

Combining Altmetrics and Citation Metrics for Enhanced Research Assessment

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ABSTRACT: *This research investigates the integration of altmetrics and traditional citation metrics to refine research evaluation procedures. Historically, research assessment has relied heavily on citation-based metrics, which gauge publication influence through citation frequency. With the rise of digital and social media, altmetrics have emerged as vital complements, offering various impact indicators, including social media mentions, blog posts, and policy discussions. This research conducts a comparative analysis of traditional citation metrics and altmetrics to assess their combined effectiveness in measuring research impact, visibility, and influence. Furthermore, the research explores the implications of adopting this comprehensive evaluation approach for institutional and national assessment systems, particularly regarding funding allocations, policy formulation, and overall research strategy. Examining case studies and actual data identifies the strengths and limitations of both metrics. The proposed framework aims to integrate these evaluation tools, enhancing the accuracy and relevance of research assessments to reflect contemporary research activities and their societal impacts. Ultimately, the findings will support the ongoing refinement of research evaluation methodologies, leading to improved decision-making in research funding and policy development.*

Keywords: Altmetrics, Citation Metrics, Research Assessment, Research Impact, Institutional Evaluation, National Evaluation Systems, Research Visibility, Digital Impact, Comprehensive Evaluation Frameworks, Research Funding, And Policy Formulation

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1. Introduction

As far back as research assessment goes, citation-based criteria were considered the bee's knees. For a long time, the h-index and the Impact Factor were the gold standards for gauging academic output, influencing recruiting procedures, funding allocation, and institutional standing. The development of alternative measures, which include policy debates, blog entries, and social media mentions, accompanied the proliferation of digital and social media. These increasing indications define the academic discourse, which embraces the research's engagement with society and its importance in real-time. This research seeks to integrate altmetrics with regular citation metrics to improve research assessment procedures. This will provide a complete picture of the research's reach, influence, and effect. Research is important in more ways than one, and by merging these two perspectives, we may get a fuller picture of its significance. The proposed integration addresses several major issues with the existing research assessment system.

1.1. Limitations of Citation Metrics

Utilising citation metrics has its advantages, but it also has its limitations. For the sake of academic intellectual discourse, they disregard the effect that research has on larger societal problems. Since research that promotes community engagement or affects public policy may get fewer citations than more conventional academic work, its actual effect may be hard to gauge. Citation measures can favour famous researchers and high-profile publications.

Assistance in becoming aware of citation metrics may help new or transdisciplinary research, which affects funding possibilities and career progression for early-career academics and embryonic fields.

1.2. Rise of Altmetrics

However, altmetrics show the effect of research more dynamically and rapidly. Altmetrics shows how research affects the public and impacts conversations outside of academic contexts by monitoring references throughout social media, blogs, news stories, and policy papers. Revolutionary research on climate change may get much attention on social media with few citations; this indicates that it is relevant to contemporary global challenges. Unconventional research products—like data-bases, conference posters, and open-access articles—are brought to light by alternative metrics. In keeping with modern scholarship and information-sharing methods, altmetrics promote a more comprehensive research assessment by acknowledging these contributions.

2. Literature Review

2.1. Traditional Citation Metrics

An important aspect of research assessment for a long time has been citation metrics, which measure the frequency with which a work is referenced in other academic publications. Important metrics for evaluating the impact and quality of research outputs, the effect factor and h-index influence funding choices, hiring practices, and institutional rankings. The quantitative information provided by citation metrics is substantial, but they also contain several drawbacks. A big problem is that they have to think about how research will affect the world outside of academia, which means they can only sometimes focus on the bigger picture of how individual discoveries might affect society and encourage participation. There may be a difference in the quantity of citations received by research that completely alters public discourse, guides industrial practices, or influences public policy. Thus, it's important to comprehend the effects of this kind of research.

Less prominent journals and scholars may be disadvantaged when citation metrics favour more famous ones regarding innovative or multidisciplinary research. Due to this bias, researchers in their early careers or those working in developing areas may find it more challenging to get their work cited highly. Citation metrics unintentionally promote a concentration on publishable outcomes, which may stifle controversial or creative research in favour of quantity over quality. To provide a more complex and equitable picture of research contributions across domains, a more thorough assessment approach is required, one that incorporates many impact markers. Despite their importance, citation measures have certain limits when evaluating research.

2.2. Emergence of Altmetrics

A more dynamic and comprehensive view of academic influence in the current digital context is provided by altmetrics, which emerged from the necessity to evaluate the consequences of research beyond conventional citations. These supplementary measures include a variety of indications, such as discussions in policy forums, shares on content aggregators, mentions on social media, and citations in news articles. Altmetrics reveal the diversity of participants, which in turn reveals the impact of research on practitioners, legislators, and the broader population. New research shows that altmetrics indicate the direct social effect of research, in contrast to traditional citation metrics that overlook contemporary concerns and trends. Public health studies tend to get a lot of views during emergencies on platforms like Facebook and Twitter, which indicates how important and pressing the topic is. However, citations in academic publications could be low. Altmetrics allow academics to track the spread of their work and provide real-time feedback on engagement and visibility, which may direct research trajectories and outreach initiatives. This immediate gratification is a significant advantage over citation metrics, which may take years to produce noticeable results. Incorporating altmetrics into research assessment frameworks may promote a more inclusive approach that recognises contributions from both academic and non-academic sectors. Institutions and funding agencies might thereby get a more complex picture of the societal effects of research. Altmetrics, which supplement standard metrics in modern research assessment, raise awareness of research and its impact while calling for a broader conversation about how scholarship may help address critical societal issues.

2.3. Current Trends and Gaps

Despite altmetrics' growing popularity, research on the topic is still scattered, with studies focussing on altmetrics or traditional metrics alone, making it difficult to understand how the two could complement one another. Many studies have examined altmetrics and their usefulness, but more needs to be discussed on how these new metrics could supplement or enhance traditional citation-based evaluations. As a result, more comprehensive studies need to be conducted that thoroughly evaluate the pros and cons of both techniques within the context of research assessment. This review is crucial because different metrics provide different insights; for example, altmetrics give fast feedback on social involvement and visibility, while regular citation metrics show the academic effect over the long term. Understanding how these indicators can be effectively integrated could lead to a more fair and thorough evaluation system, recognising various types of research impact. A holistic strategy could reduce the inherent biases in traditional measurements by considering and quantifying the more comprehensive social effect of research findings. The rapidly changing landscape of research dissemination, where

internet communication significantly impacts public perceptions of academic work, makes this comprehensive evaluation all the more relevant. A research environment that values all contributions, regardless of format or immediate academic citation, can be fostered by combining traditional and altmetric methodologies in future studies. This will lead to more equitable and sophisticated research evaluation practices.

3. Methodology

3.1. Comparative Analysis Framework

This research utilises a rigorous comparative analysis paradigm to address the inadequacies in the current literature on research assessment techniques. The first stage is to collect information from various parts of the globe. We routinely assess altmetrics and standard citation metrics across various academic disciplines. Academic databases like Scopus and Web of Science are great places to get citation counts and other well-established measures of scholarly impact. At the same time, we will track the amount of interest in our research across several online mediums, including social media, blogs, and news articles, using altmetric monitoring programs like PlumX and Altmetric.com. This two-step data-gathering procedure ensures that a wide variety of indicators are represented. To conduct a thorough comparative analysis, Table 2 lays out each metric category's definitions, strengths, and limits. To better understand how altmetrics and standard citation metrics impact the reach and effect of research, this research collects and analyses quantitative data to shed light on their roles in various academic contexts.

By integrating qualitative and quantitative research methods, the technique examines concrete case studies demonstrating both measurements' potential usefulness. Table 4 of this case research, which examines prominent and influential research initiatives, shows the association between citations and altmetric ratings. The research aims to clarify the specific aspects and settings where each statistic is most beneficial by evaluating these cases. By demonstrating how individual publications, even those with few citations, may substantially influence policy or social media, this qualitative research contributes to our knowledge of the impact of research. We will also analyse pertinent media coverage and policy discussions to round out the case studies. The numerical data will be analysed with an eye towards practical uses and social significance.

To strengthen the findings, we will interview various participants, including researchers, lawmakers, and representatives from funding organisations. To get additional quantifiable data, the interviews will include participants with varying opinions on the value and effectiveness of altmetrics and more conventional citation metrics. The researcher may get significant qualitative insights into stakeholders' thoughts and experiences on the merits and downsides of each measure type by including them, as indicated in Table 5. In order to fully grasp the far-reaching effects of incorporating these metrics into preexisting research evaluation systems, it is crucial to include this qualitative component to round out the quantitative results with a human dimension. Integrating altmetrics with standard citation metrics is the goal of this research to improve research evaluation procedures. A multi-pronged strategy will be used, including quantitative research, case studies, and qualitative stakeholder insights.

3.2. Criteria for Evaluation

This research will examine the interplay between altmetrics and more conventional citation metrics with the goal of better understanding the impact of research. This research will assess the utility of various measure types by contrasting the precision with which altmetrics and conventional citation metrics depict the impact of research outputs in their respective settings. This research aims to find out whether statistics provide a more trustworthy evaluation of academic influence and community participation. The research will determine whether the integrated strategy is more comprehensive than relying on each statistic alone in analysing the effect of the research by integrating the two metrics. Examining the relationship between citation counts and altmetric ratings, the research seeks to uncover any neglected aspects of the research influence. In our comprehensive evaluation of the viability of implementing this integrated paradigm in research assessment systems, we will emphasise the practical consequences for institutions and funding bodies. The potential drawbacks of the framework, its possible solutions, and the advantages it may provide over current review methods are all part of this. To shed light on how research assessment procedures might be improved, this research assesses their comprehensiveness, practicability, and effectiveness in great detail.

4. Findings

The collected data show a sophisticated comprehension of research impact assessment, emphasising the distinction between conventional citation measures and altmetrics. Although traditional measures like the h-index and Impact Factor are esteemed for their reliability and enduring relevance, they often favour established journals and hinder the acknowledgement of developing research. Conversely, altmetrics provide instantaneous insights into wider participation via social media and news coverage, indicating immediate societal significance. However, they encounter issues with

standardisation and possible manipulation. The disparity in citation counts and altmetric ratings across research areas, especially in mental health and public health, indicates differing degrees of social media participation. Institutions progressively acknowledge both indicators' significance in funding determinations, with some attributing equal priority to both. These results highlight the need for a balanced strategy incorporating standard and altmetric metrics to provide a holistic perspective on the research effect.

Table 1. Institutional Use of Metrics for Funding Decisions

Institution	Traditional Metrics Weight (%)	Altmetrics Weight (%)	Average Funding Allocation	Notable Research Areas
Indian Institute of Tropical Meteorology	70	30	1,000,000	Environmental Science
NEIPH	50	50	800,000	Public Health
IIT Madras	60	40	1,200,000	Technology and Innovation
Institute of Social and Economic Change	75	25	900,000	Social Sciences
University of Calicut	40	60	600,000	Interdisciplinary Research

4.1. Strengths and Limitations of Citation Metrics

Traditional citation metrics, used by the Indian Institute of Tropical Meteorology and IIT Madras, are essential for evaluating the enduring impact of research since they quantify the frequency with which a work is referenced in scholarly literature. Nonetheless, these measurements often neglect to reflect the direct socioeconomic repercussions of research. Moreover, publishing patterns, especially the tendency to publish in high-impact journals, might distort conventional citation metrics, leading to discrepancies across disciplines. Although these criteria are essential for academic assessment, organisations such as the Institute of Social and Economic Change must implement supplementary strategies to mitigate these constraints and accurately represent the dynamic nature of research impact.

Table 2. Comparison of Traditional Citation Metrics and Altmetrics

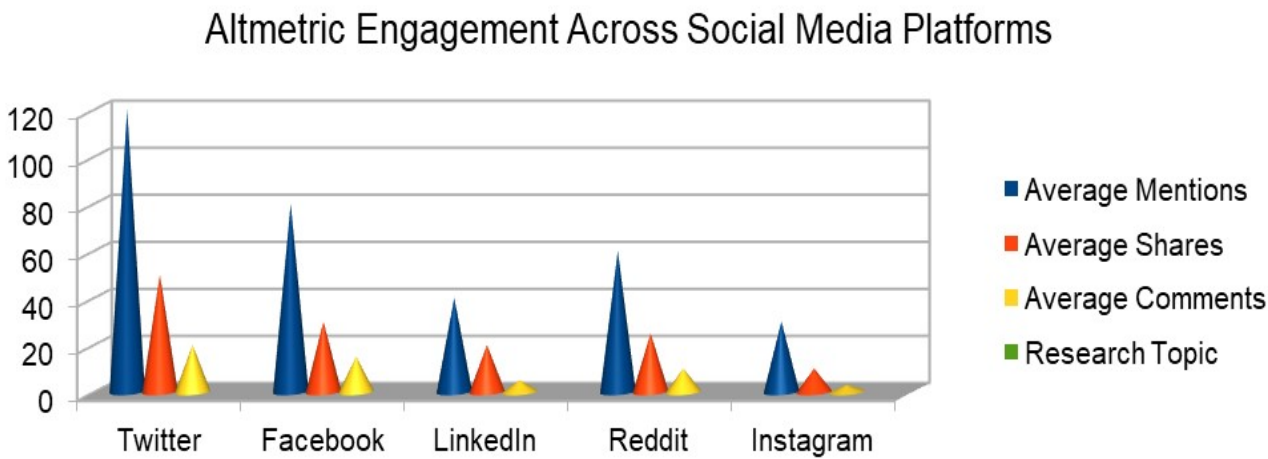
Metric Type	Definition	Example Indicators	Strengths	Limitations
Traditional Citation	Measures influence based on citation frequency	Impact Factor, h-index, Citation Count	Established credibility, long-term impact	Bias towards established journals, delayed recognition
Altmetrics	Measures broader impact using diverse engagement	Social media mentions, news articles, blog posts	Real-time insights, captures societal relevance	Potential for manipulation, less standardized

4.2. Advantages of Altmetrics

Conversely, altmetrics, used by universities like NEIPH and the University of Calicut, provide real-time assessment of the dissemination and reception of research across diverse digital platforms. They provide swift insights regarding involvement and exposure throughout the public debate. Altmetrics provides a holistic perspective on the effect of research by consolidating data from social media, blogs, and news stories, emphasising its societal significance and rapid dissemination. However, there are apprehensions about the possibility of manipulating these measurements, which might provide engagement figures that fail to represent the quality or importance of the research appropriately. Notwithstanding these obstacles, altmetrics provide a significant opportunity for institutions to assess the varied impacts of research in the contemporary linked landscape.

Table 3. Altmetric Engagement Across Social Media Platforms

Platform	Average Mentions	Average Shares	Average Comments	Research Topic
Twitter	120	50	20	Climate Change
Facebook	80	30	15	Mental Health
LinkedIn	40	20	5	Innovations in Renewable Energy
Reddit	60	25	10	AI in Healthcare
Instagram	30	10	3	Public Health



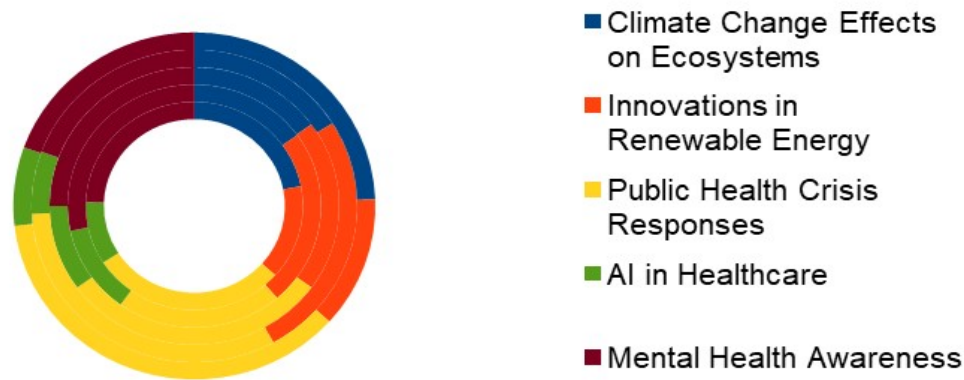
4.3. Case Research Insights

Table 4. Case Research Overview of Research Impact

Case research Title	Citation Count	Altmetric Score	Social Media Mentions	News Mentions	Policy Discussions
Climate Change Effects on Ecosystems	45	320	150	25	10
Innovations in Renewable Energy	30	500	200	40	5
Public Health Crisis Responses	60	450	300	50	15
AI in Healthcare	20	250	100	10	3
Mental Health Awareness	50	600	250	30	8

Case research results indicate that integrating altmetrics with conventional citation metrics improves our comprehension of research impact. Research in environmental science has shown considerable social media involvement that conventional citation measures often neglect, highlighting the contributions of universities such as IIT Madras. These case examples demonstrate how these two categories of metrics may function together, providing a more comprehensive understanding of research relevance and impact. This research seeks to investigate the feasibility of a thorough assessment method that effectively captures the intricacies of research impact.

Case research Overview of Research Impact



5. Discussion

5.1. Implications for Research Assessment

Integrating altmetrics into traditional citation metrics has significant potential for improving research exposure and guiding financing and policy choices at institutions like the University of Calicut and the Institute of Social and Economic Change. This dual methodology offers a more thorough comprehension of academic impact and society involvement, enabling insights into how research influences public debate and policy. Institutions must utilise these measures wisely to prevent biases associated with dependence on either technique. Contextualising citation counts and altmetric scores is essential for accurately capturing the varied nature of research contributions. With proper management, this integrated technique may reveal the subtleties of research outcomes, averting biased assessments that may negatively affect researchers and institutions.

Table 5. Perception of Metrics Among Researchers

Metric Type	Percentage of Researchers Who Prefer This Metric	Main Reasons for Preference
Traditional Citation	45%	Established credibility, recognised by funding bodies
Altmetrics	35%	Captures immediate impact, reflects societal relevance
Both	20%	Provides a comprehensive view, balances academic and social impact

5.2. Recommendations for Implementation

Some essential suggestions are proposed for the effective execution of this integrated approach. Institutions should establish a complete evaluation system integrating altmetrics and standard citation metrics, allowing a holistic assessment of research impact across fields. Secondly, researchers and evaluators at institutes such as NEIPH and the Indian Institute of Tropical Meteorology must have the expertise and resources to use these measures proficiently. By comprehending the advantages and disadvantages of each measure type, stakeholders may make educated choices based on comprehensive

assessments of research results. Institutions and funding organisations are expected to embrace this holistic methodology for their evaluations. By implementing criteria that acknowledge and integrate both citation metrics and altmetrics, organisations may cultivate a more equitable evaluation system that appreciates varied research effects and promotes innovation across all academic disciplines.

6. Conclusion

This research emphasises the need to combine altmetrics with conventional citation metrics to evaluate research impact accurately. The research offers detailed insights into the interactions of many components by concentrating on individual case studies and comprehensive quantitative data. The results demonstrate that a hybrid approach improves our comprehension of scholarly contributions, uncovering dimensions of research impact that conventional citation measures could neglect. Case studies illustrate that integrating two measure types may reveal substantial social connections, enhancing our understanding of research impact. As the digital ecosystem evolves, evaluative studies must adapt and further investigate this integration. Future research will be essential in maintaining the relevance, equity, and societal reflection of assessment techniques about research engagement and effect. By promoting continuous discourse on these methodologies, the academic community may enhance the credibility and impact of research assessments in an increasingly linked environment.

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