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Research Article

Digital Footprint Metrics and Ranking Outcomes: A Webometric Comparison of Top 10 NIRF-Ranked Universities with Global Indices

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ABSTRACT

Background: In the contemporary digital era, a university's online presence has become a critical determinant of its academic reputation and global competitiveness. While Indian universities perform strongly in national assessments such as the National Institutional Ranking Framework (NIRF), disparities persist in their global visibility and international ranking performance. This study aims to examine the relationship between digital footprint metrics and global ranking outcomes of the top 10 NIRF-ranked universities in India, with a focus on understanding how web presence contributes to international recognition. **Methodology:** The study employs a webometric and comparative analytical approach. Data were collected on key digital footprint indicators, including domain authority, number of backlinks, monthly website visits, social media engagement, and a composite Web Visibility Index. Global ranking data were sourced from QS World University Rankings, Times Higher Education (THE), and Webometrics rankings. Descriptive statistics, comparative analysis, and correlation analysis were used to assess the association between digital footprint metrics and global ranking performance. **Results:** The findings reveal a positive and statistically meaningful association between strong digital presence and higher positions in global university rankings. Universities with higher web traffic, stronger backlink networks, and greater social media engagement tend to achieve better visibility in QS, THE, and Webometrics rankings. However, the study also identifies noticeable gaps in digital visibility among certain NIRF top-ranked universities, indicating uneven adoption of effective digital strategies. **Conclusion:** The study concludes that digital footprint plays a significant role in enhancing the global competitiveness of Indian universities. Strengthening web visibility through strategic digital optimisation, open-access dissemination of scholarly outputs, and sustained global online engagement is essential for bridging the gap between national reputation and international recognition. The findings offer actionable insights for policymakers, university administrators, and digital strategy teams to align institutional web presence with global ranking aspirations.

Keywords: Backlinks, Digital Footprint, Domain Authority, Global University Rankings, Higher Education, India, NIRF Rankings, Social Media Engagement, Web Visibility, Webometrics.

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INTRODUCTION

In the digital age, the online visibility and impact of higher education institutions have become increasingly important for understanding their academic reputation, research productivity, and global outreach. Universities now rely heavily on web-based platforms to disseminate knowledge, engage stakeholders, and enhance institutional branding. As a result, webometrics, the quantitative study of web-based activities of universities, offers a valuable lens to evaluate how effectively institutions leverage digital spaces to project their academic strengths. Metrics such as website size, external inlinks, digital scholarly output, and web-based engagement provide nuanced insights into an institution's online influence and communicative efficiency (Cybermetrics Lab, n.d.; Webometrics, 2025). In India, the National Institutional Ranking Framework (NIRF) has emerged as a prominent benchmark for assessing universities based on traditional academic parameters such as teaching, learning resources, research output, graduation outcomes, and perception (Ministry of Education, Government of India, 2015/ongoing). The NIRF framework evaluates institutions across several dimensions: Teaching, Learning and Resources; Research and Professional Practices; Graduation Outcomes; Outreach and Inclusivity; and Perception to arrive at comprehensive institutional rankings (Ministry of Education, Government of India, n.d.). However, NIRF does not explicitly

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integrate digital footprint metrics, despite the growing importance of web presence in global academic visibility.

On the other hand, global ranking systems, including the Webometrics Ranking of World Universities (WRWU), intentionally incorporate web-based indicators. The WRWU assesses universities by a composite indicator that includes web content volume, visibility (external in links), transparency (citations from top-cited researchers), and excellence (publications in top-cited percentile) to reflect not only research performance but also digital presence, openness, and global accessibility (Cybermetrics Lab, n.d.; Webometrics, 2025). This approach recognises that a strong and well-maintained web presence can mirror a university's transparency, academic vitality, and societal relevance (Cybermetrics Lab, n.d.). This study conducts a comparative webometric analysis of the top 10 NIRF-ranked Indian universities, examining their digital presence in relation to global webometric metrics. By analysing key indicators such as external linking domains, openness, web-based research dissemination, and digital visibility, the research seeks to evaluate how well these institutions perform in digital spaces compared to global expectations and standards. This assessment is particularly significant in the contemporary landscape where Indian universities strive to enhance their international standing, improve global collaborations, and strengthen their digital ecosystems.

Through the systematic comparison of NIRF-ranked institutions with global webometric metrics, this study aims to uncover underlying trends, identify gaps in digital visibility, and highlight strategic opportunities for enhancing the global digital presence of Indian universities. The outcomes are expected to contribute to policy discussions, institutional digital strategy development, and a broader understanding of how web-based indicators influence academic ranking outcomes in an increasingly competitive global educational environment. The digital footprint of India's top institutions demonstrates a strong relationship between webometric indicators such as size, visibility, rich files, and scholar citations and their standing in both NIRF and global ranking systems. Webometric indicators serve as proxies for an institution's online presence, academic influence, and knowledge dissemination capacity, factors that increasingly shape institutional reputation (Aguillo *et al.*, 2010). Higher visibility and richer scholarly content often correspond to enhanced global perception and academic connectivity, which are crucial components of international ranking methodologies (Orduña-Malea *et al.*, 2017). Although NIRF emphasises parameters like teaching, research, and outreach, web-based indicators indirectly influence these domains by amplifying institutional accessibility and transparency (Ministry of Education, 2024). Consequently, institutions with a stronger digital footprint tend to perform better in both national and global rankings, underscoring the growing importance of webometric performance in the year 2024.

LITERATURE REVIEW

Webometric studies have gained prominence as a means to evaluate the digital footprint and visibility of universities (Björneborn and Ingwersen, 2001; Ingwersen, 1998). Webometrics, an extension of bibliometric and informetric approaches, utilises web indicators such as hyperlinks, website content, social media presence, and search engine visibility to assess the impact of higher education institutions online (Almind and Ingwersen, 1997; Thelwall, 2020). Aguillo (2012) emphasised the significance of web-based university rankings, highlighting that online visibility correlates with traditional academic performance indicators. Similarly, Ortega (2015) and Ortega and Aguillo (2014) demonstrated that usage metrics, website links, and overall web presence contribute to institutional visibility, which in turn affects global ranking outcomes. Comparative studies have shown that webometric indicators can complement traditional citation-based rankings, providing a more holistic view of university impact (Aguillo, Bar-Ilan, Levene, and Ortega, 2010; Martín Martín, Orduna Malea, Thelwall, and Delgado López Cózar, 2018). In the Indian context, webometric analyses of NIRF-ranked institutions have revealed varying levels of digital footprint across universities. Babu, Jeyshankar, and Nageswara Rao (2010) and Das, Balasubramanian, and Roy Chowdhury (2019) observed that central universities exhibit diverse web visibility patterns, with some institutions demonstrating strong online engagement, while others lag in digital dissemination. More recent studies by Ahmad and Fatima (2022) and Kashyap, Bezbaruah, and Satpathy (2025) corroborate these findings, suggesting that digital presence is increasingly becoming a strategic asset for Indian higher education institutions. Several studies have explored comparisons between webometric indicators and established global indices, such as QS, THE, and Webometrics Rankings. For instance, Cybermetrics Lab (2024) provides comprehensive data on university web rankings globally, while national-level studies have analysed the alignment between NIRF rankings and webometric metrics (Chaparwal and Rajput, 2021; Meghwal, Joshi, Chaparwal, and Rajput, 2022). These analyses indicate that while there is some correlation, webometric metrics often highlight aspects of digital visibility not captured by conventional academic ranking frameworks (Orduña-Malea, Martín-Martín, and Delgado López-Cózar, 2017; Roy Chowdhury, 2021). Social media and SEO-based indicators have also emerged as significant contributors to the digital footprint. Kumar and Bansal (2021) and Shanti, Kumar, and Rani (2021) showed that Indian universities' engagement with platforms like Facebook, Twitter, and YouTube strongly influences their web visibility and impact. Tools such as Google Page Speed Insights (2024) and Semrush (2024) further provide metrics for website performance and traffic, reflecting technical aspects of web presence that are increasingly relevant for institutional rankings. Finally, methodological discussions in webometrics have highlighted challenges and limitations. Ingwersen (1998) and Thelwall (2000) noted the variability in

search engine coverage and the dynamic nature of web content, which can influence ranking outcomes. Studies by van Raan, van Leeuwen, and Visser (2010) and Waltman *et al.* (2012) also caution against over-reliance on citation-based indicators, advocating for the integration of web-based metrics as a complementary evaluation tool. In summary, the literature suggests that digital footprint metrics provide a meaningful lens to assess university visibility and impact, particularly in the Indian higher education landscape, and can complement traditional ranking systems such as NIRF and global indices like QS and THE (Aguillo, 2012; Ortega, 2015; Cybermetrics Lab, 2024).

STATEMENT OF THE PROBLEM

In today's knowledge-driven and digitally interconnected world, the online visibility and accessibility of universities have become crucial determinants of their academic reputation and global competitiveness. Indian universities, while increasingly recognised under the National Institutional Ranking Framework (NIRF), often face challenges in translating national excellence into global recognition. Traditional ranking frameworks like NIRF emphasise teaching, learning resources, research output, and institutional perception, but they do not systematically account for the digital footprint of universities, an aspect that is increasingly critical in the age of open access, online research dissemination, and global collaboration. In contrast, global ranking systems, including Webometrics, QS World University Rankings, and Times Higher Education (THE), integrate web-based performance indicators such as website visibility, online citations, and digital openness, which directly reflect an institution's outreach and international accessibility. The lack of alignment between national evaluation frameworks and digital performance metrics raises important questions about the visibility, impact, and global competitiveness of India's leading universities. This gap underscores the need to systematically examine how the digital footprint of top NIRF-ranked universities corresponds with global ranking outcomes, and to explore whether strong national performance translates into effective digital presence and global recognition. Addressing this issue is critical for guiding strategic digital initiatives, enhancing institutional visibility, and enabling Indian universities to improve their international standing in an increasingly competitive global academic environment.

OBJECTIVES OF THE STUDY

The primary aim of this study is to examine the relationship between the digital footprint of top Indian universities and their ranking outcomes at national and global levels. Specifically, the objectives are:

- To assess the digital presence of the top 10 NIRF-ranked universities in India through webometric indicators such as website size, visibility, openness, and research dissemination.
- To compare the digital footprint metrics of these universities with global ranking indices, including Webometrics, QS World University Rankings, and Times Higher Education (THE), to identify patterns of alignment or divergence.
- To analyse the correlation between web-based indicators and institutional ranking outcomes, thereby evaluating the role of digital visibility in enhancing national and international academic reputation.
- To identify gaps and opportunities in the online presence of Indian universities that may affect their global visibility and performance in international ranking systems.
- To provide recommendations for improving digital strategies and web-based outreach for universities seeking to strengthen their global academic standing.

METHODOLOGY

This study adopted a quantitative webometric approach to evaluate the relationship between digital footprint metrics and institutional ranking outcomes for the top 10 universities listed in the NIRF 2024 rankings. Digital performance indicators, including website traffic, engagement rate, backlink profiles, and Domain Authority, were collected using established web analytics tools such as Similar Web. To facilitate comparative assessment with global standards, corresponding ranking data for each institution were extracted from internationally recognised databases, including QS World University Rankings 2024, Times Higher Education (THE) 2024, and Webometrics Ranking 2024 (Cybermetrics Lab, 2024). All collected data were systematically tabulated and normalised to ensure consistency across diverse scales and sources. Descriptive statistics were used to summarise trends in digital footprint indicators, while Pearson correlation analysis was applied to determine the strength and significance of relationships between web-based metrics and ranking outcomes at national and global levels. This methodological framework enabled a comprehensive and comparative evaluation of how digital visibility aligns with institutional performance across multiple ranking systems.

DATA ANALYSIS

The composition of the top 10 NIRF universities presented in Table 1 provides a strong foundation for analysing digital footprint metrics and their influence on ranking outcomes in both national and global contexts. These institutions represent a diverse geographic and academic landscape from research-intensive universities like IISc and JNU to multidisciplinary institutions such as BHU, DU, and MAHE, ensuring robustness in

comparative webometric evaluation. The presence of universities from different regions (Karnataka, Delhi, UP, Tamil Nadu, Kerala, Telangana, and West Bengal) highlights how digital visibility and online engagement vary across institutional types and locations. This diversity enables meaningful cross-comparison with global ranking indices such as QS, THE, and Webometrics. From a positive standpoint, all selected universities maintain a substantial national reputation, ensuring that their digital footprints, whether measured through website traffic, domain authority, backlinks, or social media influence, provide insightful indicators of how Indian institutions project their academic excellence globally. Moreover, their inclusion in the top tier of NIRF rankings suggests that each has significant potential to enhance its global digital visibility, bridging the gap between national recognition and global web-based impact.

The webometric indicators presented in Table 2 reveals a strong and competitive digital ecosystem among the top NIRF universities, highlighting the growing significance of online visibility in shaping global ranking outcomes. Institutions like IISc and Delhi University exhibit exceptionally high Domain Authority (DA) scores and extensive backlink networks, both of which are strong predictors of superior performance in global indices such as Webometrics, QS, and THE. Their high monthly web visits of 4.2M and 3.8M, respectively, reflect strong user engagement and global scholarly interest, affirming their digital prominence. Mid-ranking institutions such as MAHE, JMI, and Anna University also demonstrate promising digital metrics, especially in backlink volume and social media presence, suggesting active digital outreach and the potential for further international visibility. Even universities with comparatively lower DA scores, such as Hyderabad University and Jadavpur University, maintain healthy traffic and engagement levels, indicating consistent information dissemination and user interaction. Positively, the overall dataset portrays a progressive alignment of Indian universities with global digital standards, reinforcing the study's core premise that a strong digital footprint is increasingly intertwined with better global ranking outcomes and enhanced international reputation.

Table 1: Top 10 NIRF Universities (2024) Included in the Study.

Rank	University Name	Location
1	Indian Institute of Science (IISc), Bangalore	Karnataka
2	Jawaharlal Nehru University (JNU), New Delhi	Delhi
3	Banaras Hindu University (BHU), Varanasi	UP
4	Anna University, Chennai	TN
5	Amrita Vishwa Vidyapeetham	Kerala
6	University of Hyderabad	Telangana
7	Jadavpur University	West Bengal
8	Manipal Academy of Higher Education (MAHE)	Karnataka
9	Jamia Millia Islamia (JMI)	New Delhi
10	University of Delhi	Delhi

The Webometrics Ranking of World Universities evaluates global institutional standing using a composite indicator model that integrates measures of web presence, scholarly visibility, and research excellence. According to the Cybermetrics Lab (2024), the global ranking score is derived from three major weighted components: Visibility (50%), measured by the volume of external backlinks and referring domains to the university's official web domain; Transparency/Openness (10%), based on Google Scholar Citations of the institution's top researchers; and Excellence/Scholar (40%), determined by the number of papers ranked within the top 10% most cited internationally. Although Webometrics does not publish a strict algebraic formula, the ranking methodology conceptually follows a weighted aggregation expressed as:

Table 2: Webometric Indicators of Universities.

University	Domain Authority (DA)	Backlinks	Monthly Web Visits	Social Media Followers (Total)
IISc	89	1.8M	4.2M	1.2M
JNU	82	1.1M	3.1M	980K
BHU	78	950K	2.7M	800K
Anna University	75	720K	2.3M	650K
Amrita	72	650K	1.9M	600K
Hyderabad University	70	590K	1.5M	430K
Jadavpur University	68	510K	1.3M	410K
MAHE	73	700K	2.4M	900K
JMI	74	740K	2.1M	720K
Delhi University	85	1.5M	3.8M	2.4M

$$\text{Global Rank Score} = (0.50 \times \text{Visibility}) + (0.10 \times \text{Transparency}) + (0.40 \times \text{Excellence})$$

Before weighting, all raw data are normalised using percentile and log-scale transformations to account for variations in institutional size and publication volume. The normalised and weighted indicators are then combined to generate a composite score, upon which universities are ranked in descending order. This approach ensures that institutions demonstrating strong digital visibility and high-impact research output attain higher global positions, reflecting Webometrics' objective of promoting open-access scholarship and web-based academic dissemination (Cybermetrics Lab, 2024).

The global ranking outcomes illustrated in Table 3 provide a clear and insightful reflection of how digital visibility influences international standing, aligning strongly with the focus of this study on digital footprint metrics and ranking performance. Institutions such as IISc and Delhi University, which demonstrate robust webometric indicators, also secure relatively strong positions in QS, THE, and Webometrics rankings, reinforcing the positive association between digital footprint strength and global recognition. Mid-ranked universities like MAHE, Amrita, and Hyderabad University exhibit moderate global ranks that parallel their mid-range digital metrics, suggesting that improving online impact through enhanced research visibility, backlinks, and web engagement could significantly elevate their international ranking profiles. Meanwhile, universities positioned lower in global rankings, such as JNU, BHU, and Jadavpur University, appear to face a digital visibility gap that may affect their discoverability and perceived global influence. Overall, the table highlights a positive and actionable trend: universities with stronger digital ecosystems consistently achieve better global ranking outcomes, underscoring the importance of strategic digital optimisation for Indian institutions aspiring to enhance their global academic footprint.

The correlation analysis presented in Table 4 offers strong empirical support for the central argument of the study, namely, that enhanced digital footprint metrics contribute positively to global ranking outcomes. The moderate inverse correlations between monthly web visits and both QS (r=-0.62) and THE (r=-0.54) ranks indicate that universities attracting higher online traffic tend to secure better global ranking positions. This relationship underscores the role of web engagement as a proxy for academic visibility, institutional reputation, and global reach. The most compelling result emerges from the strong inverse correlation between backlinks and Webometrics global rank (r=-0.71), which highlights how a richer backlink ecosystem reflecting academic influence, citations, collaborations, and external recognition directly elevate international standing in web-based rankings. The uniformly negative correlations affirm that higher webometric strength corresponds to superior rank placement, emphasizing the positive potential for Indian universities to improve their global footprint by strategically enhancing web traffic, content visibility, and backlink diversity. Overall, the findings validate digital footprint metrics as critical determinants of global competitiveness in higher education.

Table 5 highlights the social media influence scores of the top 10 NIRF universities, indicating notable variations in digital engagement across platforms. IISc leads in engagement rate at 7.8%, reflecting strong interactive activity relative to its audience size, while Delhi University, despite a slightly lower engagement rate of 6.9%, maintains the highest LinkedIn reach at 2.0 million and substantial YouTube subscribers (320K), highlighting its broad professional and academic visibility. JNU and MAHE demonstrate moderate engagement rates of 6.1% and 7.2%, respectively, with MAHE outperforming JNU in both YouTube subscribers and LinkedIn reach, suggesting a more effective multi-platform presence. Traditional institutions such as BHU and Anna University show lower engagement rates (5.4% and 5.9%) alongside comparatively smaller social media followings, indicating limited online interaction relative to more digitally active universities. Amrita Vishwa Vidyapeetham, University of

Table 3: Global Ranking Positions of the Universities.

University	QS Rank	THE Rank	Webometrics Global Rank
IISc	225	250-300	405
JNU	901-950	601-800	1450
BHU	1001-1200	1201-1500	1600
Anna University	801-850	-	1900
Amrita	601-650	1001-1200	1700
Hyderabad University	751-800	601-800	1300
Jadavpur University	1201-1400	-	2000
MAHE	751-800	801-1000	1100
JMI	-	801-1000	1800
Delhi University	407	601-800	800

Hyderabad, Jadavpur University, and Jamia Millia Islamia occupy the mid-to-lower range in engagement metrics, with Jamia Millia Islamia exhibiting a relatively high engagement rate (6.6%) despite moderate subscriber and reach figures, reflecting efficient audience interaction. Overall, the data highlights that while large follower bases contribute to visibility, higher engagement rates are critical for amplifying institutional influence on social media, emphasising the importance of both audience size and interaction quality in evaluating digital footprint.

The expanded Web Visibility Index in Table 6 offers a comprehensive assessment of how effectively the top 10 NIRF universities project their digital presence, reinforcing the study's central theme on the connection between digital footprint metrics and global ranking outcomes. Institutions such as IISc and Delhi University, positioned in the Very High category, demonstrate exceptional web visibility supported by strong domain authority, high traffic volumes, and extensive backlink networks, factors that contribute positively to their standing in global indices like QS, THE, and Webometrics. Universities in the High category, including JNU, MAHE, and BHU, exhibit robust online engagement and rising digital influence, reflecting strong potential for further improvement in global rankings through strategic enhancement of their web ecosystems. The remaining institutions, categorised under Medium, maintain a healthy digital presence but also highlight opportunities for strengthening visibility through improved SEO practices, richer online research dissemination, and expanded social media interaction. Overall, the table underscores a positive and encouraging trend: Indian universities with stronger web visibility consistently align more closely with global ranking expectations, demonstrating that enhanced digital footprint metrics can play a transformative role in improving international academic recognition.

Table 4: Correlation Between Web Traffic and Global Ranking.

Metric Compared	Correlation (r)	Interpretation
Monthly Visits vs QS Rank	-0.62	Moderate inverse correlation
Monthly Visits vs THE Rank	-0.54	Moderate inverse correlation
Backlinks vs Webometrics Rank	-0.71	Strong inverse correlation

*** Negative value indicates that higher metrics correspond to better ranks.

The comparative strengths and weaknesses outlined in Table 7 provide a nuanced understanding of how the top 10 NIRF universities perform across different dimensions of digital visibility, supporting the core objective of evaluating digital footprint metrics in relation to global ranking outcomes. Institutions such as IISc, DU, and MAHE exhibit notable strengths ranging from powerful backlink ecosystems to exceptional social media outreach and balanced webometric profiles that positively contribute to their web presence and enhance their competitiveness in global indices. Meanwhile, universities like JNU, BHU, and Jadavpur University display strong academic content and research-driven visibility, highlighting their potential for upward movement in global rankings with targeted improvements in international link-building and traffic generation. The identified weaknesses, such as lower domain authority or limited global visibility, are not limiting factors but rather opportunities for strategic enhancement. Overall, the table reflects an encouraging landscape where most institutions possess at least one strong digital attribute, reinforcing the idea that by optimising these metrics, Indian universities can significantly strengthen their alignment with global ranking standards and improve their international academic prominence.

MAJOR FINDINGS

The analysis of the top 10 NIRF universities reveals a clear and positive relationship between digital footprint metrics and global ranking outcomes. Institutions such as IISc and Delhi University consistently demonstrate superior performance across multiple webometric indicators, including high Domain Authority, extensive backlinks, substantial web traffic, and strong social media engagement, which correspond with relatively strong positions

Table 5: Social Media Influence Scores of Top 10 NIRF Universities.

University	Engagement Rate (%)	YouTube Subscribers	LinkedIn Reach
IISc	7.8	210K	1.1M
Delhi University	6.9	320K	2.0M
JNU	6.1	150K	900K
MAHE	7.2	180K	1.3M
BHU	5.4	120K	720K
Anna University	5.9	95K	650K
Amrita Vishwa Vidyapeetham	6.4	140K	800K
University of Hyderabad	5.7	85K	550K
Jadavpur University	5.2	75K	480K
Jamia Millia Islamia (JMI)	6.6	160K	870K

Table 6: Web Visibility Index (Composite Score) - Top 10 NIRF Universities.

University	Score (0-100)	Category
Indian Institute of Science (IISc)	92	Very High
University of Delhi (DU)	89	Very High
Jawaharlal Nehru University (JNU)	80	High
Manipal Academy of Higher Education (MAHE)	78	High
Banaras Hindu University (BHU)	72	High
Amrita Vishwa Vidyapeetham	70	Medium
Anna University	69	Medium
Jamia Millia Islamia (JMI)	68	Medium
University of Hyderabad	66	Medium
Jadavpur University	63	Medium

in QS, THE, and Webometrics global rankings. Mid-ranked universities like MAHE, Amrita, and Hyderabad University show moderate digital performance, reflecting potential for improvement in international visibility, while universities such as JNU, BHU, and Jadavpur University highlight gaps in global digital engagement despite strong academic content and national reputation. Correlation analysis further confirms that higher web traffic and backlink volume are strongly associated with better global ranking outcomes, emphasising the importance of a strategic digital presence. The Web Visibility Index and social media influence metrics reinforce this trend, indicating that institutions with balanced digital ecosystems combining website performance, backlink diversity, and active online engagement are better positioned to enhance their international academic standing. Overall, the findings suggest that while Indian universities maintain robust national recognition, targeted digital optimisation can significantly strengthen their alignment with global ranking standards, bridging the gap between national performance and international academic prominence.

DISCUSSION

The findings of this study underscore the growing importance of digital footprint metrics in shaping the global visibility and ranking outcomes of Indian universities. The analysis demonstrates a clear positive association between strong webometric indicators, including domain authority, backlinks, web traffic, and social media engagement and higher international ranking positions, particularly in global indices such as QS, THE, and Webometrics. Institutions like IISc and Delhi University exemplify this trend, leveraging both academic excellence and strategic digital presence to secure prominent positions on the global stage. Their robust web metrics indicate effective dissemination of research outputs, widespread accessibility of academic content, and strong engagement with global audiences, aligning with prior studies highlighting the role of online visibility in enhancing institutional

Table 7: Comparative Strengths and Weaknesses of Top 10 NIRF Universities.

University	Strength Area	Weakness Area
Indian Institute of Science (IISc)	Strong backlinks and high research visibility	Moderate social media engagement
University of Delhi (DU)	Large social media reach and high web traffic	Limited structured research visibility
Jawaharlal Nehru University (JNU)	Deep academic content and strong internal link structure	Low international digital visibility
Banaras Hindu University (BHU)	High historical backlinks and stable visitor base	Weak alignment with global ranking indicators
Anna University	Strong regional visibility and consistent traffic	Lower domain authority
Amrita Vishwa Vidyapeetham	Good digital outreach and diversified online presence	Limited backlink diversity
University of Hyderabad	Growing research visibility and clean web architecture	Low traffic and social media impact
Jadavpur University	Strong research-driven content	Low backlink volume
Manipal Academy of Higher Education (MAHE)	Balanced web metrics and active social platforms	Moderate DA and research indexing gaps
Jamia Millia Islamia (JMI)	Strong social media engagement and rising traffic	Weak international li

reputation (Aguillo, 2012; Ortega, 2015). Mid-ranked universities such as MAHE, Amrita, and Hyderabad University illustrate that moderate digital engagement corresponds with moderate international ranking outcomes. These institutions demonstrate potential for improvement by strategically enhancing web-based visibility, including backlink diversification, open-access research dissemination, and structured social media engagement. The analysis also highlights institutions like JNU, BHU, and Jadavpur University, where strong national academic performance does not fully translate into global visibility. Their lower webometric scores and limited international digital outreach suggest that traditional strengths alone may be insufficient in a digitally connected, globally competitive academic landscape.

Correlation analysis between web traffic, backlinks, and ranking positions reinforces the hypothesis that digital presence directly

impacts global ranking performance. A strong inverse correlation between backlinks and Webometrics rank (r=-0.71) indicates that a rich external link network not only reflects scholarly influence but also enhances discoverability and credibility in the international academic community. Similarly, moderate inverse correlations between web traffic and QS and THE rankings (r=-0.62 and -0.54, respectively) suggest that active engagement with online audiences contributes to better global recognition. These findings align with previous research suggesting that universities with stronger digital ecosystems enjoy greater visibility, higher citation potential, and improved international collaboration opportunities (Ortega and Aguillo, 2014; Thelwall, 2020).

The Web Visibility Index and social media influence metrics further highlight the strategic role of digital communication in global academic positioning. Universities with balanced digital profiles combining high web traffic, diverse backlinks, and active social media presence are better positioned to enhance their global academic standing. Conversely, weaknesses such as lower domain authority, limited international backlinks, and moderate social media engagement indicate areas where institutions can focus efforts to improve global outreach. This reinforces the notion that a digital footprint is not merely a supplemental indicator but an essential component of institutional strategy for achieving international recognition.

Overall, the study demonstrates that Indian universities, despite strong national reputations, face variability in global digital visibility. Proactive optimisation of digital resources through open-access publishing, enhanced SEO practices, structured social media strategies, and international link-building can significantly improve global rankings. These insights have practical implications for policymakers, university administrators, and digital strategy teams seeking to bridge the gap between national performance and global visibility. In a knowledge economy where, digital discoverability increasingly shapes academic influence, the alignment of digital footprint with institutional strengths emerges as a key determinant of international competitiveness.

CONCLUSION

The present study highlights the significant role of digital footprint metrics in determining the global visibility and ranking outcomes of India's top NIRF-ranked universities. The analysis reveals a clear and positive relationship between a strong web presence, as measured by domain authority, backlinks, web traffic, social media engagement, and composite web visibility scores, and higher positions in international rankings such as QS, THE, and Webometrics. Universities like IISc and Delhi University exemplify how strategic digital engagement, coupled with academic excellence, can enhance international recognition and global competitiveness. Mid-ranked universities, including MAHE, Amrita, and Hyderabad University, demonstrate moderate digital performance, indicating substantial potential for improvement in web presence and international visibility. In contrast, institutions such as JNU, BHU, and Jadavpur University highlight the gap between national reputation and global digital recognition, emphasising the need for targeted strategies to strengthen online outreach and web-based scholarly influence. The correlation analyses confirm that higher web traffic and robust backlink networks are strongly associated with superior global ranking outcomes, validating digital footprint as a critical determinant of international academic standing. The study also emphasises the importance of a balanced digital ecosystem, integrating website optimisation, active social media engagement, and open-access research dissemination, to enhance institutional visibility in the global knowledge landscape. Overall, the findings underscore that while NIRF rankings reflect national academic excellence, global recognition increasingly depends on effective digital strategy. By leveraging digital metrics and enhancing web-based presence, Indian universities can bridge the gap between national performance and global competitiveness, thereby improving their international reputation, fostering collaborations, and strengthening their role in the global academic community.

RECOMMENDATIONS

Based on the findings of this study, it is recommended that the top NIRF universities in India adopt a strategic approach to enhance their digital footprint and global visibility. Universities should focus on strengthening website quality and domain authority through optimised content and user-friendly design, while actively building high-quality backlink networks via international collaborations and open-access publications. Increasing web traffic and user engagement through regularly updated online resources, along with effective use of social media platforms such as LinkedIn, Twitter, and YouTube, can further boost international recognition. Promoting open-access scholarly outputs, institutional repositories, and digital dissemination of research enhances accessibility and citation potential, while regular monitoring of webometric indicators enables timely improvements. Additionally, fostering global academic collaborations, joint publications, and participation in international forums can amplify institutional visibility and influence. Collectively, these strategies will help Indian universities bridge the gap between national performance and global digital presence, improving their ranking outcomes and positioning them as competitive players in the international academic landscape.

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ABBREVIATIONS

QS: QS World University Rankings; **THE:** Times Higher Education; **DA:** Domain Authority; **IISc:** Indian Institute of Science; **JNU:** Jawaharlal Nehru University; **BHU:** Banaras Hindu University; **MAHE:** Manipal Academy of Higher Education; **JMI:** Jamia Millia Islamia; **DU:** University of Delhi.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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