

A STUDY OF CITATIONS AND THEIR INFLUENCE WITHIN THE CONTEXT OF SCIENTIFIC RESEARCH IN MYANMAR

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Abstract: Citation analysis has become an important tool for researchers, publishers, and funding agencies seeking to evaluate the impact and quality of scholarly research. However, it is important to recognize that citation metrics are only one measure of impact and should be interpreted in light of other factors, such as the quality and novelty of the research, the relevance to the field, and the broader societal impact of the work. Scientists in developing countries need to understand the challenges that can arise during research, and the emergence of many scientists is also very important. In Myanmar, scientists study a variety of topics related to the research, which is based on the research findings, such as Agriculture and Forestry, Arts, Design and Architecture, Business and Management, Economics and Econometrics, Education, Engineering and Technology, History, Philosophy, Theology, Law/ Law and Legal Studies, Medical and Health Sciences, Natural Sciences, Social Sciences and others. According to the Ad Scientific Index, there are 156 scientists from 37 universities in Myanmar. Citation analysis can provide valuable insights into the impact and influence of scholarly research in a variety of scientific fields, and can help researchers, publishers, and funding agencies to identify areas of strength and areas in need of further development. The research is using data from the Ad Scientific Index Website, which offers evaluations of journals and universities based on scientific performance and the added value of scientific productivity by individual researchers. The website also provides rankings of institutions based on the scientific attributes of affiliated scientists.

Keywords: Scientists, developing countries, citation, analysis, impact, Myanmar.

Introduction: When conducting research, it is essential to properly reference the sources of information that you use. This is done through a citation, which is a reference to the original source of information that you have quoted, paraphrased, or summarized in your work. To

ensure proper citation, an in-text citation should be used whenever you use someone else's idea in your work. An in-text citation is a brief reference within the text of your paper or presentation that directs the reader to a full citation located at the end of the paper, which provides all necessary details about the source of information used.

A citation is a reference to a published or unpublished source of information, such as a book, journal article, website, or other document, that allows readers to locate the original source of the information. Citations typically include information such as the author's name, the title of the source, the date of publication, and the page numbers where the information can be found. Citations are an important part of academic writing and research, as they allow readers to verify the accuracy and credibility of the information presented, and give credit to the original authors for their ideas and contributions.

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When searching the library's databases for articles or e-books, the search results list is actually a complete list of quotes. Instead of being designed according to the database, CSE, or Chicago model, the quotes are designed according to the style of the database administrator. Without publishing, your own ideas are useless, and you will not be quoted for not sharing information that most people in your readership should know.

Bibliometric is a widely used method that involves analyzing quantitative data obtained from citations used to reference and connect documents. Citation metrics are commonly used to evaluate the scholarly influence or impact of publications and researchers. By examining the frequency and patterns of citations, bibliometric analysis provides insights into the significance and impact of research outputs, as well as the influence and productivity of individual researchers. This method is particularly useful in assessing the quality and impact of academic research and is widely used in various research fields.

Related works: Citation analysis is a quantitative method used to study the patterns and impact of citations in academic literature. It involves analyzing the number of times a particular work has been cited by other works, as well as the context and purpose of those citations.

One common metric used in citation analysis is the h-index, which measures both the number of publications an author has produced and the number of times those publications have been cited by others. Other metrics include the number of citations per article, the number of co-citations (i.e., the frequency with which two or more works are cited together), and the citation networks linking different authors or publications. [1] Analyzes the citation patterns of a specific journal over a 20-year period. [2] Provides a comprehensive overview of bibliometrics and citation analysis, including their history, methods, and applications.

Simply having a large number of publications may not necessarily indicate success for a researcher. While a high number of publications may suggest productivity, it is important to consider other factors such as the quality of the research and the impact it has had on the field. For instance, a researcher with only 10 publications that have received 400 citations may be more successful than another researcher with over 100 publications that have received only 200 citations. The number of times a researcher's publications are cited by other authors is a

key indicator of the value and impact of their research in the scientific literature. [3] examines the citation patterns of articles published in a specific astronomy journal before and after it became open access. [4] analyzes the citation patterns of Canadian theses in the field of library and information science. [5] analyzes the citation patterns of medical research publications from a Nigerian university. [6] uses co-citation analysis to map the intellectual structure of the field of information science. [7] provides a comprehensive overview of citation analysis as a tool for research evaluation, including its strengths, limitations, and practical applications.

The AD Scientific Index [20] is a platform that evaluates academic studies across 218 countries, 21,230 universities/institutions, and 1,342,310 scientists, using various criteria to present results that can be used to evaluate productivity and efficiency by individuals and institutions. The platform offers multiple rankings and analyses based on different criteria, including the "total H-index," "last 6 years H-index," "total i10 index," "last 6 years' i10 index," "total number of citations," and "last 6 years' citations." These rankings provide valuable insights into the scholarly impact and productivity of researchers and institutions.

Citation analysis provides a valuable tool for researchers to evaluate the impact of their research, as well as to identify the most influential research in their field. However, it is important to note that citation analysis has its limitations, and should be used in conjunction with other methods of evaluation to get a more complete picture of the impact of research [8].

Scientific Index: Scientific indexes [9] [10] [11] [12] [13] [14] [15] are an important resource for researchers, publishers, and funding agencies seeking to evaluate the impact and quality of scholarly research. They can help to identify areas of strength and areas in need of further development, and can inform decision-making related to funding, publishing, and research strategy. Some examples of scientific indexes are shown in table 1.

Table 1. Examples of Scientific Index

Scientific Index	Description	Functions
Web of Science	Web of Science is a comprehensive scientific index that covers a wide range of academic fields,	It provides access to journal articles, conference proceedings, and other scholarly

	including science, social sciences, and humanities.	publications, as well as citation data and other metrics for evaluating the impact and influence of research.
Scopus	Scopus is another comprehensive scientific index that covers a wide range of academic fields, including science, technology, social sciences, and humanities.	It provides access to journal articles, conference proceedings, and other scholarly publications, as well as citation data and other metrics for evaluating the impact and influence of research.
Google Scholar	Google Scholar is a free search engine that provides access to scholarly literature, including journal articles, conference proceedings, theses, and dissertations.	It also provides citation data and other metrics for evaluating the impact and influence of research.
PubMed	PubMed is a scientific index that specializes in the biomedical and life sciences.	It provides access to journal articles, conference proceedings, and other scholarly publications in these fields, as well as citation data and other metrics for evaluating the impact and influence of research.

Why citation is important for researchers:

Citation is an important measure of a researcher's impact, influence, and reputation within their field. It can also help to support funding and career advancement opportunities, as well as to establish the quality and validity of their research.

Citation for Researchers: Citation is very important for researchers. Citations provide evidence of the impact and quality of a researcher's work, as well as their contributions to a particular field or topic.

Recognition and Credit: Citations give credit to the original authors of a research article or publication, and allow other researchers to acknowledge and build upon their work. Citations can also help to establish a researcher's reputation and recognition within their field.

Impact and Influence: The number and quality of citations a researcher receives can indicate the impact and influence of their work, as well as the relevance and importance of their research to their field.

Funding and Career Advancement: Citations can be used to support grant proposals and applications for academic positions, promotions, and tenure. High citation counts can also be a factor in awarding prestigious research grants and prizes.

Validation and Quality Assurance: Citations provide evidence that a researcher's work has been peer-reviewed and accepted by the academic community, and can help to establish the credibility and quality of their research.

Citation Analysis in Different fields: Citation analysis [16] [17] [18] [19] [20] [21] can be used to evaluate the impact and influence of scholarly research in a variety of scientific fields. Here are a few examples of how citation analysis can be used in different fields:

Engineering Citation Analysis: Engineering citation analysis involves examining the citations within engineering research articles and publications to identify patterns, trends, and relationships among different research topics, authors, and institutions. Engineering citation analysis is an important tool for understanding the impact, influence, and trends within the field of engineering. It can help researchers to identify new research directions, collaborations, and funding opportunities, as well as to evaluate the quality and impact of their own research.

Information Technology (IT) Citation Analysis: Information technology (IT) citation analysis involves examining the citations within IT research articles and publications to identify patterns, trends, and relationships among different research topics, authors, and institutions. IT citation analysis is an important tool for understanding the impact, influence, and trends within the field of information technology. It can help researchers to

identify new research directions, collaborations, and funding opportunities, as well as to evaluate the quality and impact of their own research.

Academic Citation Analysis: Academic citation analysis involves examining the citations within academic research articles and publications to identify patterns, trends, and relationships among different research topics, authors, and institutions. Academic citation analysis is an important tool for understanding the impact, influence, and trends within academic research. It can help researchers to identify new research directions, collaborations, and funding opportunities, as well as to evaluate the quality and impact of their own research.

Medical Citation Analysis: Medical citation analysis involves examining the citations within medical research articles and publications to identify patterns, trends, and relationships among different research topics, authors, and institutions. Medical citation analysis is an important tool for understanding the impact, influence, and trends within the field of medicine. It can help researchers to identify new research directions, collaborations, and funding opportunities, as well as to evaluate the quality and impact of their own research.

Veterinary Citation Analysis: Veterinary citation analysis involves examining the citations within veterinary research articles and publications to identify patterns, trends, and relationships among different research topics, authors, and institutions. Veterinary citation analysis is an important tool for understanding the impact, influence, and trends within the field of veterinary medicine. It can help researchers to identify new research directions, collaborations, and funding opportunities, as well as to evaluate the quality and impact of their own research.

Biomedical Citation Analysis: Biomedical citation analysis can be used to identify the most highly cited articles and authors in a particular subfield, as well as to track the impact of specific drugs, therapies, or medical devices. For example, a citation analysis of research on cancer treatments might reveal that certain drugs or therapies are highly cited and have had a significant impact on the field.

Computer Science Citation Analysis: Computer science, citation analysis can be used to evaluate the impact of specific software tools, algorithms, or programming languages, as well as to track the evolution

of different research subfields over time. For example, a citation analysis of research on artificial intelligence might reveal that certain approaches, such as deep learning or neural networks, are highly cited and have had a major impact on the field.

Environmental Science Citation Analysis: Environmental science citation analysis can be used to track the impact of research on climate change, biodiversity, and ecosystem health. For example, a citation analysis of research on climate change might reveal that certain studies, such as those on the impact of melting polar ice caps or rising sea levels, are highly cited and have had a significant impact on policy and public awareness.

Social Science Citation Analysis: Social science citation analysis can be used to track the impact of research on topics such as social inequality, political behavior, or cultural trends. For example, a citation analysis of research on social inequality might reveal that certain studies, such as those on the impact of race or gender on educational or economic outcomes, are highly cited and have had a significant impact on public policy and public discourse.

Educational Citation Analysis: Educational citation analysis is a method of evaluating the impact and quality of scholarly research in the field of education. It involves analyzing the frequency and patterns of citations to a particular publication, author, or research topic to identify the significance and influence of that work within the field. Educational citation analysis provides a valuable tool for evaluating the impact and quality of research in the field of education and for informing decision-making in educational policy and practice.

Economic Citation Analysis: Economic citation analysis is a method of evaluating the impact and quality of scholarly research in the field of economics. It involves analyzing the frequency and patterns of citations to a particular publication, author, or research topic to identify the significance and influence of that work within the field. Economic citation analysis provides a valuable tool for evaluating the impact and quality of research in the field of economics and for informing decision-making in economic policy and practice. It is used by researchers, policymakers, and institutions to identify the most influential and relevant research in the field and to guide the direction of future research.

Researchers Citation Index in Myanmar: There are many researchers and research institutions/Universities in Myanmar that are conducting research in various fields, such as medicine, agriculture, environmental science, social science, and humanities.

The following table shows the list of universities in Myanmar based on the Ad Scientific Index. According to the Ad Scientific Index [20], there are 156 scientists from 37 universities in Myanmar.

Table 2. Scientists list in Myanmar

1	University of Veterinary Science Yezin	5
2	University of Mandalay	30
3	Yangon Technological University	13
4	University of Computer Studies Yangon	12
5	University of Medicine Mandalay	2
6	University of Technology Yatanarpon Cyber City	5
7	University of Dental Medicine Mandalay	2
8	University of Computer Studies Taunggyi	2
9	Mandalay Technology University	15
10	University of Information Technology Yangon	6
11	Yangon University of Economics	5
12	University of Medicine 1 Yangon	5
13	Thanlyin Technological University	2
14	Kalay University	1
15	University of Computer Studies Mandalay	11
16	Yangon University of Education	6
17	Myanmar Institute of Information Technology	4
18	Monywa University of Economics	4
19	East Yangon University	3
20	Myanmar Maritime University	3
21	University of Medicine Magway	2
22	University of Dental Medicine Yangon	2
23	West Yangon Technological University	2
24	Myeik University	1
25	University of Medicine 2 Yangon	1
26	University of Nursing Yangon	1
27	University of Medical Technology Mandalay	1
28	University of Pharmacy Yangon	1
29	Technological University Mawlamyine	1
30	Technological University Meiktila	1
31	University of Computer Studies Sittway	1
32	STI Myanmar University	1
33	Meiktila University of Economics	1
34	Myanmar Aerospace Engineering University	1
35	Yangon University of Distance Education	1
36	Technological University Myitkyina	1
37	University of Computer Studies Hinthada	1
	Total	156

Finding and analysis: There are many researchers and research institutions in Myanmar that are working to address important social, economic, and environmental challenges facing the country, and to promote sustainable development and social harmony. The following table 3 shows the numbers of scientists in top 5 Universities in Myanmar based on AD Scientific Index Website [20].

According to the table, 30 scientists are the most scientists in University. We can also find easily the number of scientists and publications, academic interests, and other detailed analysis results concerning universities and institutions.

Table 3. The numbers of scientists in Myanmar

No	Difference types of Universities in Myanmar	The numbers of Scientists in each University
1	University of Mandalay	30
2	Mandalay Technological University	15
3	Yangon Technology University	13
4	University of Computer Studies	12

	Yangon	
5	University of Computer Studies Mandalay	11

The above table provides information about the numbers of scientists in different types of universities in Myanmar. The University of Mandalay has the highest number of scientists with 30, followed by Mandalay Technological University with 15, Yangon Technology University with 13, University of Computer Studies Yangon with 12, and University of Computer Studies Mandalay with 11.

The table also highlights the diversity of universities in Myanmar, including traditional liberal arts and science universities like the University of Mandalay, technical universities like Mandalay Technological University and Yangon Technology University, and specialized universities like the University of Computer Studies Yangon and the University of Computer Studies Mandalay.

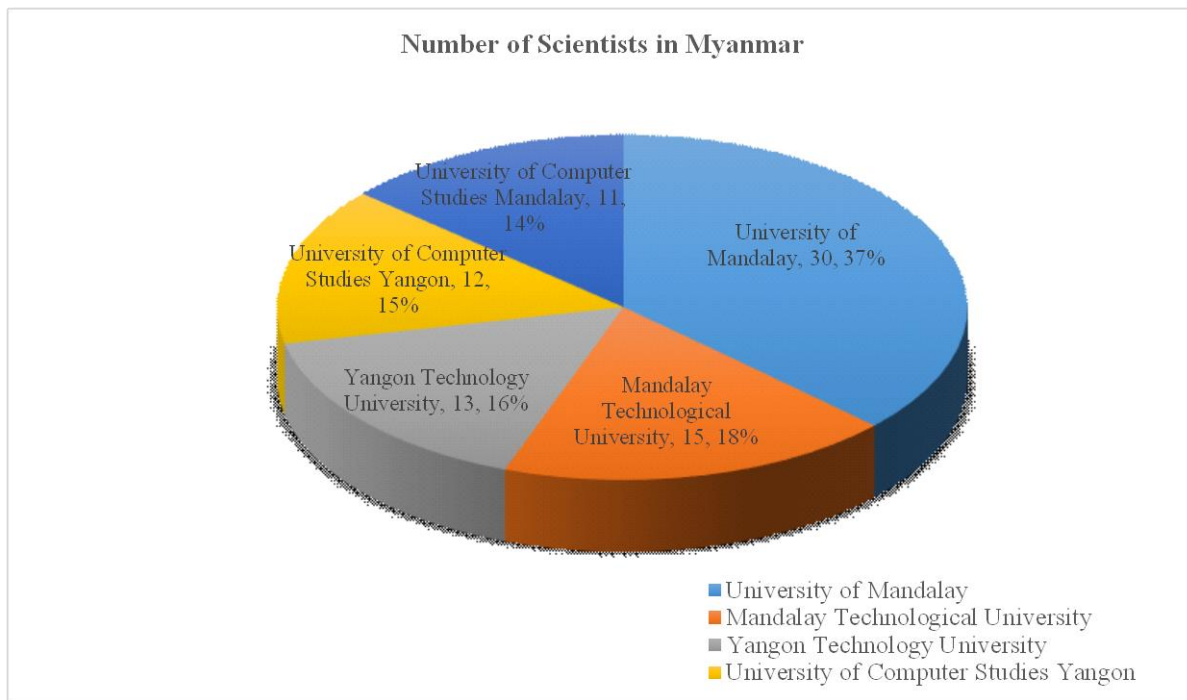


Figure 1. The numbers of percentage of scientists in Myanmar

Citation analysis can be used to evaluate the impact and influence of individual authors, publications, or research

fields. It can also be used to identify trends and patterns in scholarly communication, such as the emergence of

new research topics or the impact of specific technologies or methodologies. The following table 4 shows the numbers of research field in different universities in Myanmar. According to the table, the field of engineering scientists are the most researcher (28.2%) in Myanmar. The second is academic field (22.4%) and the third is computer science field (17.3%).

Table 4. The numbers of Research Field in Different Universities in Myanmar

No.	Research Field in Myanmar	Numbers of Scientists	Percentage (%)
1	Veterinary Citation Analysis	5	3.2%
2	Academic Citation Analysis	35	22.4%
3	Medical Citation Analysis	17	10.9%
4	Computer Science Citation Analysis	27	17.3%

5	Information Technology(IT) Citation Analysis	10	6.4%
6	Engineering Citation Analysis	44	28.2%
7	Educational Citation Analysis	7	4.5%
8	Economic Citation Analysis	10	6.5%
9	Others	1	0.6%
	<i>Total</i>	156	100%

The above table and the following figure 2 provides information about the research fields in Myanmar and the number of scientists working in each field. The largest research field in terms of the number of scientists is engineering, followed by academic citation analysis and computer science citation analysis. The smallest research field is "others" with only one scientist.

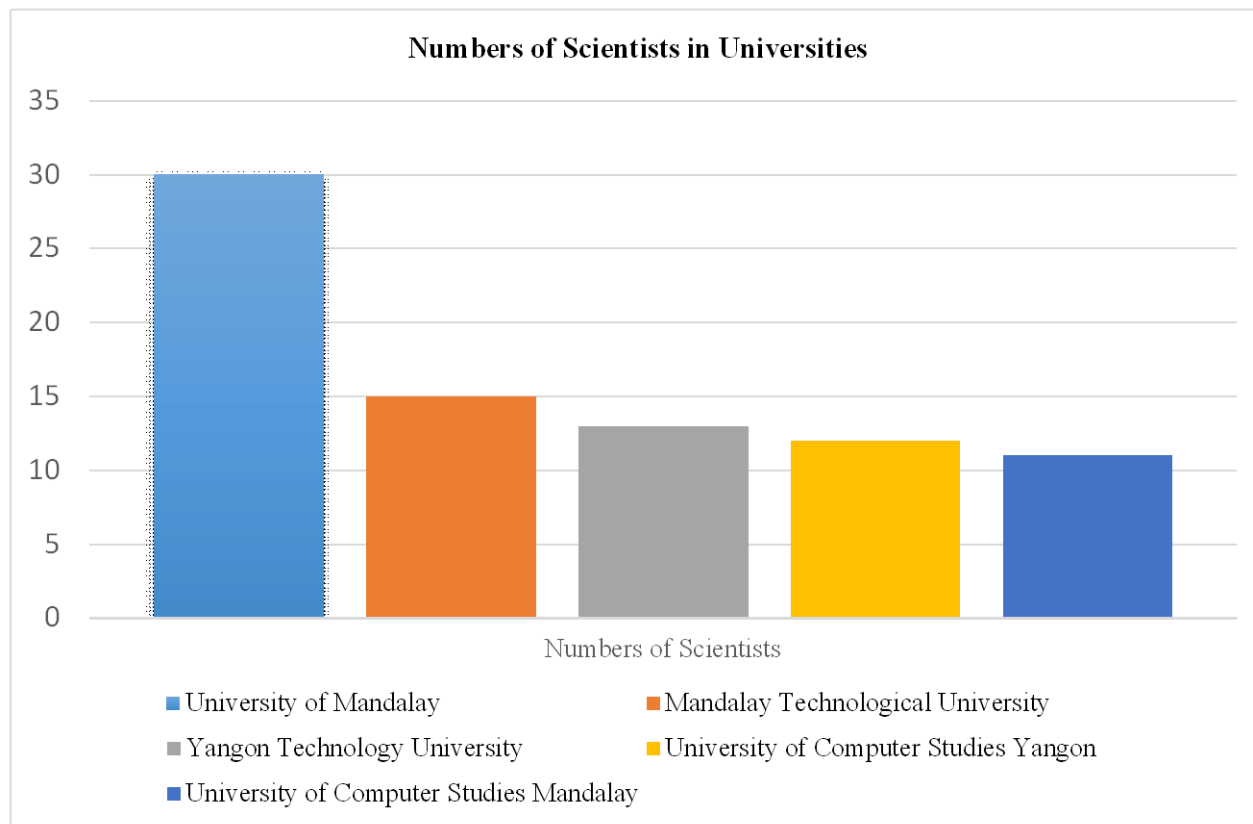


Figure 2. The numbers of Scientists in Research Field

To improve the research landscape in Myanmar, it is suggested to provide more support and resources to the

smaller research fields such as veterinary, educational, economic and "others." Additionally, efforts can be made

to encourage collaboration between researchers across different fields to facilitate interdisciplinary research. Furthermore, it is important to promote a culture of research and innovation, by providing incentives for researchers, promoting research culture in academic institutions, and supporting research-based startups. This can help to attract more researchers and funding to Myanmar's research sector, leading to a more vibrant and impactful research community.

The impact of scientific research in Myanmar: . A scientific index is a database or platform that provides information on academic journals, articles, and their citations. These indexes are used by researchers, publishers, and funding agencies to evaluate the impact and quality of scholarly research. Based on the results of the citation analysis and the impact of scientific research in Myanmar, the following suggestions table 5 can be made:

Table 5. The impact of Scientific Research in Myanmar

No	Impact of Scientific Research	Description
1	Promote interdisciplinary research	To tackle complex and multi-faceted issues, there is a need to promote interdisciplinary research. Collaboration between researchers across different fields can lead to more innovative research outcomes and better problem-solving.
2	Increase research funding	To encourage more research and innovation, it is important to provide adequate funding for research projects in all fields. Government agencies and private sector organizations should provide more funding for research, and grants should be made available to support innovative and impactful research projects.
3	Encourage collaboration between	Collaboration between academia and industry can lead to the development of research

	academia and industry:	projects that are more relevant to the needs of society and industry. It can also lead to the commercialization of research, creating more economic opportunities for researchers and the country.
4	Improve research infrastructure:	To support high-quality research, there is a need to improve research infrastructure, including access to high-performance computing facilities, specialized laboratories, and research equipment. This will allow researchers to conduct more sophisticated experiments and analysis, leading to more impactful research outcomes.
5	Promote a research culture	To create a more vibrant research community in Myanmar, there is a need to promote a research culture. This can be done by providing incentives for researchers, promoting research culture in academic institutions, and supporting research-based startups. By creating a culture that values and rewards research, more researchers will be attracted to the field, leading to more impactful research outcomes.

The citation analysis and impact assessment of scientific research in Myanmar have provided valuable insights into the research landscape in the country. The results show that there is significant potential for growth and development in various fields, including engineering, computer science, and medicine. However, the analysis also highlights areas where improvements are needed, such as increasing funding for research, promoting interdisciplinary collaboration, improving research infrastructure, and cultivating a research culture.

Conclusions: Citation analysis is an important tool to evaluate the impact of scientific research in various fields. It involves analyzing the number of times a particular research article has been cited by other researchers in their publications. The results of citation analysis can provide insights into the quality and impact of research articles and help researchers in making informed decisions about their research. One of the key findings of the citation analysis is that highly cited articles tend to be published in high-impact factor journals. This indicates that publishing in high-impact factor journals can increase the visibility and impact of research articles. However, there are also instances where highly cited articles were published in lower impact factor journals, indicating that the quality of research is not solely dependent on the journal's impact factor. Another important finding is that certain research fields tend to have higher citation rates compared to others. For example, research in medical and life sciences tends to have higher citation rates compared to research in social sciences and humanities. This could be due to the nature of the research itself, as well as the audience and the impact it has on society. By implementing the suggested improvements, Myanmar can further enhance its research capabilities and become a more competitive player in the global research community. This, in turn, can lead to more innovative and impactful research outcomes, benefiting both the country and the wider world. The findings of this study can serve as a useful guide for policymakers, researchers, and other stakeholders in Myanmar to promote and support high-quality research in the country.

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