Citation analysis of theses and dissertations submitted to the College of Natural Sciences, University of Dodoma (2011–2023)

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ABSTRACT

Bibliometric studies on postgraduate research in Tanzania remain limited, particularly in the natural sciences. This study examined citation patterns in master's dissertations and doctoral theses submitted to the College of Natural Sciences at the University of Dodoma in order to assess the types, currency, and origin of cited sources. A descriptive research design employing bibliometric techniques was used to analyze 153 postgraduate documents, including 146 master's dissertations and 7 doctoral theses submitted between 2011 and 2023. Findings revealed a strong reliance on citation of journal articles, while citation of monographs, theses, websites, and locally produced sources remained limited. Doctoral candidates demonstrated greater use of current, digital, and peer-reviewed resources compared to master's students. The study concludes that citation practices reflect both evolving digital research trends and limitations in access to diverse scholarly resources. It recommends strengthening access to electronic resources, improving the visibility of local research outputs, and enhancing research and information literacy training to support the quality and sustainability of postgraduate scholarship.

(Key words**: citation patterns; postgraduate research; scholarly communication; journal usage; local content; library collection development.)

I. INTRODUCTION

This study examines citation patterns in postgraduate theses and dissertations submitted to the College of Natural Sciences at the University of Dodoma between 2011 and 2023. These scholarly works represent an important indicator of research productivity, academic growth, and knowledge generation within the university. Academic libraries use various methods to evaluate their collections and assess their alignment with courses or programs offered at the institution. One method used to evaluate a library collection is citation analysis. According to Nigro et al. (2022) citation analysis aims to study what is being cited in various publications, assess the extent to which a given library collection supports scholars' need for literature, and evaluate the alignment between their collections and the evolving needs of faculty and researchers. One practical approach is to examine how well library holdings correspond to the materials scholars cite in their published work. By analyzing the reference lists in local research outputs such as faculty publications, theses, and dissertations, libraries can assess the alignment between the materials scholars actually use and the resources currently available in the library. The production of postgraduate theses and dissertations at the University of Dodoma (UDOM) has increased steadily since the establishment of the College of Natural Sciences in 2011. These scholarly works represent an important indicator of research productivity, academic growth, and knowledge generation within the university. As postgraduate research continues to expand, understanding the nature and quality of the information sources students use becomes increasingly important for evaluating scholarly communication and research development.

In Tanzania, many studies have explored citation analysis and its applications. Some reviews of this literature have already appeared. Dulle et al. (2004), Mallya and Sife (2012), Sife and Bernard (2013), Samzugi and Mwinyimbegu (2015), Mnzava and Chirwa (2019), Msoffe and Sife (2021), Mabele et al. (2023), Muneja (2023, 2024), Ndibalema (2024), and Ngassa et al. (2023), have examined citation practices in different institutional and disciplinary contexts. Despite these contributions, little attention has been given to the citation

behavior of postgraduate students at UDOM, particularly within the College of Natural Sciences. The absence of such focused analysis creates a significant knowledge gap regarding the types, relevance, currency, and geographical origin of information sources cited in postgraduate research. Without empirical evidence on students' citation practices, university libraries face difficulties in making informed collection development decisions, while academic departments may struggle to align research and curricula with current scholarly trends. Consequently, the quality and relevance of postgraduate research may be affected. This study, therefore, seeks to conduct a citation analysis of master's and doctoral theses submitted to the College of Natural Sciences at UDOM between 2011 and 2023. Specifically, the study examines the patterns, currency, and origin of cited sources in order to provide insights into postgraduate students' scholarly communication practices. The findings are expected to contribute to improved library services, evidence-based collection development, and enhanced research quality within the university.

The University of Dodoma (UDOM) has witnessed steady growth in postgraduate research output over the past decade. Despite this progress, there has been no systematic analysis of citation behavior in postgraduate works at the College of Natural Sciences since its establishment in 2011. While earlier Tanzanian studies (Samzugi & Mwinyimbegu, 2015; Sife & Bernard, 2013; Mnzava & Chirwa, 2019; Msoffe & Sife, 2021; Mabel et al., 2023; Muneja, 2023, 2024; Ndibalema, 2024; Ngassa et al., 2023) have explored citation trends in other institutions and disciplines, none have specifically examined citation patterns at UDOM's College of Natural Sciences.

This absence of empirical evidence creates a critical knowledge gap. Without understanding the types of sources postgraduate students cite—their relevance, timeliness, and balance between local and international scholarship, university libraries cannot make informed decisions about resource acquisition. Likewise, academic departments lack the evidence needed to align curricula with evolving scholarly trends. As a result, research support systems risk inefficiency, and the overall quality and global relevance of postgraduate research may be compromised. Further, it remains difficult to understand how postgraduate students engage with scholarly resources and whether their citation practices reflect current developments in scientific research.

Consequently, libraries may lack evidence-based guidance for collection development and subscription decisions, while academic departments may face challenges in aligning postgraduate training with evolving research and information needs. Addressing this gap is therefore essential for strengthening scholarly communication, improving research quality, and enhancing the relevance and visibility of postgraduate research at UDOM.

Addressing this gap is essential. A systematic analysis of citation patterns at UDOM's College of Natural Sciences will strengthen scholarly communication, guide resource management, and enhance the quality and impact of postgraduate research. Therefore, this study seeks to analyze the citation patterns in master's dissertations and doctoral theses at UDOM's College of Natural Sciences, with the aim of providing evidence based insights to improve resource allocation, curriculum alignment, and research support systems.

Availability of theses and dissertations

Availability refers to the ability of a resource to be accessed and retrieved through a particular system when needed (Hornby, 2015). In this context, the availability of master's dissertations and doctoral theses implies their accessibility, irretrievability, and usability through various devices and systems.

Studies in other contexts highlight how availability influences citation behavior. For example, Mukhedkar et al. (2022) at the Post Graduate Institute of Post-Harvest Management in India reported a significant rise in citation frequency among master's dissertations between 2018 and 2020, with peaks linked to improved research quality, alignment with global issues, and expanded access to digital repositories across Africa and Asia. Similarly, Jamdade et al. (2024) documented 3,441 doctoral theses in Law submitted to the Shodhganga repository between 2016 and 2021, noting that expanded access to digital repositories and open-access publishing increased visibility and citation potential.

Despite such evidence, the College of Natural Sciences at the University of Dodoma has not yet had its citation patterns systematically analyzed, making this an area worthy of scholarly inquiry.

Citation patterns by resource type

In academic research, the frequency with which a paper is cited is often taken as a measure of its significance. The way these citations change year by year is referred to as the citation pattern or citation curve a graph that tracks how frequently an article is cited annually from the time it was first published (Feng, 2022). Building on this view, Raitskaya and Tikhonova (2022) argue that citations function not merely as indicators of influence but also as

practical measures of research productivity and researcher performance. In their account, citations are more than numerical markers; they are integral to the fabric of scholarly communication, sustaining the exchange of ideas and shaping the cumulative development of knowledge across disciplines. The analysis of citation patterns in master's dissertations and doctoral theses is particularly significant in this regard, as it sheds light on the types of resources postgraduate researchers consult, the citation practices they adopt, and the age and relevance of the materials they rely upon. Such insights not only reveal the intellectual foundations of advanced research but also highlight the evolving standards of scholarly engagement within higher education. Recent bibliometric studies further demonstrate that citation trends vary considerably across disciplines and institutional contexts, underscoring the importance of situating citation analysis within broader academic and organizational frameworks

Recent bibliometric studies further demonstrate that citation trends vary considerably across disciplines and institutional contexts. For example, Muneja (2023, 2024), in studies on climate change research in Tanzania, found that journal articles were the most frequently cited sources, followed by books and conference proceedings. Similar findings were reported by Ndibalema (2024) in research on Open Educational Resources and Ngasa et al. (2023) in studies on phthalate biodegradation, where journal articles dominated citations. Likewise, other Tanzanian studies (Mzava & Chirwa, 2019; Msoffe & Sife, 2021; Mabele et al., 2023) consistently demonstrate the predominance of journal articles in scholarly citations, reflecting the central role of peer-reviewed journals in contemporary scholarly communication.

However, not all studies report similar patterns. Samzugi and Mwinyimbegu (2015) found that textbooks constituted the most cited sources in their study. They further recommended that academic libraries strengthen information literacy training and promote greater use of electronic resources among students. The differences between these findings and more recent studies may be attributed to several factors, including disciplinary variations, changes in access to electronic resources over time, differences in institutional library collections, and varying levels of information literacy among postgraduate students. Disciplines in the sciences and applied research fields tend to rely heavily on recent journal literature due to the rapidly changing nature of knowledge, whereas some social science and humanities fields continue to make substantial use of textbooks and monographs. In addition, the increasing availability of online databases and digital scholarly resources in recent years may have contributed to the growing dominance of journal citations in newer studies.

Similarly, Sangeda and Lwoga (2017) examined scholarly publications produced in Tanzania between 1991 and 2015 and found that scholars published 12,379 articles across 34 institutions, of which 83.9% were journal articles. The study further revealed that medical sciences accounted for the highest research output, a finding that reinforces the importance of journal literature in scientific research fields where current and peer-reviewed information is highly valued.

Despite the growing body of bibliometric and citation studies in Tanzania, no study has specifically examined citation patterns within dissertations and theses produced at the University of Dodoma (UDOM), particularly in the College of Natural Sciences. This absence of evidence creates a significant knowledge gap.

II. METHODOLOGY

This study employed a descriptive research design using a quantitative bibliometric approach. The design is appropriate for studies seeking to systematically describe characteristics, patterns, or trends within a particular phenomenon without manipulating variables (Creswell & Creswell, 2018). In the present study, the design enabled the systematic examination of citation patterns in postgraduate dissertations and theses.

The study further adopted a quantitative bibliometric approach. Bibliometric refers to the application of quantitative and statistical techniques to analyse published information and patterns of scholarly communication, including citations, authorship, publication trends, and resource use (Donthu et al., 2021). The bibliometric approach was appropriate for quantitatively assessing the types and frequency of information resources cited by postgraduate students.

Data collected from the reference lists of selected dissertations and theses and organized using Microsoft Excel. The data were then analysed quantitatively through descriptive statistical techniques, including frequencies, percentages, tables, and charts generated in Microsoft Excel. The analysis focused on identifying patterns in resource types cited, frequency of citations, age of cited materials, and the distribution of information sources used by postgraduate students in the College of Natural Sciences at UDOM. These analytical procedures enabled the researcher to summarize and interpret citation behaviours effectively.

III. STUDY RESULTS

Composition of analysed theses and dissertations (2011-2023)

This study analysed 153 postgraduate theses and dissertations submitted to the College of Natural Sciences at the University of Dodoma between 2011 and 2023. Of these, 146(95.42%) were master's dissertations and 7(4.58%) were doctoral theses. Table 1 shows the distribution trends of citations.

Table 1: Composition of master's dissertations and doctoral theses[1]

Document Type	Distribution		Total Citations		Internet Resource Citations	
	F	%	F	%	F	%
Doctoral Thesis	7	4.58	823	6.47	437	4.47
Masters Dissertation	146	95.42	11899	93.53	9331	95.53
Total	153	100	12722	100	9768	100

The results in Table 1 show that although doctoral theses constitute a small proportion of the documents, they account for a slightly higher 117 citation-per-document ratio while for masters constitute 82 citation-per-document ratio. However, master's dissertations dominate both in volume and total citations, especially in internet-based sources. This suggests a growing reliance on online materials among master's students, aligning with broader trends in digital research (Mukhedkar et al. 2022). However, this pattern must be interpreted cautiously due to the disproportionate sample size between the two groups.

Availability of theses and dissertations by years

The first objective was to assess the availability of master's dissertations and doctoral theses over time and across disciplines. Table 2 presents the annual and disciplinary distribution of submitted documents. It indicates that, out of 153 works analyzed, 72(47.4%) originated from the Natural Resource Management programme, followed by Biodiversity Conservation (28), Chemistry (26), and Mathematics (16). The highest output occurred in 2015 (35 submissions), followed by 2023 (17 submissions). The early years (2011–2012) showed minimal activity, likely reflecting the college's formative stage. Interestingly, low outputs in later years, such as 2016 and 2022, may reflect factors such as enrolment fluctuations, supervision constraints, or repository update delays. These trends mirror observations in other studies (Jamdade et al., (2024), which note that institutional and policy environments influence postgraduate research output

Table 2: Availability of master's dissertations based on years and programme[2,3]

Year	Masters							PhD		Overall Total	
	BC	CH	MT	PH	ST	NR	Total	CH	ST	Total	
	F	F	F	F	F	F	F	F	F	F	F	%
2011	1	0	0	0	0	0	1	0	0	0	1	0.65
2012	0	0	3	0	0	5	8	0	0	0	8	5.23
2013	7	0	0	0	0	6	13	0	0	0	13	8.49
2014	2	0	3	0	0	6	11	0	0	0	11	7.19
2015	7	0	0	0	0	28	35	0	0	0	35	22.8
2016	0	0	0	0	0	12	12	0	0	0	12	7.84
2017	2	9	0	0	0	0	11	1	0	1	12	7.84
2018	5	6	0	0	0	2	13	0	0	0	13	8.49
2019	0	1	2	0	0	0	3	2	0	2	5	3.27

[1] *Source: Field Research, 2025*
[2] *University of Dodoma Institutional Repository, 2023*
[3] **Key**: BC = Biodiversity Conservation; CH = Chemistry; PH = Physics; MT = Mathematics; ST = Statistics; NR = Natural Resource Management

Year	Masters								PhD		Overall Total	
	BC	CH	MT	PH	ST	NR	Total	CH	ST	Total		
	F	F	F	F	F	F	F	F	F	F	F	%
2020	1	2	2	1	0	10	16	0	0	0	16	10.5
2021	0	6	0	0	0	0	6	2	1	3	9	5.88
2022	0	1	0	0	0	0	1	0	0	0	1	0.65
2023	3	1	6	0	3	3	16	1	0	1	17	11.1
Total	**28**	**26**	**16**	**1**	**3**	**72**	**146**	**6**	**1**	**7**	**153**	**100**

Citation patterns by resource type

The second objective examined the types of information resources cited by postgraduate students. Table 3 summarizes the citation patterns for both master's and doctoral-level works. It shows that journal articles were the most frequently cited resources across all documents, accounting for 46.6% of total citations and demonstrating particularly high dominance in doctoral theses (72.9%). Internet-based journal citations were also substantial (54.6%), indicating a strong preference for peer-reviewed and digitally accessible scholarly literature. These findings are consistent with earlier studies by Muneja (2023, 2024) and Ndibalema (2024), which emphasized the scholarly credibility, accessibility, and timeliness of journal literature in academic research. Monographs and research reports followed in usage, with research reports accounting for 23.9% of citations in master's dissertations.

In contrast, theses/dissertations and websites were the least cited sources, suggesting limited engagement with grey literature and non-peer-reviewed web content. The low citation of theses and dissertations may reflect postgraduate students' preference for peer-reviewed journal articles, which are often perceived as more authoritative, current and academically rigorous. It may also indicate limited accessibility and visibility of institutional research outputs due to inadequate digitization, restricted repository access, or low awareness of available university-generated research. Furthermore, the growing availability of electronic journal databases may encourage students to rely more heavily on easily accessible online scholarly sources than on locally archived theses and dissertations. These findings support Mabele et al. (2023), who asserted that peer-reviewed journal articles remain central to postgraduate scholarship and scholarly communication.

Table 3: Citation Patterns by Resource Type[4]

Information Resources	Masters				PhD				Overall			
	Resources		Internet		Resources		Internet		Resources		Internet	
Monograph	2760	23.2	1023	10.9	107	13	20	4.58	2867	22.5	1043	10.6
Journal	5324	44.7	4964	53.2	600	72.9	376	86.04	5924	46.6	5340	54.6
Thesis/dissertation	170	1.43	42	0.45	6	0.73	0	0.00	176	1.38	42	0.43
Research report	2839	23.9	2585	27.7	64	7.7	16	3.66	2903	22.8	2601	26.6
Website	268	2.25	257	2.75	17	2.1	17	3.89	285	2.24	274	2.81
Others	538	4.52	460	4.93	29	3.5	8	4.58	567	4.46	468	4.79
Total	**11899**	**100**	**9331**	**100**	**823**	**100.**	**437**	**86.04**	**12722**	**100**	**9768**	**100.**

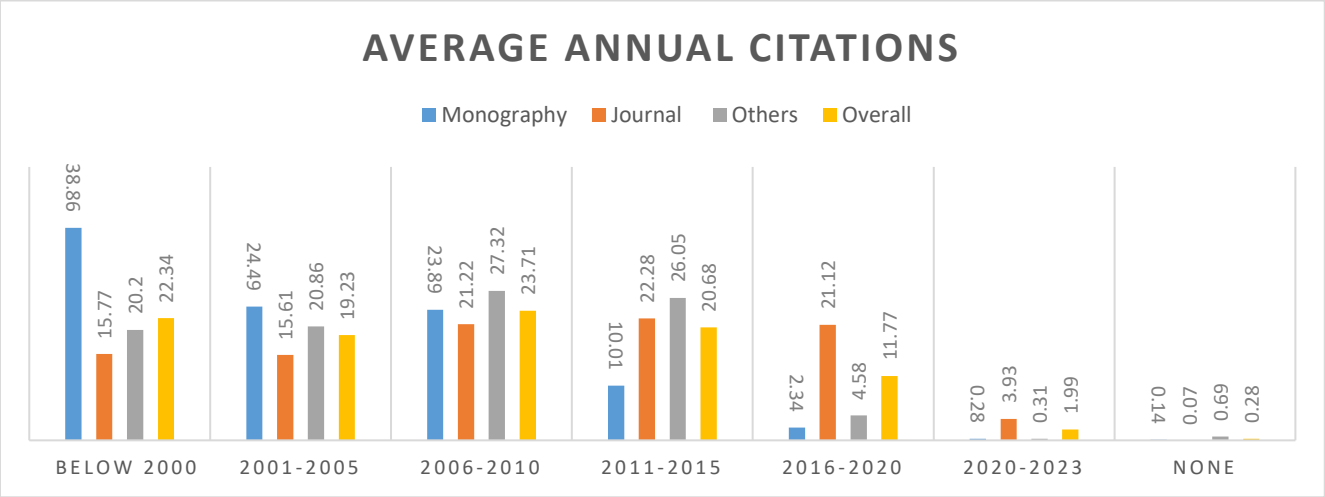
[4] ***Source:*** *Field research, 2025*

Citation trends by resource types and publication year

Another focus was to examine the recency of source types cited. Figure 1 presents average annual citations of monographs, journal articles, and other materials across various publication cohorts. The findings on charted revealed notable shifts in citation trends across resource types and publication periods. From 2000 to 2010, monographs dominated older citations, particularly within the pre-2005 cohort, reflecting their traditional role as foundational sources of academic knowledge. During the period 2011–2015, journal articles overtook monographs, averaging 22.28 citations compared to 10.01 for books, while other sources such as reports and conference proceedings also recorded increased usage (26.05). The period 2016–2020 showed a sharp decline in monograph citations (2.34), contrasted with sustained journal article usage (21.12), suggesting a significant shift toward peer-reviewed and current scholarly literature.

Although the overall citation rates declined during 2021–2023, journal articles remained the most frequently cited source (3.93), while monograph citations declined further (0.80). The reduction in citation rates during this period may be attributed to several factors. First, recent publications generally require time to accumulate visibility and scholarly impact, a phenomenon commonly referred to as publication lag or citation maturity effect. Second, the period coincided with the disruptions associated with the COVID-19 pandemic, which affected research activities, library access, postgraduate supervision, and academic publishing processes globally. These disruptions may have influenced both the volume of postgraduate research output and patterns of source utilization. Additionally, changing research practices and increased reliance on digital databases may have encouraged more selective citation behavior focused primarily on recent peer-reviewed journal literature.

Figure 1: Average annual citations for doctoral theses and master's dissertations



The observed shift toward journal articles aligns with global academic trends associated with the increasing digitization of scholarly communication (Mnzava & Chirwa, 2019; Ngassa et al., 2023). However, the limited use of locally produced theses and regional research raises concerns regarding the visibility, accessibility, and integration of African scholarship within scientific inquiry. This may indicate a disconnect between institutional repositories and student research practices. Furthermore, the continued decline in monograph citations may reflect broader curricular and pedagogical changes in which concise, peer-reviewed sources are increasingly prioritized over comprehensive foundational texts traditionally found in books.

IV. DISCUSSION OF FINDINGS

Postgraduate Research Output Trends (2011–2023)

The findings presented in Table 2 indicate that postgraduate research output within the College of Natural Sciences at the University of Dodoma (UDOM) between 2011 and 2023 was characterized by a substantially higher number of master's dissertations than doctoral theses. This imbalance may suggest relatively

low doctoral enrolment and completion rates within the College. Such trends are commonly associated with structural challenges affecting doctoral education in many higher learning institutions, including limited supervisory capacity, inadequate research funding, prolonged completion periods, and infrastructural constraints that affect advanced scientific research (Cloete et al., 2015). Doctoral studies generally require extensive financial, technical, and supervisory support, which may explain their comparatively lower output levels.

Among the disciplines examined, Natural Resource Management recorded the highest postgraduate research output at the master's level, followed by Biodiversity Conservation, Chemistry, and Mathematics, while Statistics and Physics showed comparatively lower representation. These disciplinary variations may reflect differences in student enrolment patterns, labour market demand, funding opportunities, and availability of research infrastructure across departments. Fields related to environmental management and biodiversity conservation may attract greater student interest due to increasing global and national concerns regarding environmental sustainability, climate change, and natural resource governance. Similar disciplinary variations in research productivity have been observed in previous bibliometric studies in African universities (Sangeda & Lwoga, 2017; Muneja, 2023).

The temporal distribution of postgraduate submissions further revealed a gradual increase in research output over the study period, although the growth pattern was not consistent. The relatively low output recorded during the early years (2011–2013) may be associated with the initial establishment and expansion phase of postgraduate programmes within the College. As postgraduate programmes matured and institutional capacity improved, research submissions increased. However, fluctuations observed across subsequent years suggest that postgraduate productivity remains vulnerable to both institutional and external influences, including funding availability, staffing levels, policy changes, and broader socio-economic conditions. The irregular growth pattern may also reflect variations in admission cycles and completion rates among postgraduate students.

In contrast, doctoral thesis production did not demonstrate substantial growth throughout the study period. This stagnation may indicate persistent structural constraints within doctoral education, including high attrition rates, inadequate research mentorship, limited financial support, and challenges associated with conducting advanced scientific research. Similar concerns regarding doctoral education capacity and completion challenges have been reported in higher education studies across Sub-Saharan Africa, where doctoral programmes frequently face shortages of qualified supervisors and limited research funding opportunities (Cloete et al., 2015). These findings therefore underscore the importance of strengthening institutional support systems, improving doctoral supervision, and expanding research funding mechanisms in order to enhance doctoral-level research productivity at UDOM.

Citation behaviour and information use

The analysis of citation patterns presented in Table 3 revealed that journal articles constituted the most frequently cited sources across both master's dissertations and doctoral theses, highlighting their central role in postgraduate research and scholarly communication. This dominance of journal literature is consistent with findings from previous bibliometric studies conducted in Tanzania and elsewhere, which similarly reported journal articles as the primary sources used in academic research (Muneja, 2023, 2024; Ndibalema, 2024; Ngassa et al., 2023). The prominence of journal citations may be attributed to the credibility, peer-review status, currency, and accessibility of journal literature, particularly through electronic databases and digital library platforms.

Research reports and monographs followed journal articles in citation frequency, although at substantially lower levels. The comparatively limited use of monographs in recent postgraduate works suggests a gradual transition from traditional print-based scholarship toward digitally accessible and peer-reviewed scholarly communication. Earlier theses and dissertations relied more heavily on books and monographs, reflecting their historical importance in providing foundational theoretical knowledge. However, more recent postgraduate research demonstrates a stronger preference for journal articles, particularly current and electronically accessible sources. This transition aligns with broader global trends in scholarly communication driven by the digitization of academic information and increased access to online journal databases (Mnzava & Chirwa, 2019; Ngassa et al., 2023).

The findings also indicate relatively low citation rates for theses, dissertations, and websites. The limited use of theses and dissertations may suggest restricted visibility and accessibility of institutional research outputs, inadequate utilization of institutional repositories, or student preference for peer-reviewed sources perceived as more authoritative. This finding raises concerns

regarding the underutilization of locally generated scholarly knowledge within postgraduate research. Similarly, the low reliance on general web sources may reflect students' preference for academically credible and peer-reviewed materials over non-scholarly internet content.

Furthermore, the consistency of citation patterns across master's dissertations and doctoral theses suggests relative homogeneity in information-seeking behaviour among postgraduate students regardless of degree level. While this consistency may indicate adherence to established scholarly standards emphasizing peer-reviewed literature, it may also point to an over-reliance on a narrow range of resource types. Excessive dependence on journal articles at the expense of monographs, theses, and regional scholarship may limit students' engagement with foundational theories, contextual knowledge, and locally relevant research. Consequently, universities and academic libraries may need to strengthen information literacy programmes that encourage balanced and critical use of diverse scholarly resources, including institutional repositories and African research outputs.

V. CONCLUSION

This study set out to examine postgraduate research output trends and citation patterns within the College of Natural Sciences at the University of Dodoma (UDOM) over the period 2011–2023. The findings demonstrate a clear growth in master's-level research output over time, indicating increasing institutional capacity for postgraduate training. However, the consistently low number of doctoral theses reveals a structural weakness in doctoral education. This imbalance suggests that while master's programmes are expanding successfully, doctoral training remains constrained by factors likely related to supervision capacity, research funding, and infrastructural support, which are essential for sustaining advanced-level research productivity.

The study also established a strong dominance of journal articles in postgraduate citation practices across both masters and doctoral levels. This pattern reflects a broader shift in scholarly communication toward digitally accessible, peer-reviewed, and current literature. The increasing reliance on journal articles indicates that postgraduate students are aligning their research practices with global academic standards, where journals serve as the primary medium for knowledge dissemination. However, this dominance also raises important scholarly concerns. The relatively low use of monographs, theses, and dissertations suggests a narrowing of information sources, which may limit engagement with foundational theories, contextual knowledge, and locally generated research.

From a broader perspective, these findings highlight a dual transformation in postgraduate scholarship at UDOM. On one hand, there is evidence of increased research productivity and stronger alignment with international scholarly communication practices. On the other hand, there is an emerging imbalance in both research output (between master's and doctoral levels) and information use (over-reliance on journal literature). This duality suggests that while postgraduate research is becoming more globally integrated, it may simultaneously be underutilizing locally relevant and diverse scholarly resources.

The declining use of theses and dissertations, despite their role as institutional knowledge products, further indicates potential weaknesses in the visibility, accessibility, and integration of institutional repositories into student research practices. This gap suggests that knowledge produced within the university is not being fully reintegrated into subsequent scholarly work, thereby limiting the cumulative development of institutional research knowledge.

Overall, the study concludes that although postgraduate research at UDOM is expanding and increasingly aligned with global scholarly communication trends, there is a need to strengthen doctoral training capacity and promote a more balanced and inclusive approach to information use. Enhancing access to diverse scholarly resources, improving institutional visibility of local research outputs, and supporting advanced research training will be essential for improving both the quality and sustainability of postgraduate scholarship at the College of Natural Science.

VI. RECOMMENDATIONS

Enhancing access to diverse scholarly resources

University libraries should expand access to a wider range of scholarly materials beyond journal articles. While journals remain central, equal attention should be given to monographs, edited volumes, and institutional research outputs. Subscription to multidisciplinary databases should be strengthened to ensure continuous access to current and high-quality research materials.

Strengthening Institutional Repository use and visibility

The university should improve the functionality, accessibility, and visibility of its institutional repository. All postgraduate theses and dissertations should be systematically digitized and made easily searchable. Academic staff and students should be encouraged to cite institutional research outputs where relevant to promote knowledge reuse and strengthen local scholarship visibility.

Institutional repositories should be strengthened through proper digitization and promotion of postgraduate theses and dissertations to improve visibility and usage of local research outputs.

Postgraduate programmes should incorporate compulsory information literacy training to improve students' skills in selecting, evaluating, and using a wide range of academic sources.

Libraries should apply bibliometric analysis regularly to guide collection development decisions based on actual citation patterns of postgraduate students.

The university should promote research capacity in underrepresented disciplines such as Physics and Statistics through targeted support and improved research infrastructure.

Implications for collection development

The findings of this study provide important evidence for evidence-based collection development within the university library system. The dominance of journal articles as the most frequently cited resource indicates that postgraduate students primarily rely on current, peer-reviewed, and digitally accessible literature. This suggests that library collection development should prioritize the acquisition and maintenance of up-to-date journal subscriptions, particularly through major indexed databases. Continuous investment in electronic journal packages is therefore essential to support postgraduate research needs.

At the same time, the relatively low use of monographs, theses, and dissertations suggests a potential gap in awareness, accessibility, and integration of these resources into academic work. This implies that collection development should not only focus on journals but also strengthen the visibility and accessibility of institutional research outputs through well-developed digital repositories. Improving the discoverability of theses and dissertations may enhance their use as valuable sources of local and context-specific knowledge.

Furthermore, the declining citation of older materials and the preference for recent publications indicate that collection policies should prioritize currency of resources, particularly in fast-evolving scientific fields. However, the continued need for foundational knowledge also highlights the importance of maintaining a balanced collection that includes essential monographs and reference works.

Overall, the findings suggest that collection development at UDOM should be guided by actual citation behavior of postgraduate students, with a strong emphasis on electronic resources, improved institutional repositories, and strategic balancing between current journal literature and foundational scholarly materials.

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