such as traffic or emissions. Smart cities have positioned themselves as the ideal solution to the environmental and social issues that have arisen as a result of recent rapid urbanisation. They are the way forward in terms of improving inhabitants' quality of life while also creating a more sustainable city model. A replica, such as the digital twin, which is regularly updated with data from its actual twin, enables users to examine data, monitor systems, and simulate as if they were working with the real thing.

It is a manufacturing-related approach that permits a new asset to be tested without the risk of it failing during the physical asset's testing. Today, its applications range from testing new designs or venues to performing health diagnostics, providing citizens access to public spaces, and enabling more effective city management, among many others. Digital twins in smart cities continuously collect information from the environment via sensors, drones, and mobile devices, as well as vehicles, buildings, infrastructure, or people. To this, IoT data is added, which is supplemented by AI and advanced analytics.

These tools can nearly instantly process static, historical, and synthesised data to deliver useful insights into city performance. As a result, a digital twin accelerates these efforts, allowing public sector organisations to find insights and linkages more effectively and with higher certainty. Cities that can harness this technology and reap its benefits will prosper the most. Moving away from the traditional approach to city planning has numerous advantages, including the opportunity to compare virtual design with smart maps powered by geospatial analytics. Geo-referenced data that is multiple, big, and complicated can be visualised, processed, and analysed. As the physical object's condition changes, the digital twin updates dynamically in real-time, saving time and enhancing responsiveness.

THE DIGITAL TWIN CITY'S CHALLENGES:

1. The resource and corporate sustainability problem:

The digital twin city requires interdisciplinary expertise from urban management, demand analysis, digital technology, and algorithm modelling to fully understand its potential. Currently, the city is dominated by IT professionals, highlighting the need for interdisciplinary talent in algorithm modelling and business analysis. The digital twin city also requires interoperable knowledge bases and industry models in various aspects of data, models, and interaction. The high research costs of digital twin cities make it difficult to translate into practical benefits. A wider range of citizens, institutions, and market players is needed to innovate and form a risk-sharing development pattern.

2. The challenge of data governance and privacy concerns

Urban IoT sensing's limited data-collection capabilities can lead to insufficient application depth in digital twin cities. Inconsistent multidimensional and multi-scale data collection and uneven

construction of IoT facilities may result in ex ante models and virtual simulations. Lack of standardized governance of varied urban multisource data also hinders integration and fusion, leading to low data quality and insufficient governance effectiveness. Centralized processing of large amounts of data increases the risk of data security failures and privacy leakage.

3. The challenge of scientific understanding and value perception

Digital twin city technology is undergoing rapid development and change, with its potential being explored from various perspectives. Over emphasizing 3D modelling and visualization of city components while overlooking simulation extrapolation and virtual interaction could lead to unbalanced development. The development of digital twin cities is determined by supply and demand, and some cities focus too much on fine reproduction without in-depth analysis of application requirements. This could result in disconnect in urban planning, construction, management, and services, reducing digital twin technology to a flashy ornament.

THE POWER OF DIGITAL TWINS IN SMART CITIES:

- Our cities, like the rest of the globe, are rapidly changing. The notion of Smart Cities has gained traction, promising a future that is interconnected, sustainable, and efficient. The innovative technology of digital twins is at the centre of this transformation. Decision-makers may optimise urban planning, foresee and avert issues, and make data-driven decisions by constructing a digital model that replicates the physical world. When integrated into Smart City frameworks, digital twins provide a plethora of benefits. Here are some significant benefits:
- Predictive Maintenance: Cities can predict future issues and conduct proactive maintenance by continuously monitoring and evaluating data from digital twins. This method decreases downtime, increases asset longevity, and lowers maintenance expenses.
- Improved Urban Planning: Digital twins allow city planners to simulate multiple scenarios and assess the impact of various measures. Visualising the effects of suggested changes improves the effectiveness and efficiency of urban planning.
- Resilience and disaster Response: Cities can use digital twins to simulate disaster situations, improve readiness, and respond quickly to crises. Authorities can make educated judgements and maintain public safety by analysing real-time data.
- Improved Resource Management: Digital twins give real-time data and analytics on everything from energy use to waste management, helping cities to optimise resource allocation, decrease inefficiencies, and promote sustainability.
- Improved public Engagement: By providing accessible and interactive venues, digital twins enable greater public involvement. Citizens can actively participate in urban planning, express their concerns, and make decisions.

RECOMMENDATIONS FOR INDUSTRY:

1. The threshold for building digital twin city scenes should be lowered to attract more practitioners and stakeholders. This could involve government departments building public service platforms, promoting open source software, and developing SaaS micro-applications. This could help city managers, operators, and residents collaborate to enhance digital twin scenarios and improve business processes.

2. The digital twin field requires unique advantages to foster a prosperous innovation ecosystem. By bringing together people with common interests, a larger crowd increases the chance of innovation and benefits. Key technologies and industrial elements, such as IoT perception, visualization, and data fusion, can be utilized to cultivate individual strengths, break industry competition, establish incremental business models, and open up new business spaces.

3. The focus should be on standard-led industrial implementation and forming interconnected partnerships. Standardization should play a crucial role in promoting digital twin cities, refining common requirements and normative standards from advanced regions like the US, China, and Singapore. Cooperation on digital twin city reference architecture, city information models, and maturity should be strengthened.

4. Government and enterprises should collaborate on business model innovation to expand the "to C" market and transform from a one-time project relationship to a long-term operation partnership. The digital twin city cloud service market should be actively developed, providing on-demand supply and customized designs for digital twin SaaS services. The service can be extended from "to G" to "to B" and "to C" services depending on the precision of the twin city model. The digital twin city combines ICT technology and human civilization, creating a green system with less pollution, waste, and sustainability. Block chain, digital watermarking, and privacy enhancement will support sustainable development. In 2022-2023, CICT and the World Economic Forum will promote integration and innovation among industry, academia, research, and application, promoting exchanges and cooperation among governments, enterprises, and academia.

CONCLUSION:
Smart cities are metropolitan regions that use information and communication technology, sensors, and other electronic devices that are linked to the Internet of Things to collect large amounts of data that can be used to optimise resources and services. The digital-twin technology appears as the best option for smart cities. As a result, architects and designers agree that digital twins are a game changer in the design and operation of smart cities' buildings, transport systems, road landscapes, and more. Digital twins have found their initial application in smart cities to better comprehend the city's transport capabilities, which range from bike sensor data to parking and air traffic availability, but have the potential to spread to architecture in the near future. When organisations can easily employ digital twins to boost productivity and minimise expenses, they will become more popular. Processes, planning, design, construction, and operation and maintenance operations in smart cities are progressively digitised and digital twins serve the purpose well. We conclude that there are significant opportunities for scaling digital twins, which have the ability to benefit the city, its residents, and clients.

REFERENCES:
1. Li Tao, & Song Zhanyu, & Jinjin Ming, & Zhang Hongsheng, & Li Keyi, Carbon counting and reduction measures for the whole life cycle of buildings under the "double carbon" target—China Unicom's promotion of building energy efficiency to help low-carbon development. China Construction Informatization, (08), 2022, pp. 39–41.
2. Chang Pei & Zhang Qi, Analysis of the current situation of China's construction industry under the influence of the new crown epidemic. Anhui Construction, vol. 28(09), 2021, pp. 258-259.

3. Rajat, A., & Shankar C., & Mukund. Imagining construction's digital future, 2016. Online: Sridharhttps://www.mckinsey.com/business-functions/operations/our-insights/imaginingconstructions-digital-future

4. Zhang Snap, & Xia Zilin, National speed skating museum "ice ribbon" "super brain" online. Middle school students reading, (05), 2022, pp. 15–16.

5. Liu Zhanshi, & Shi Guoliang, & Du Xiuli, & Jiao Zedong, Intelligent operation and maintenance theoretical system and implementation method based on digital twin. Journal of Civil and Environmental Engineering (in English and Chinese), 2022.

6. Terra Digital Technology (Beijing) Co., Intelligent Lingang: Building a "six-energy" system.China Construction Informatization, (17), 2021, pp. 27–29.

7. Xu Yan, & Deng Yang, & Yuan Huanqing, Smart city construction under the empowerment of digital twin technology. Urban and rural construction, (03), 2022, pp. 54–56.

8. Aaron, P., & Lane, W. Industry 4.0 and the digital twin, 2017. Online: https://www2.deloitte.com/us/en/insights/focus/industry-4-0/digital-twin-technology-smart-factory.html

9. Zhang Xinsheng, Design and implementation of a workshop control system based on digital twin. Zhengzhou University, 2018, pp. 44–70 .

10. Niu Weirui, & Wang Binwu, Comparative study on the development of domestic and foreign construction industry. Construction, (07), 2022, pp. 12–17.

Addressing Mental Health Needs in Public Health Management: Bridging Gaps in Services and Support

PDF (https://ijmtlm.org/index.php/journal/article/view/73/65)

Keywords:
Mental health, public health management, gaps in services, support, interventions, stigma, access to care, community-based support.

Sachin Ayarekar, Vikrant Nangare, Gaurav, Amol Pandurang Godge, Ramchandra Vasant Mahadik, Swati Desai

Abstract

Mental health issues represent a significant public health challenge globally, yet there remains a considerable gap in addressing these needs effectively within public health management systems. This paper explores the various dimensions of mental health within the context of public health management, focusing on identifying existing gaps in services and support. Drawing upon a comprehensive review of literature, this paper highlights the multifaceted nature of mental health challenges, including stigma, limited access to care, insufficient resources, and disparities in service provision. It examines the roles of different stakeholders, such as governments, healthcare providers, community organizations, and individuals, in addressing mental health needs. Moreover, this paper discusses potential strategies and interventions to bridge the existing gaps, including integrating mental health services into primary care, leveraging technology for remote interventions, promoting mental health literacy, and strengthening community-based support systems. By addressing these challenges and implementing effective interventions, public health management can better respond to the mental health needs of populations, ultimately contributing to improved well-being and reduced burden of mental illness.

Issue
Vol. 27 No. 1s (2024) (https://ijmtlm.org/index.php/journal/issue/view/31)

Section
Articles

Make a Submission (https://ijmtlm.org/index.php/journal/about/sub

(https://www.scimagojr.com/journalsearch.php?q=25110&tip=sid&exact=no)

(https://www.scopus.com/sourceid/25110)

1.1

2023 CiteScore

25th percentile

Powered by Scopus

(https://hjrs.hec.gov.pk/index.php?r=site%2Fresult&id=1073180#journal_result)

Home (http://ijmtlm.org)

Current Issue (http://ijmtlm.org/index.php/journal/issue/current)

Archives (http://ijmtlm.org/index.php/journal/issue/archive)

Contact Us (http://ijmtlm.org/index.php/journal/about/contact)

Downloads

Source details

International Journal of Medical Toxicology and Legal Medicine

Years currently covered by Scopus: from 1999 to 2003, from 2005 to 2011, from 2017 to 2024

Publisher: Auricle Global Society of Education and Research

ISSN: 0972-0448   E-ISSN: 0974-4614

Subject area: (Medicine: Pathology and Forensic Medicine)   (Pharmacology, Toxicology and Pharmaceutics: Toxicology)

Source type: Journal

[View all documents >]   [Set document alert]   💾 Save to source list

CiteScore 2023
1.1   ⓘ

SJR 2023
0.283   ⓘ

SNIP 2023
0.365   ⓘ

CiteScore   CiteScore rank & trend   Scopus content coverage

CiteScore   2023 ⌄

1.1 = $\dfrac{394 \text{ Citations } 2020 - 2023}{354 \text{ Documents } 2020 - 2023}$

Calculated on 05 May, 2024

CiteScoreTracker 2024 ⓘ

0.9 = $\dfrac{303 \text{ Citations to date}}{339 \text{ Documents to date}}$

Last updated on 05 November, 2024 • Updated monthly

CiteScore rank 2023 ⓘ

Category	Rank	Percentile
Medicine └ Pathology and Forensic Medicine	#156/208	25th
Pharmacology, Toxicology and Pharmaceutics	#108/133	19th

View CiteScore methodology >   CiteScore FAQ >   Add CiteScore to your site 🔗

ELSEVIER

"A STUDY ON PASSENGER SATISFACTION TOWARDS EMERGING METRO RAILCORPORATION IN PUNE CITY"

Prof. Gaikwad Bharti Anand[1] Dr. Suhas Khandal[2]

Prof. Shwetal Shantanu Jadhav[3] Prof. Shriram Ugale[4]

[1]Research Scholar, Zeal institute of Business Administration, computer Applications and Research, Pune
[2]Zeal institute of Business Administration, computer Applications and Research, Pune
[3]Zeal institute of Business Administration, computer Applications and Research, Pune
[4]Zeal institute of Management and Computer Application, Pune

Abstract: The Pune Metro is a rapid transit system serving the city of Pune, Maharashtra, India. It aims to provide a sustainable and efficient mode of public transportation to alleviate traffic congestion and improve connectivity within the city. The project is being implemented and execute on January 2022 by the Pune Metropolitan Region Development Authority (PMRDA) and Maharashtra Metro Rail Corporation Limited (MAHA-METRO), with support from the Government of Maharashtra and the Government of India. The Pune Metro is being constructed in phases, with several lines planned to connect various parts of the city. The first phase includes two lines:

Line 1 (Purple Line): This line stretches from Pimpri-Chinchwad to Swargate, covering a distance of approximately 16.59 kilometers. It will have 14 stations and serves key areas such as Pimpri, Chinchwad, Kasarwadi, Phugewadi, Dapodi, Bopodi, Khadki, Range Hills, Shivajinagar,Civil Court, Agriculture College, and Swargate.

Line 2 (Aqua Line): This line runs from Vanaz to Ramwadi, spanning approximately 14.67 kilometers. It will have 16 stations, connecting areas like Vanaz, Ideal Colony, Nal Stop, Garware College, Deccan Gymkhana, PMC, Pune Railway Station, Ruby Hall Clinic, Bund Garden, Yerwada, and Ramwadi.

Keywords: Sustainable, alleviate, connectivity, metropolitan

Introduction: The Pune Metro is expected to ease traffic congestion, reduce pollution, and enhance the overall transportation infrastructure of Pune. Additionally, it will provide a convenient mode of travel for residents and visitors alike. Beyond the initial phases, there may be plans to expand the Pune Metro network further, adding more corridors and extending existing lines to cover additional areas of the city and its suburbs. These expansion plans would likely be based on factors such as population growth, urban development, and transportation needs. The Pune Metro is expected to integrate seamlessly with other modes of transportation, including bus services, suburban rail, and potentially other future transit systems. Integrated ticketing and convenient interchange facilities would encourage more people to use public transport and reduce reliance on private vehicles. Pune Metro could incorporate advanced features such as automated train control systems, real-time passenger information systems, and smart infrastructure for enhanced safety, efficiency, and passenger experience.

Objectives

1. To understand the customer satisfaction for ticketing service provided by Pune Metro.

1. To assess the customer perception towards using Pune Metro service.

2. To know the passengers' expectations towards Metro transport service providers.

3. To know the current status of working of Pune Metro Service.

4. To assess the overall customer satisfaction with Pune Metro Service.

Research Methodology;

Type of Research – Descriptive Research is used in this study in order to study the services provided by Pune Metro Rail Transporters and to study the gap between their services and passenger satisfaction.

Collection of Data –Primary Data
1. Observation Method
2. Interview Method
3. Structured Questionnaire for passengers

Secondary Data
1. Annual Reports

2. Books

3. Articles and Research Papers

4. Internet
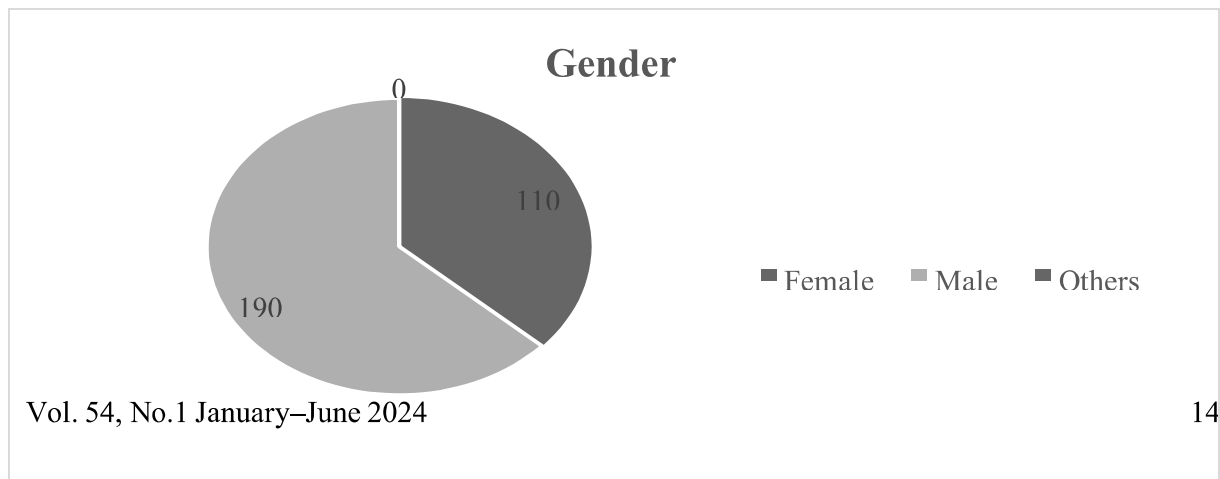
5. Newspapers

6. Magazines

7. E-Books

Sampling Method – Convenient Sampling Method
Sampling Size- 300
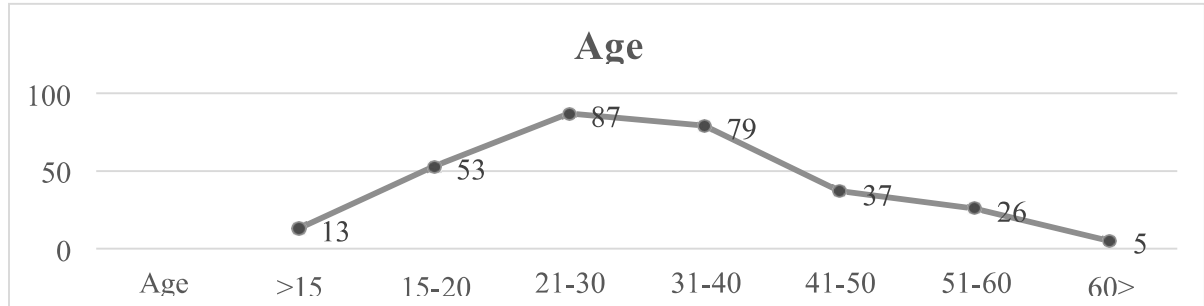**Sampling Unit-**People using Metro Service in Pune City
Data Interpretation:
Graph No 1: Gender Status of Respondents

Gender

0
110
190

Female   Male   Others

Interpretation:

The above graph shows the gender distribution, with 110 individuals identified as female and190 individuals identified as male.

Graph No 2: Age group of respondents

Interpretation:

The above graph depicts that the largest group falls within the 21-30 age range, indicating a significant portion of the population or sample consists of young adults. Secondly age group of 31-40 also has 79 respondents whereas, 53 respondents travel belonging to age group of 15-20. Italso shows that in age group of 41-50, 37 people were found travelling. Very less portion of respondents travel from age group of 51-60, above 60 and below 15 i.e. 26, 5 and 13 respectively.

Graph No 3: Income Per annum of Respondents
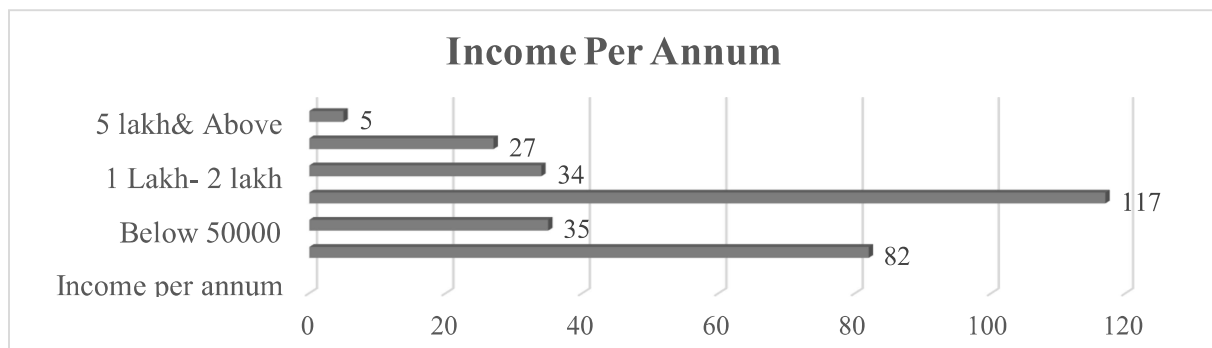
Interpretation:

The above graph shows the income distribution within a sample population of 300 individuals' considerable number of individuals fall within the "50000-1 Lakh" are 117 and "1 Lakh-2 Lakh" are 34. However, the smaller counts in the "2 Lakh-5 Lakh" are 27 and "5 Lakh & Above" are 5. It reveals a varied economic landscape, with the majority falling into the "No Income" and "Below 50000" income brackets i.e. 82 and 35, suggesting a significant proportion facing financial challenges.
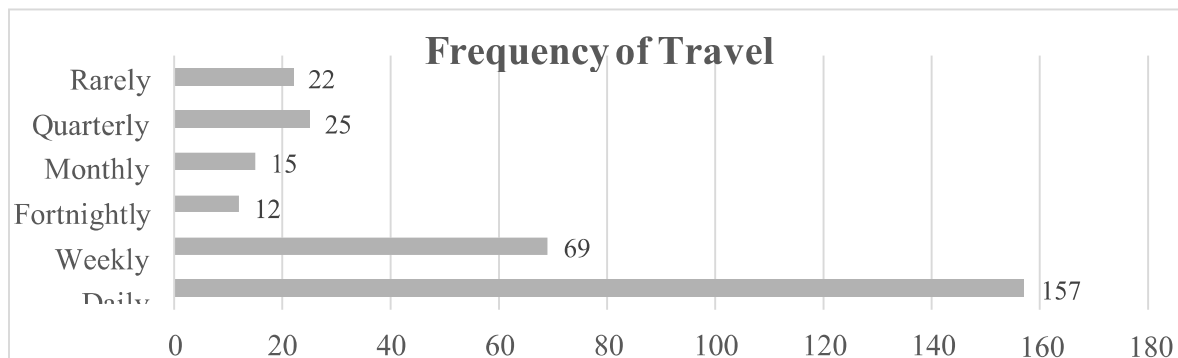
Graph No 4: Occupation of Respondents
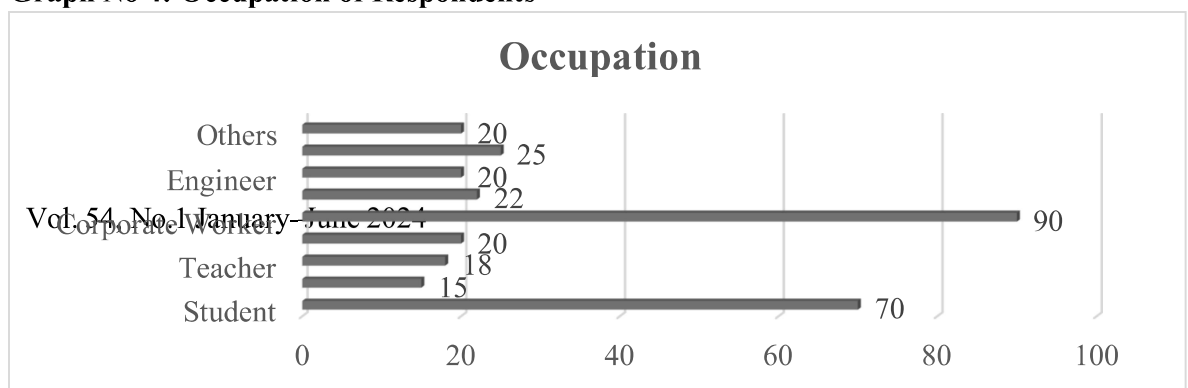
Interpretation:

The above graph showcasing a range of professions. Corporate Workers represent the largest cohort of 90 indicating a significant presence of young adults. Students also constitute a substantial portion of 70 respondents. Professionals such as doctors, teachers, lawyers, engineers, bankers, and businessmen each contribute to the occupational fabric, albeit with smaller counts with 15, 18, 20, 20, 25 and 22 respectively.
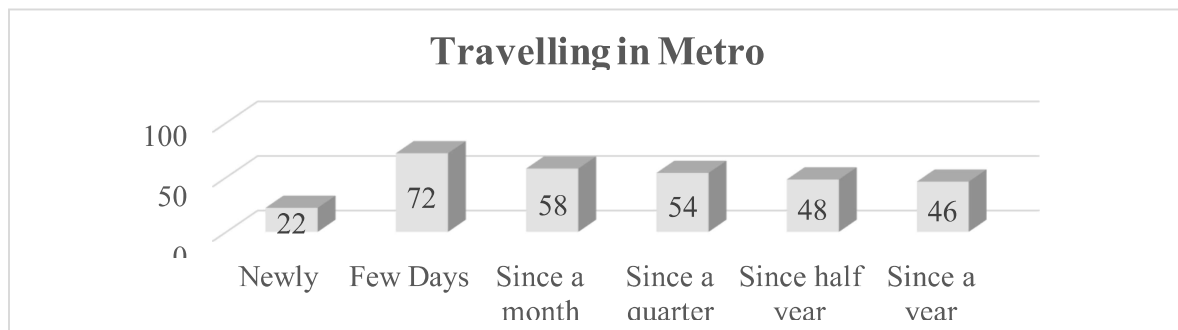
Graph No 5: Frequency of Travel by Respondents

Frequency of Travel

Category	Value
Rarely	22
Quarterly	25
Monthly	15
Fortnightly	12
Weekly	69
Daily	157

Interpretation:

The above graph shows that the majority of individuals (157) engage in daily travel, suggesting regular commuting or routine travel for work, school, or other activities. Weekly travel is also quite common, with 69 individuals indicating a regular but less frequent pattern. Fortnightly travel, occurring every two weeks is less prevalent, as indicated by the smaller count of 12 individuals. Monthly and quarterly travel frequencies are represented by 15 and 25 individuals, respectively, indicating less frequent but still recurring travel intervals. Additionally, 22 individuals travel rarely, suggesting infrequent travel.

**Graph No 6: Metro Utility Period by Passengers**

Travelling in Metro

Category	Value
Newly	22
Few Days	72
Since a month	58
Since a quarter	54
Since half year	48
Since a year	46

Interpretation:

The above graph depicts that the majority of individuals (72) have been using the metro for a few days, suggesting recent adoption or occasional use. Significant portion (58) has been utilizing metro services for about a month, indicating a growing familiarity with this mode of transportation. Additionally, sizable counts are observed for individuals who have been using the metro since a quarter (54) or since half a year (48), indicating sustained usage over more extended periods. A slightly smaller count (46) has been using the metro for a year, representing a segment of more

experienced users. Meanwhile, a smaller group (22) are new users, suggesting a recent introduction to metro travel.

Graph No 7: Use of Metro Card by Respondents
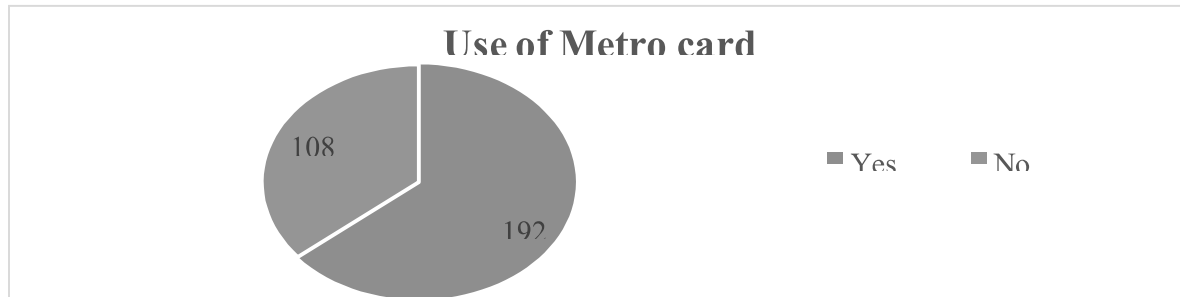
Interpretation:

The above graph shows the significant majority (192) of individuals use metro cards, suggesting widespread adoption of this payment method for metro travel. Conversely, a smaller portion (108) do not use metro cards, possibly opting for alternative payment methods such as single tickets or cash.

Graph No 8: Respondents Preferences towards Mode of Ticket Booking
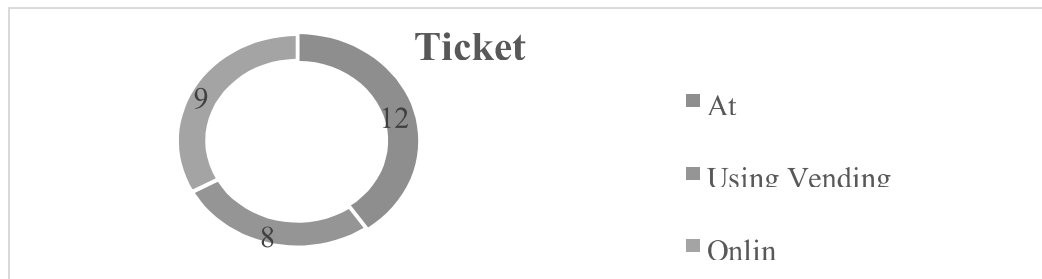
Interpretation:

The above graph shows that the majority of individuals (121) opt to book tickets at the counter, indicating a preference for in-person transactions or a reliance on traditional methods. A significant portion (99) utilizes online booking platforms, highlighting the growing popularity of digital channels for ticket purchase, which offers convenience and flexibility. Additionally, a sizable count (80) uses vending machines for ticket booking.
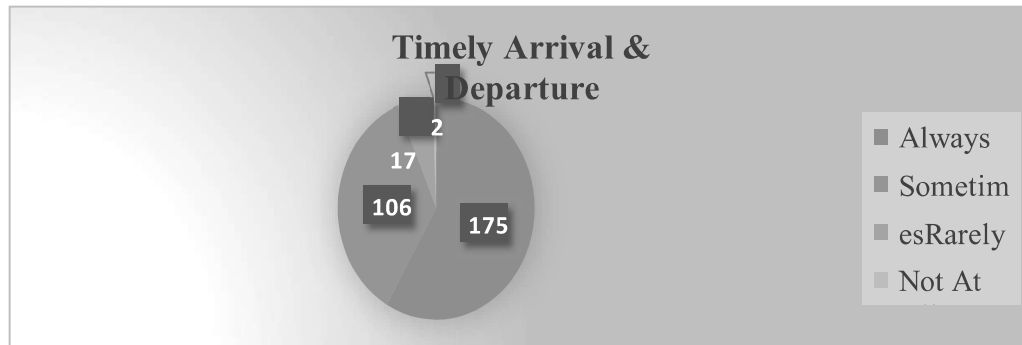
Graph No 9: Respondents Opinions About Average waiting Time for a Metro
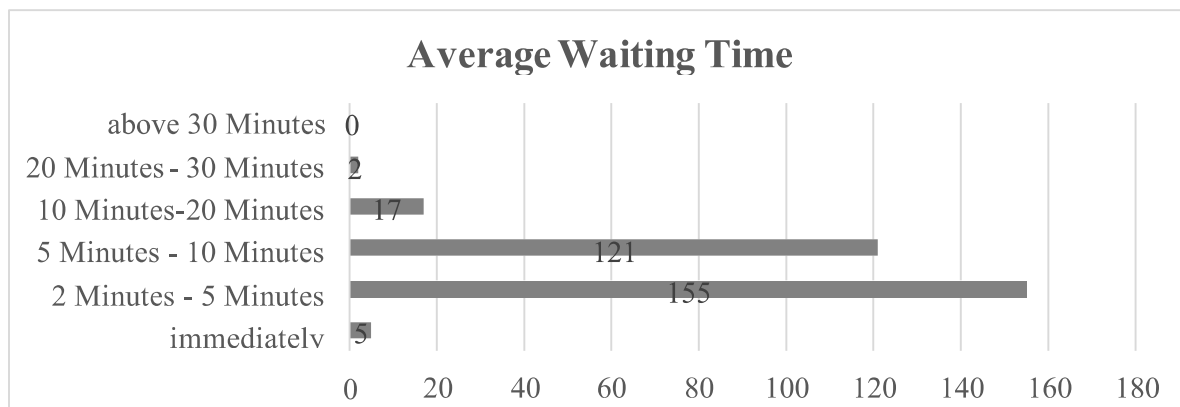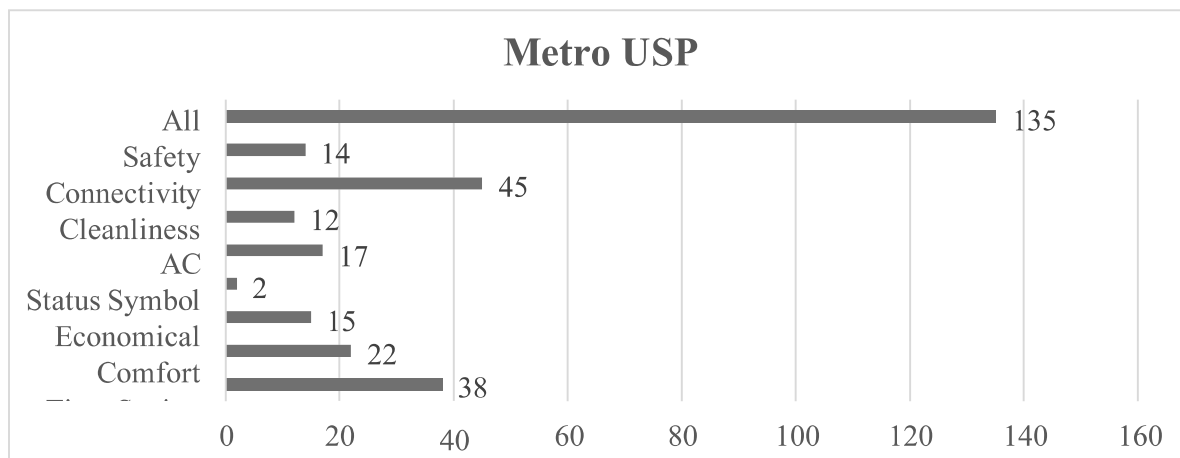
Interpretation:

The graph shows that majority of individuals (155) experience a waiting time ranging from 2 to 5 minutes, suggesting relatively short waiting periods before boarding a train. A substantial portion (121) experiences a slightly longer wait of 5 to 10 minutes, still within a reasonable timeframe. However, fewer individuals experience longer waiting times, with only 17 waiting between 10 to 20 minutes, and an even smaller count of 2 individuals waiting between 20 to 30 minutes. Notably, there are no instances of individuals waiting for above 30 minutes.

Graph No 10: Respondents Opines about Timely arrival & Departure of Metro

Timely Arrival & Departure

- Always
- Sometim
- esRarely
- Not At

(values: 2, 17, 106, 175)

Interpretation:

Metro USP

- All: 135
- Safety: 14
- Connectivity: 45
- Cleanliness: 12
- AC: 17
- Status Symbol: 2
- Economical: 15
- Comfort: 22
- (Time Savings): 38

The above graph shows that majority of respondents (175) indicate that trains always arrive and depart on time, suggesting a high level of reliability and punctuality in the metro service. A smaller fraction (17) reports rare instances of trains arriving or departing late, highlighting sporadic disruptions to service punctuality. Interestingly, a very small count (2) expresses dissatisfaction.

Graph No 11: Passengers Attracted USP for Metro

Interpretation:

The above graph depicts that the data indicates that a majority of respondents (175 out of 300) believe that metro trains always arrive and depart on time, reflecting a high level of satisfaction with the service's punctuality. A smaller number of respondents (17) report rare instances of delays, while an even smaller minority (2) express dissatisfaction with the service, stating that

trains do not arrive or depart on time at all.

Graph No 12: Respondents Attitude about the Statement "Is Metro Helpful" for feasible travelling?

Metro is

	1	8	8	0
Mostl	Somewh	To some	Cant	Not at

(y-axis: 0, 20, 30)
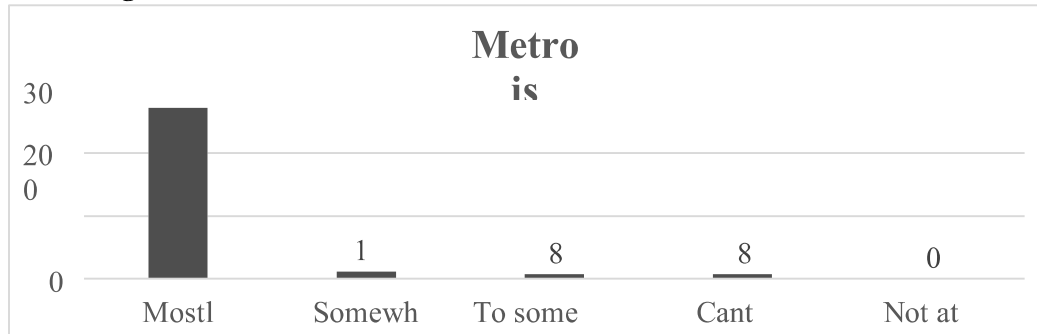
Interpretation:

The above graph depicts that a significant majority of respondents (272 out of 300) consider the metro system to be mostly helpful. This suggests a high level of satisfaction and confidence in the usefulness and effectiveness of the metro in meeting their transportation needs. A smaller portion of respondents (12) perceive the metro system to be somewhat helpful, indicating a moderate level of satisfaction. Notably, none of the respondents indicate that the metro system is not helpful at all.
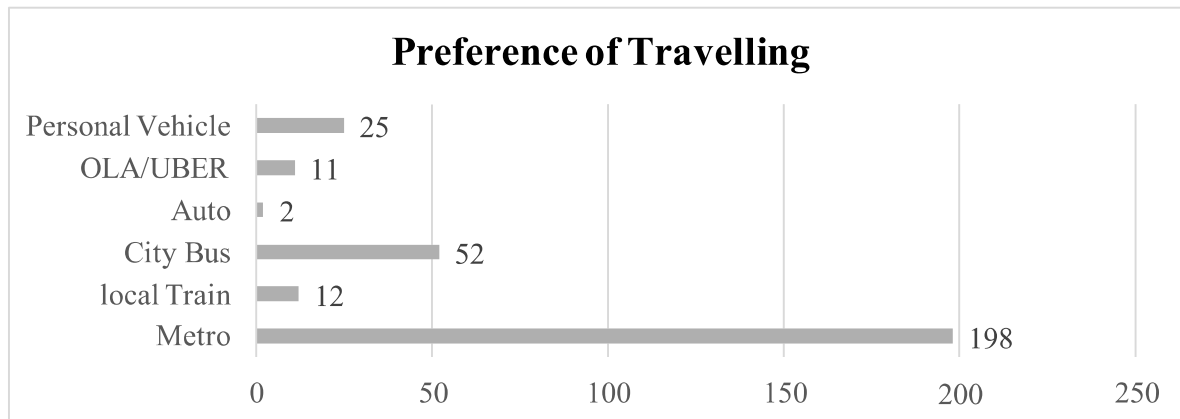
Graph No 13: Satisfaction Level of Passangers

Satisfaction

(y-axis: 10, 15, 20, 25 with 0)

85	20	8	0	0
Rank 1	Rank	Rank	Rank	Rank

Interpretation:

The above graph shows that the majority of respondents (207 out of 300) rank their satisfaction level as second, indicating a relatively high level of satisfaction but with potential areas for improvement. Additionally, a significant portion of respondents (85 out of 300) rank their satisfaction level as first, reflecting a high degree of satisfaction. Notably, there are no respondents who rank their satisfaction level as fourth or fifth.
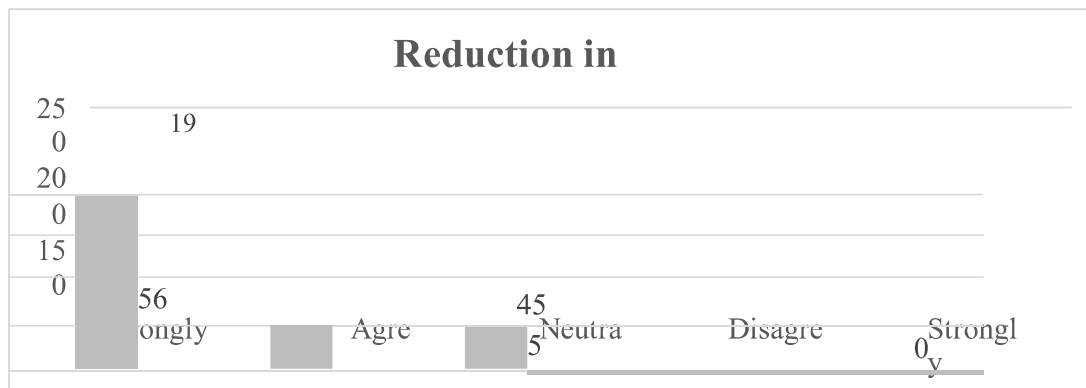
Graph No 14: Preference of Travelling by Respondents

Preference of Travelling

Mode	Value
Personal Vehicle	25
OLA/UBER	11
Auto	2
City Bus	52
local Train	12
Metro	198

(x-axis: 0, 50, 100, 150, 200, 250)

Interpretation:

The above graph shows that the majority of individuals (198 out of 300) prefer traveling by metro, indicating a strong preference for this mode of transportation. City buses are the next preferred mode, with 52 individuals favoring them, followed by personal vehicles, which are preferred by 25 individuals. Local trains, OLA/UBER, and autos are less preferred modes, with smaller numbers of individuals expressing a preference for them.

Graph No 15: Passengers Agreeing About Reduction in Traffic by Using Metro

Reduction in

(y-axis: 0, 50, 100, 150, 200, 250)

Category	Value
Strongly	19 (56?)
Agre	
Neutra	45
Disagre	5
Strongly	0

Interpretation:

The above graph depicts that the overwhelming majority of respondents (194 out of 300) strongly agree that there has been a reduction in traffic. An additional 56 respondents agree with this statement, albeit not as strongly. A smaller portion of respondents (45) remain neutral on the issue, indicating neither agreement nor disagreement. A very small number of respondents (5) disagree with the statement, suggesting they perceive no reduction in traffic. Notably, there are no respondents who strongly disagree with the notion of traffic reduction.

Graph No 16: Respondents Favoring to Decrease in Pollution because of Metro

Decrease in Pollution

Strongly Agree: 272
Agree: 28
Neutral: 0
Disagree: 0
Strongly Disagree: 0
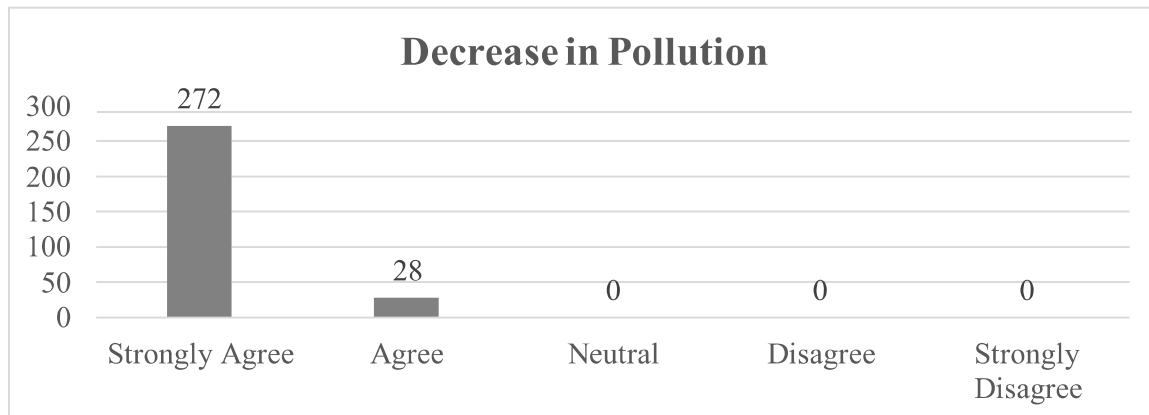
Interpretation:

The above graph shows that majority of respondents (272 out of 300) strongly agree that there has been a decrease in pollution. Additionally, 28 respondents agree with this statement, although not as strongly. Notably, there are no respondents who express neutrality, disagreement, or strong disagreement with the notion of a decrease in pollution.

Graph No 17: Respondents Opinion about Cleanliness at Metro Station

Cleanliness at Metro Station

Not at all: 0
Cant Say: 4
To some Extent: 10
Somewhat: 54
Mostly: 232
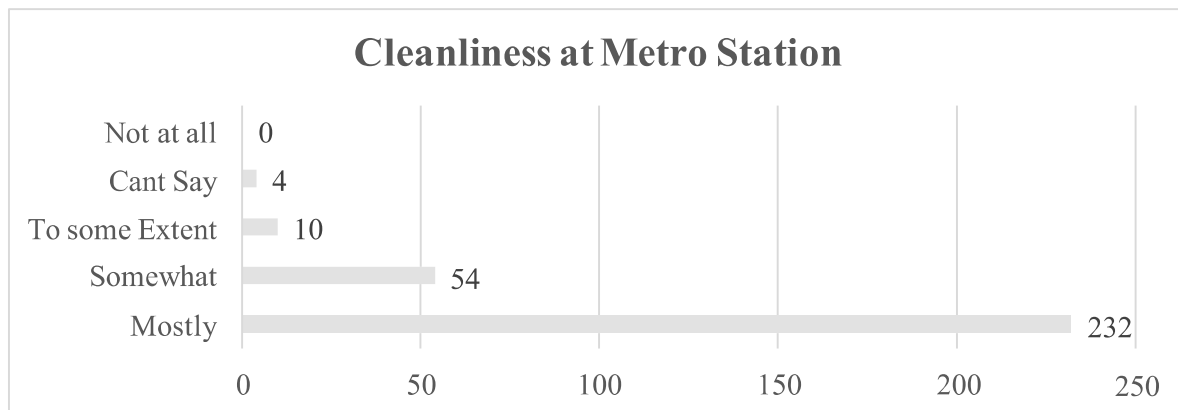
Interpretation:

The above graph tells us that the majority of respondents (232 out of 300) perceive the cleanliness at metro stations as mostly satisfactory, indicating a high level of cleanliness overall. Additionally, 54 respondents view the cleanliness somewhat positively, suggesting a moderate level of satisfaction. A smaller group of respondents (10) perceive the cleanliness at metro stations to some extent, indicating a mixed or varied experience. Furthermore, a few respondents
(4) are uncertain and cannot definitively state their opinion on the cleanliness. Notably, there are no respondents who perceive the cleanliness at metro stations negatively.

Graph No 18: Respondents Opines about Cleanliness of washrooms at Metro Stations

Interpretation:

Clean Washrooms

Category	Value
Not at all	0
Cant Say	37
To some Extent	35
Somewhat	48
Mostly	180
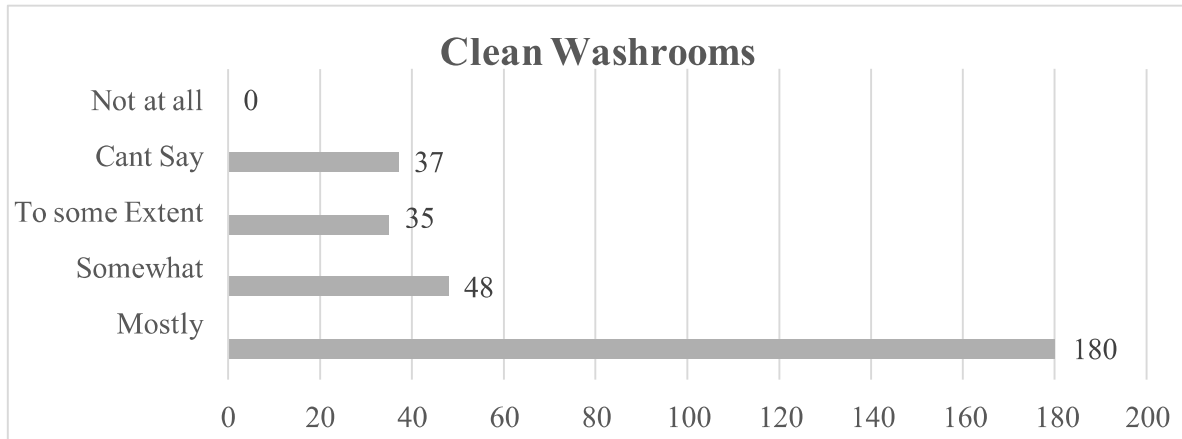
The majority of respondents (180 out of 300) perceive the cleanliness and sanitization of washrooms as mostly satisfactory, indicating a generally positive experience. Additionally, 48 respondents view the cleanliness and sanitization somewhat positively, suggesting a moderate level of satisfaction. Notably, there are no respondents who perceive the cleanliness and sanitization of washrooms negatively

Graph No 19: Respondents Recommending for Metro Service to Family and friends;

Interpretation:

Recommend to family & Friends

Ye
s
N

280
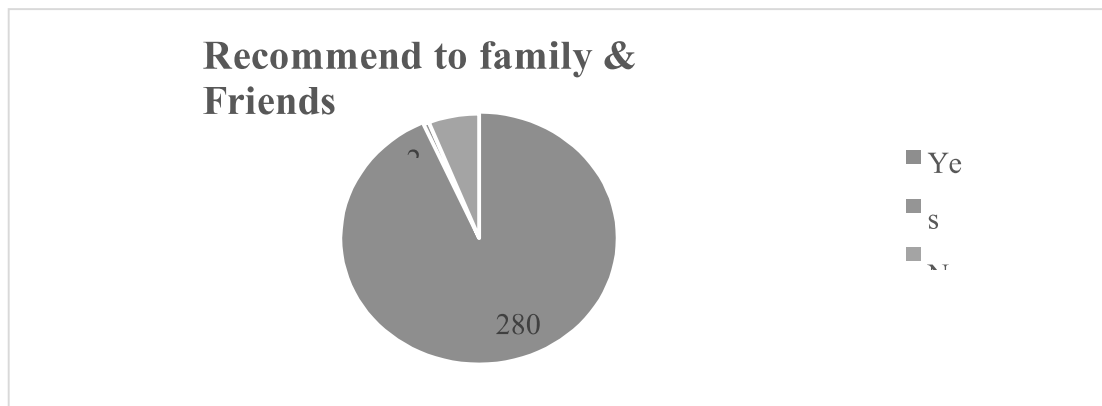
The overwhelming majority of respondents (280 out of 300) indicate that they would recommend the service or experience to their family and friends, suggesting a high level of satisfaction and confidence in its quality. However, a small minority of respondents (2) state that they would not recommend it. Additionally, a few respondents (18) are uncertain and cannot definitively say whether they would recommend it or not.

Graph No 20: Expectations of Respondents from Metro Service
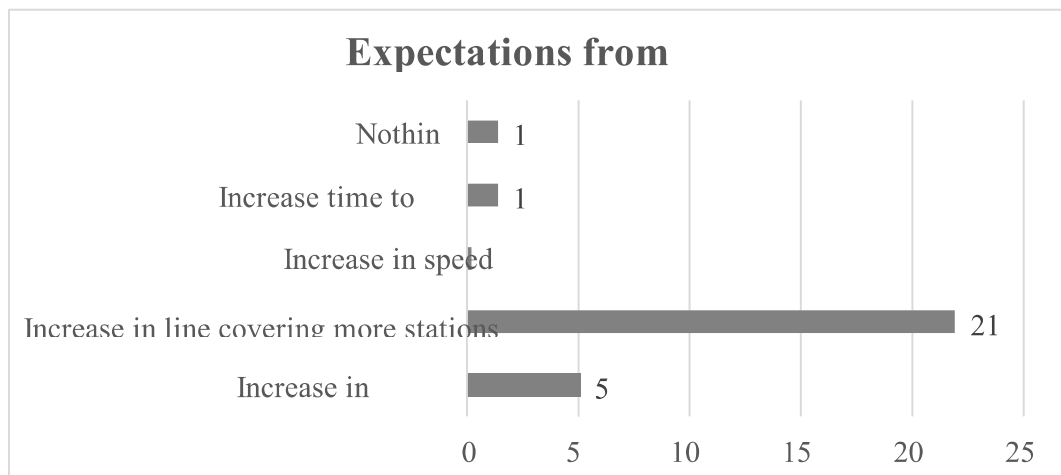
Interpretation:

The above graph interprets that the majority of respondents (219 out of 300) express an expectation for an increase in the metro line, covering more stations. This suggests a desire for expanded coverage and accessibility within the metro network. Additionally, a significant portion of respondents (51) anticipate an increase in the number of metro stations, indicating a need for improved access points. However, only a small number of respondents express expectations for increasing the speed of the metro (2) or increasing the time to stop (14). Notably, there are also respondents (14) who express that they have no specific expectations from the metro system.

Findings:

1. It was found that majority of the population is male that is 190 out 0f 300.

2. It was found that people in the age range of 21-30 travel very often they cover 87 people out 0f 300 whereas, very few people travel in metro of above 60 age group.

3. It was found that people who have income in the range of 50,000 to 1 Lakh travel very frequently and are 117 out of 300, people with above income of 5lakh travel via metro rarely with only 5 respondents.

4. It was found that mostly corporate workers using metro on daily basis they are 90. Doctors areonly 15 out of the sample and travel very rarely.

5. It was found that 157 people out of 300 travels on daily basis, 12 travel on fortnightly basis.

6. It was found that majority of the people use metro card to travel i.e. 192 out of 300.

7. It was found that 121 people find it convenient to took tickets online and 80 book their tickets online.

8. It was found that 155 people wait for 2min-5min for a metro to arrive at the station whereas only 2 out of 300 waited for more than 20 mins.

9. It was found that 175 people said that metro follows a [proper arrival and departure schedule whereas 2 out of 300 people say that metro does not follow proper schedule of arrival and departure.

10. It was found that majority of the people i.e. 135 out of 300 use metro for safety measures, cleanliness, AC, economical, time saving, comfort etc. reasons.

11. It was found that 272 people out of 300 said that metro is very helpful whereas only 8 said that that they can't say if it's helpful.

12. It was found that 207 people out of 300 rated metros at Rank 2.

13. It was found that 198 people's first priority to travel is metro and second priority is given to city bus, least preferred transportation is by auto by 2 people.

14. It was found that major part of the respondents i.e. 194 said that the traffic will reduce in future with more use of metro by people. None of them denied to the fact that it will reduce traffic.

15. It was found that major part of the sample i.e. 272 out of 300 strongly agree that metro will contribute in decreasing the pollution in future, none of the respondents denied that metro will reduce pollution in the environment.

16. It was found that 232 people out of 300 said that metro station and washrooms are clean and hygiene is maintained throughout the day. None of them disagree to the cleanliness maintained atthe metro stations.

17. It was found that majority of sample i.e. 280 will recommend using metro service to family and friends whereas a small portion of people 2 can't say if they want t recommend metro service to their family and friends.

18. It was found that 219 people out of 300 expect metro service to expand and increase number of stations and include more stops for their convenience.

Suggestions

Suggestions Based on Interpretation:

1. Meto services should be expanded to cater different locations of the Pune city. Only few Metro lines and station are active which directly affect passenger count, try to activate other linesand station. (Ref. Graph No. 20)

2. To maintain cleanliness and Hygiene guidelines should be displayed at metro station. (Ref. Graph No. 17)

3. Innovative and attractive schemes should be given for people using metro cards so that people will get delighted and will attract another crowd das well (Ref. Graph No. 7)

4. It was observed that ticket booking vending machine was not working at the metro station.

Proper maintenance should be followed by metro staff. (Ref. Graph No. 8)

Suggestions Based On Observations:

1. As relatively small portion of people use metro awareness program should be arranged.

2. More number of washrooms should be made as a provision to cater big population as currentlyonly there is one washroom at each floor at metro station.

3. As per safety concern proper boarding and deboarding pattern should be followed and metro management should supervise these that people follow and get familiar to this pattern.

4. It is being observed that ticket with QR code is used as tickets, it can be converted to coins as other state metro service to become paperless.

5. Women compartment and seats reserved for women should be compulsorily use by women only.

6. Fares of metro must be cheap as compare to other transport facilities to motivate passengers touse metro service and eventually contribute to decrease traffic and pollution.

7. All metro stations have good platforms but location maps, platform number should be more highlighted.

References:

1. "Marketing Management" by Philip Kotler, Kevin Lane Keller, Abraham Koshy,Mithileshwar Jha, 13 th Edition, Pearson. Page no.20

2. "Research Methodology" by C.R. Kothari,3 rd Edition, Himalaya Publication, Page

3. "Metro Rail Projects in India"by M. Ramachandran , Oxford,21 October 2011

4. ebook-Excellence in Metro Operations and Management by by Sharat Sharma ,AmitKumar Jain , Sankalp Devendra Best Practices World Over Paperback – Big Book, 30 September 2023

5. Web links – https://www.punemetrorail.org/the-company.

6. The Daily local newspapers including Lokmat, Sakal, Dainik Divya Marathi –March 2