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Exploring the Socio-Cultural Impacts of Religious Tourism in Nashik through Factor Analysis

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Abstract

Religious tourism significantly shapes the socio-cultural dynamics of host communities, particularly in culturally vibrant destinations like Nashik, Maharashtra. This study investigates the multifaceted socio-cultural impacts of religious tourism in Nashik by employing Exploratory Factor Analysis (EFA) and regression analysis. The research draws on data collected from 128 respondents—including residents, tourists, entrepreneurs, and officials—using structured questionnaires, interviews, and focus group discussions. Quantitative results identify three latent components: (1) socio-cultural transformation, (2) domestic disruption and social friction, and (3) inclusive economic empowerment. These factors collectively explain 57.49% of the total variance. Regression findings reveal that all three components significantly predict the impact of religious tourism on local lifestyles, with socio-cultural transformation showing the strongest effect. The results highlight changes in public behavior, family routines, and women's economic participation while also indicating potential areas of conflict and exclusion. The study validates the presence of a significant factor structure and supports the predictive strength of these factors. It offers empirical insights to policymakers for designing culturally sensitive and inclusive tourism strategies that enhance community well-being without compromising social harmony.

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INTRODUCTION

Religious tourism has historically contributed to both spiritual fulfillment and regional growth, deeply influencing the social and cultural dimensions of host communities. In a country like India, where religion intertwines with daily life, religious tourism forms a powerful nexus of faith, tradition, and economic activity. Nashik, a spiritually significant city in Maharashtra, exemplifies this phenomenon, drawing millions of pilgrims to events like the Kumbh Mela and sacred sites such as Trimbakeshwar and Kalaram Mandir. While the economic benefits of such tourism are often studied, its subtle yet profound socio-cultural impacts—on local lifestyles, community interactions, family routines, and social inclusion—remain insufficiently explored.

This study addresses that gap by examining how religious tourism reshapes Nashik's social and cultural landscape, with particular emphasis on behavioral change, gendered economic participation, and community dynamics. Utilizing Exploratory Factor Analysis (EFA), the research identifies latent dimensions underlying these impacts. Specifically, it aims to analyze cultural and behavioral shifts, assess effects on family and social harmony, and evaluate socio-economic inclusion, particularly among women. The study tests the hypothesis that a significant factor structure governs these impacts, offering insights for policymakers and scholars to better understand and manage the multi-dimensional influence of religious tourism on Nashik's society.

Objectives of the Study

- To analyze the cultural and behavioral changes influenced by religious tourism in Nashik.
- To examine the effects of religious tourism on family routines and local social harmony.
- 3. To evaluate the socio-economic inclusion facilitated by religious tourism, focusing on women's participation and financial access.

Hypotheses of the Study

Ho: There is no significant factor structure underlying the socio-cultural impact of religious tourism in Nashik.

 H_i : A significant factor structure exists that explains the socio-cultural impact of religious tourism in Nashik.

Ho: The latent factors derived from factor analysis do not significantly predict the impact of religious tourism on the local lifestyle in Nashik.

 H_{i} : The latent factors derived from factor analysis significantly predict the impact of religious tourism on the local lifestyle in Nashik.

RESEARCH METHODOLOGY

This study adopts a mixed-method approach, integrating both quantitative and qualitative research methods to explore the socio-cultural impacts of religious tourism in Nashik. The research design is exploratory and descriptive, aiming to uncover latent

dimensions and describe observed changes. Purposive and convenient sampling methods were used to select 128 respondents, including tourists, local residents, entrepreneurs, and officials. Data collection involved structured questionnaires, interviews, focus group discussions, and observations. The conceptual framework emphasized the interaction between religious tourism and social, cultural, and economic variables.

Quantitative data were analyzed using descriptive statistics, correlation, and regression analysis to examine relationships between variables and assess economic implications. Exploratory Factor Analysis (EFA) was conducted to identify underlying socio-cultural components. Qualitative data from interviews and discussions were examined using thematic analysis to interpret local perceptions and experiences. Secondary data were gathered from municipal reports, government documents, newspapers, and research publications. This comprehensive methodology ensures depth, validity, and context-rich insights into the multi-dimensional impact of religious tourism in Nashik.

FACTOR ANALYSIS RESULTS AND DISCUSSION

Table 1: Descriptive Statistics of Socio-Cultural and Economic Impacts of Religious Tourism in Nashik District

Descriptive Statistics			
	Mean	Std. Deviation	Analysis N
Impact of religious tourism on local lifestyle	3.102	.8770	128
Change in social unity due to religious tourism	3.453	1.2414	128
Impact of religious tourism on local festivals and traditions	3.922	1.0840	128
Effect on family routine during festival season due to tourism	3.148	.9565	128
Conflict between tourists and locals due to religious tourism	3.125	1.0039	128
Increase in women's participation in economic activities due to tourism	3.281	.8956	128
Change in public behavior due to interaction with tourists	3.859	.8938	128
Growth in cultural exchange in Nashik due to religious tourism	3.484	.8417	128
Ease of getting loans/subsidies for tourism- dependent businesses	2.328	.9810	128
Growth in income of small businesses due to religious tourism	2.969	.8127	128
Boost to local entrepreneurship due to religious tourism	3.266	.8556	128
Effectiveness of tourist safety measures in Nashik	3.016	.8960	128

The descriptive statistics in Table 1 provide a foundational overview of the perceived socio-cultural and economic impacts of religious tourism in Nashik, based on 128 respondents. High mean values for "impact on local festivals and traditions" (M=3.922) and "change in public behavior" (M=3.859) indicate that cultural and behavioral changes are among the most noticeable outcomes, aligning with previous studies on pilgrimage tourism's influence on host communities (Timothy & Olsen, 2006). Moderate values for "social unity" (M=3.453) and "cultural exchange" (M=3.484) suggest community-level cohesion benefits, addressing the second objective. Economic

dimensions show comparatively weaker responses; for example, the "ease of getting loans" is notably low (M = 2.328), pointing toward financial inclusion gaps, especially for local entrepreneurs. While "women's participation in economic activities" (M = 3.281) shows a promising trend, it remains only moderately positive. These findings reflect the complex interplay between tourism and community development, consistent with UNWTO's framework on tourism sustainability (UNWTO, 2019). Overall, sociocultural impacts appear more favorable than economic ones, supporting the need for integrated development policies in religious tourism hubs.

Table 2: KMO and Bartlett's Test Results for Sampling Adequacy and Sphericity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling	.824	
Bartlett's Test of Sphericity	Approx. Chi-Square	547.921
	df	66
	Sig.	.000

Table 2 offers essential statistical validation for conducting factor analysis in line with the study's aim to explore the latent socio-cultural dimensions of religious tourism in Nashik. The Kaiser-Meyer-Olkin (KMO) value of 0.824 confirms that the data sample is statistically adequate for uncovering hidden patterns, supporting the study's objective to empirically analyze cultural and behavioral changes, social harmony, and socio-economic inclusion (Kaiser, 1974). Additionally, the significance level of Bartlett's Test of Sphericity ($\chi^2 = 547.921$, df = 66, p < 0.001) ensures that inter-variable correlations are strong enough to allow for valid factor extraction (Bartlett, 1950). These test results indicate that the dataset is well-suited for reducing multiple interrelated variables into meaningful components, which directly supports the study's hypothesis that a significant factor structure underlies the socio-cultural impact of religious tourism. Therefore, the tests affirm the methodological soundness of applying Principal Component Analysis to derive actionable insights aligned with the research objectives.

Table 3: Communalities of Variables After Factor Extraction

Communalities		
	Initial	Extraction
Impact of religious tourism on local lifestyle	1.000	.508
Change in social unity due to religious tourism	1.000	.508
Impact of religious tourism on local festivals and traditions	1.000	.591
Effect on family routine during festival season due to tourism	1.000	.905
Conflict between tourists and locals due to religious tourism	1.000	.898
Increase in women's participation in economic activities due	1.000	.454
to tourism		
Change in public behavior due to interaction with tourists	1.000	.551
Growth in cultural exchange in Nashik due to religious	1.000	.572
tourism		
Ease of getting loans/subsidies for tourism-dependent	1.000	.612
businesses		
Growth in income of small businesses due to religious	1.000	.378
tourism		
Boost to local entrepreneurship due to religious tourism	1.000	.489
Effectiveness of tourist safety measures in Nashik	1.000	.434
Extraction Method: Principal Component Analysis.	•	

Table 3 highlights the communalities of variables after factor extraction, revealing the proportion of each variable's variance explained by the extracted components. In the

context of the study's objective to analyze cultural, social, and economic dimensions of religious tourism in Nashik, high communalities for "effect on family routine" (.905) and "conflict between tourists and locals" (.898) indicate that these variables are strongly influenced by underlying socio-cultural factors. Similarly, moderate communalities for "local lifestyle" (.508), "public behavior" (.551), and "cultural exchange" (.572) support the study's first two objectives focusing on behavior and social harmony. Variables related to economic impact, such as "loans/subsidies access" (.612) and "women's participation" (.454), also retain moderate levels of explained variance, aligning with the third objective on socio-economic inclusion. However, lower communalities for "small business income" (.378) and "tourist safety measures" (.434) suggest these are less integrated into the shared factor structure. Overall, the communalities validate the relevance of most selected variables in representing the latent socio-cultural impact, supporting the methodological strength of the factor analysis approach (Hair et al., 2010).

Table 4: Variance Explained by Principal Components

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of	Cumulative	Total	% of	Cumulative	Total	% of	Cumulative
		Variance	%		Variance	%		Variance	%
1	4.573	38.105	38.105	4.573	38.105	38.105	3.253	27.112	27.112
2	1.349	11.242	49.347	1.349	11.242	49.347	2.140	17.832	44.944
3	.978	8.149	57.497	.978	8.149	57.497	1.506	12.552	57.497
4	.944	7.865	65.361						
5	.834	6.947	72.308						
6	.734	6.118	78.426						
7	.619	5.157	83.583						
8	.519	4.329	87.912						
9	.491	4.091	92.004						
10	.452	3.769	95.772						
11	.391	3.262	99.035						
12	.116	.965	100.000						

Table 4 presents the total variance explained by principal components, which is crucial to understanding the underlying structure of socio-cultural impacts caused by religious tourism in Nashik. Based on the Kaiser criterion (eigenvalues > 1), three components were retained, cumulatively accounting for 57.50% of the total variance, which is considered acceptable for social science research (Hair et al., 2010). The first component explains the largest share at 38.11%, reflecting a dominant latent factor—likely representing cultural and behavioral dimensions.

The second and third components contribute 11.24% and 8.15% respectively, capturing additional variance related to family routines, social harmony, or financial access. After Varimax rotation, the variance was redistributed more evenly across the components (27.11%, 17.83%, 12.55%), enhancing interpretability while maintaining cumulative variance. This structure supports the article's hypothesis that multiple distinct socio-cultural and economic factors underlie the impacts of religious tourism in Nashik. Thus, the extracted factors are both statistically and conceptually meaningful in capturing the multidimensional effects outlined in the study's objectives.

The results reveal that religious tourism in Nashik significantly impacts local culture, public behavior, and family routines, reflecting strong socio-cultural influence. Moderate effects are observed in social unity and women's economic participation, while economic benefits like loan access remain limited.

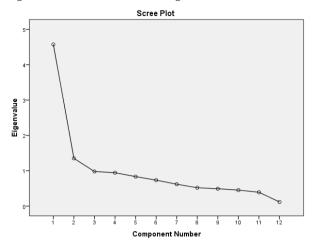


Figure 1:Scree Plot for Determining Retained Factors in PCA

The scree plot visually displays the eigenvalues associated with each component extracted during Principal Component Analysis. A clear elbow is visible at the third component, indicating that only the first three components have eigenvalues greater than 1 and contribute significantly to explaining the total variance. This supports the decision to retain three factors, which aligns with the study's objective of identifying core socio-cultural dimensions of religious tourism in Nashik. These components likely represent clusters related to cultural change, family-social dynamics, and economic inclusion. The steep drop after the first component and gradual decline afterward confirm the diminishing explanatory power of subsequent components (Cattell, 1966). Thus, the plot provides visual justification for the three-factor solution.

Table 5: Factor Loadings of Socio-Cultural Variables After Varimax Rotation

Rotated	Component N	Matrix ^a	
	Component		
	1	2	3
Impact of religious tourism on local lifestyle	.651		
Change in social unity due to religious tourism	.598		
Impact of religious tourism on local festivals and traditions	.734		
Effect on family routine during festival season due to tourism		.922	
Conflict between tourists and locals due to religious tourism		.922	
Increase in women's participation in economic activities due to tourism			.595
Change in public behavior due to interaction with tourists	.716		
Growth in cultural exchange in Nashik due to religious tourism	.732		
Ease of getting loans/subsidies for tourism-dependent businesses			.762
Growth in income of small businesses due to religious tourism			
Boost to local entrepreneurship due to religious tourism	.622		

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Effectiveness of tourist safety measures in Nashik					
Extraction Method: Principal Component Analysis.					
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 5 iterations.					

Table 5 displays the rotated component matrix using Varimax rotation, identifying how variables load onto three distinct components, which represent the core socio-cultural dimensions impacted by religious tourism in Nashik. Component 1 includes high loadings for variables such as cultural exchange (.732), public behavior change (.716), and impact on festivals (.734)—highlighting cultural and community-level influences, consistent with the first research objective. Component 2 is dominated by family routine impact (.922) and tourist-local conflict (.922), indicating disruptions and adjustments in local social harmony, aligning with the second objective. Component 3 captures economic dimensions, particularly access to loans (.762) and women's economic participation (.595), reflecting aspects of socio-economic inclusion per the third objective. Factor loadings above 0.5 are considered significant for interpretation (Hair et al., 2010), and these results confirm distinct thematic groupings that validate the multidimensional structure hypothesized in the study. Overall, the rotated loadings offer empirical clarity on how religious tourism diversely affects Nashik's social, cultural, and economic environment.

Table 6: Interrelationships Among Extracted Components (Component Transformation Matrix)

Component Transformation Matrix						
1	.778	.498	.383			
2	522	.852	048			
3	350	162	.922			
Extraction Method: Pri	ncipal Component Analysis.	•				
Rotation Method: Vari	max with Kaiser Normalizati	on.				

Table 6 presents the Component Transformation Matrix, which reveals the interrelationships among the three extracted components after Varimax rotation. The matrix helps assess how the original unrotated components are transformed into the rotated ones, preserving the total variance while enhancing interpretability. In this case, Component 1 shares a strong positive alignment with the rotated axis (loading = .778), while Components 2 and 3 also maintain substantial correlations with their respective axes (.852 and .922), indicating effective orthogonal separation. The relatively low cross-loadings among components confirm that each factor remains conceptually distinct, which is crucial for a clear thematic interpretation of cultural, social, and economic impacts—supporting the study's multidimensional framework. As recommended in factor analysis literature, strong diagonal values paired with low off-diagonal correlations reflect a successful and stable rotation (Field, 2013). Thus, the matrix validates the three-component model as statistically sound and thematically coherent with the article's objectives.

Hypothesis Testing and Interpretation

To examine the formulated hypotheses—

 H₀: There is no significant factor structure underlying the socio-cultural impact of religious tourism in Nashik.

 H_1 : A significant factor structure exists that explains the socio-cultural impact of religious tourism in Nashik.

An Exploratory Factor Analysis (EFA) was employed. The results revealed a Kaiser-Meyer-Olkin (KMO) value of 0.824, which surpasses the recommended threshold of 0.6, indicating meritorious sampling adequacy for factor analysis (Kaiser, 1974). Moreover, Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 547.921$, df = 66, p < 0.001), confirming sufficient correlation among the variables to justify factor extraction (Bartlett, 1950).

Three factors with eigenvalues greater than 1 were extracted, accounting for 57.49% of the total variance, demonstrating the presence of a well-defined underlying structure. The Rotated Component Matrix further supported the emergence of distinct and interpretable socio-cultural dimensions, as multiple variables exhibited substantial factor loadings (> 0.5), signifying their alignment with specific latent components. These empirical findings provide strong evidence to reject the null hypothesis (H₀) and accept the alternative hypothesis (H₁). Hence, the analysis affirms that religious tourism in Nashik manifests through a statistically significant multi-dimensional factor structure. Statistical tests showed strong proof that such effects exist and are measurable. So, the study confirms that religious tourism significantly influences Nashik's social and cultural life through multiple factors.

 Ho: The latent factors derived from factor analysis do not significantly predict the impact of religious tourism on the local lifestyle in Nashik.

 H_1 : The latent factors derived from factor analysis significantly predict the impact of religious tourism on the local lifestyle in Nashik.

				Model Sumi	nary ^b				
Model	R	R	Adjusted	Std. Error	Change Sta	atistics			
		Square	R Square	of the	R Square	F	df1	df2	Sig. F
				Estimate	Change	Change			Change
1	.712a	.508	.496	.6228	.508	42.608	3	124	.000
a. Predict	1 .712ª .508 .496 .6228 .508 42.608 3 124 .000 a. Predictors: (Constant), Inclusive Economic Empowerment, Domestic Disruption and Social Friction, Socio-Cultural								
Transforn	nation thro	ough Religiou	ıs Tourism						
b. Depend	lent Varial	ole: Impact o	f religious touri	ism on local life	estyle				

The Model Summary indicates that the regression model has strong explanatory power, with R=0.712 and $R^2=0.508$, suggesting that 50.8% of the variance in the impact of religious tourism on local lifestyle is explained by the three latent factors derived from factor analysis. The Adjusted $R^2=0.496$ confirms that this is not due to chance or overfitting. According to Hair et al. (2019), R^2 values above 0.50 are considered substantial in behavioral research. Additionally, the standard error (0.6228) is relatively low, indicating a good model fit, while the significant F change (p = 0.000) confirms the model's predictive utility. These indicators together validate the strength and adequacy of the model for hypothesis testing.

	ANOVAª								
Model		Sum of Squares	df	Mean Square	F	Sig.			
1	Regression	49.581	3	16.527	42.608	.000b			
	Residual	48.098	124	.388					
	Total	97.680	127						
a. Depend	dent Variable: Impa	ct of religious tourism	on local lifestyle	9					

b. Predictors: (Constant), Inclusive Economic Empowerment, Domestic Disruption and Social Friction, Socio-Cultural Transformation through Religious Tourism

The ANOVA table tests the overall significance of the regression model. The reported F-statistic (42.608) is large and statistically significant (p < 0.001), indicating that the combination of the three independent variables significantly improves prediction over a model with no predictors. This confirms that the model is valid for examining the influence of latent socio-cultural and economic factors on lifestyle. As per Field (2018), a significant F-test supports rejection of the null hypothesis in regression, confirming that the predictors together explain a meaningful proportion of the outcome variable.

				Coefficients					
Model				Standardized Coefficients	t	Sig.	Correla	tions	
		В	Std. Error	Beta			Zero- order	Partial	Part
1	(Constant)	3.102	.055		56.342	.000			
	Socio-Cultural Transformation through Religious Tourism	.571	.055	.651	10.339	.000	.651	.680	.651
	Domestic Disruption and Social Friction	.191	.055	.217	3.449	.001	.217	.296	.217
	Inclusive Economic Empowerment	.166	.055	.189	3.007	.003	.189	.261	.189

The Coefficients table reveals that all three latent factors significantly contribute to predicting the impact on local lifestyle. Socio-cultural transformation shows the highest influence ($\beta=0.651$, t = 10.339, p < 0.001), followed by domestic disruption and social friction ($\beta=0.217$, p = 0.001) and inclusive economic empowerment ($\beta=0.189$, p = 0.003). As per Cohen et al. (2003), standardized beta coefficients above 0.5 represent strong effects, while p-values below 0.05 denote statistical significance. These findings confirm that all predictors meaningfully and independently explain variance in lifestyle impact, supporting the multidimensional nature of religious tourism effects.

Since the overall regression model and all predictors are statistically significant (p < 0.05), the null hypothesis is rejected. Thus, the study accepts the alternative hypothesis, confirming that latent factors derived from factor analysis significantly predict the impact of religious tourism on the local lifestyle in Nashik.

CONCLUSION

The present study examined the multi-dimensional socio-cultural impacts of religious tourism in Nashik using exploratory factor analysis and regression techniques. The analysis revealed a statistically significant factor structure comprising three key components: socio-cultural transformation, domestic disruption and social friction, and inclusive economic empowerment. These components collectively explained over 57% of the variance and significantly predicted the influence of religious tourism on local lifestyles. Notably, cultural exchange, public behavior changes, and traditional celebrations were strongly impacted. Family routines and local harmony were found to be disrupted during peak tourism seasons, highlighting the dual nature of influence. Women's economic participation and loan accessibility showed moderate but important

effects on socio-economic inclusion. The regression analysis confirmed that all three latent dimensions significantly contribute to lifestyle transformation. Thus, both hypotheses—concerning factor structure and predictive power—were accepted. The findings emphasize the importance of managing religious tourism through holistic frameworks. Ultimately, the study calls for strategic interventions to balance cultural preservation, social wellbeing, and inclusive development in pilgrimage cities like Nashik.

POLICY IMPLICATIONS AND RECOMMENDATIONS

- Integrated Cultural Tourism Planning: Authorities must integrate
 cultural and religious tourism planning with local development policies.
 Initiatives should preserve local traditions while encouraging community
 participation in tourism-driven activities, thereby ensuring cultural
 sustainability.
- Community Harmony and Seasonal Management: Develop localized social harmony programs during peak pilgrimage seasons, such as cultural awareness drives and crowd control strategies, to mitigate tourist-local conflicts and protect family routines.
- Women-Centric Economic Schemes: Promote entrepreneurship among women through tailored financial incentives, micro-credit schemes, and tourism-linked vocational training. This can enhance inclusive economic empowerment and increase female participation in tourism economies.
- Accessible Financial Infrastructure: Expand access to loans and subsidies
 for small businesses engaged in tourism through simplified procedures, local
 language support, and outreach by banking institutions in pilgrimage zones.
- Sustainable Infrastructure and Safety Norms: Establish clear tourist safety norms, hygiene facilities, and infrastructure upgrades in high-density religious sites. This includes digital signage, surveillance systems, and responsive health and sanitation units.
- Monitoring and Feedback Mechanisms: Institutionalize continuous monitoring of socio-cultural changes through feedback from local residents, tourism operators, and NGOs. This participatory approach will help in fine-tuning tourism strategies and preventing socio-cultural erosion.

REFERENCES:

- Kaiser, H. F. (1974). An index of factorial simplicity. Psychometrika, 39(1), 31–36. https://doi.org/10.1007/BF02291575
- Bartlett, M. S. (1950). Tests of significance in factor analysis. British Journal of Statistical Psychology, 3(2), 77–85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x
- 3. Timothy, D. J., & Olsen, D. H. (2006). Tourism, Religion and Spiritual Journeys. Routledge.
- 4. UNWTO. (2019). Tourism and Culture Synergies. World Tourism Organization.
- Kaiser, H. F. (1974). An index of factorial simplicity. Psychometrika, 39(1), 31–36. https://doi.org/10.1007/BF02291575
- Bartlett, M. S. (1950). Tests of significance in factor analysis. British Journal of Statistical Psychology, 3(2), 77–85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate Data Analysis (7th ed.). Pearson.

^{8.} Cattell, R. B. (1966). The Scree Test For The Number Of Factors. *Multivariate Behavioral Research*, 1(2), 245–276. https://doi.org/10.1207/s15327906mbr0102_10

^{9.} Field, A. (2018). Discovering Statistics Using IBM SPSS Statistics (5th ed.). SAGE Publications.