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The University's Corporate Mission and Its Support for the Built Environment in Tanzania, with a Focus on Maintenance

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Abstract Concerns regarding poor building maintenance practices within African universities, in general, and within Tanzanian universities specifically, have been raised. This may be likely caused by, among other things, the improper alignment of universities' built portfolios with their corporate missions to support their strategic objectives. There may be inadequate knowledge on integrating maintenance management into the university's corporate mission. Poorly maintained facilities stifle the development of learning environments that support students and teachers in achieving their goals. This study seeks to create a framework for integrating maintenance within the university's corporate mission that may enhance optimal use of resources. The investigation targeted all eleven (11) universities in the Dar es Salaam region, but responses came from only nine (9) universities and colleges. Semi-structured interviews were employed to gather qualitative data. Through purposive sampling, 11 top management were selected, but only 9 availed themselves for the interviews. The data were analysed using content analysis using NVivo Plus 12 software. The findings revealed that although maintenance is integrated into the corporate missions of universities, its provisions do not trickle down to the operational level for some management reasons. The main reasons are a lack of qualified personnel at decision-making levels and a lack of maintenance policies in the institutions. The findings underscore the critical role of top management in prioritising maintenance within a university's corporate mission, hence the need for reward and punishment policies. It is therefore recommended that maintenance statements be followed up by including clear sections on maintenance and actionable implementation strategies to ensure the effective upkeep of institutional buildings. To that effect, a framework for a university corporate mission in line with maintenance in Tanzania is developed.

Keywords Universities, Colleges, Corporate Mission, Maintenance Management, Dar es Salaam, Tanzania

1. Introduction

Continuous maintenance is required to mitigate depreciation and ensure the building's optimal functionality over its entire lifecycle, contributing to achieving a Sustainable built environment. A vast amount of literature exists reporting on maintenance neglect and unsatisfactory conditions of facilities in public universities in Africa, in general, and in Tanzania specifically. For example, [1,2,3,4,5,6,7,8]. Maintenance preserves the financial value of a building [8]. Expertise in building maintenance has become indispensable for those involved in facilities maintenance and management.

However, the issue of building maintainability remains unresolved despite the numerous theories and hypotheses proposed [9]. [9] claims that a very unclear relationship exists between design and maintenance. Although several studies have dwelt on maintenance neglect in public buildings [3], [10], [11], little has been done in the area of integration of maintenance sections into a university's corporate missions in Tanzania. According to [12], the strategic alignment of universities' built portfolios with their corporate missions is critical for enhancing their educational impact and supporting their strategic objectives. The need to integrate maintenance considerations at pre-planning and planning stages is reflected in the need to ensure cost-effective maintenance and minimal operating costs during implementation and use.

[13] advocate, including maintenance considerations during the feasibility study, highlighting the need to integrate the design team into the pre-design phase.

Similarly, an integrated design process, including collaboration between all stakeholders, has been identified as essential for proactive maintenance planning from project inception. Where maintenance problems are properly addressed

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in the design phase. According to [14], [15], design teams must systematically address issues related to assessment, feasibility studies, performance evaluation, and establishment of design and decision criteria before implementation. Any university's physical infrastructure, including its buildings and other built facilities, derives its conceptual foundation and ongoing operational legitimacy from the institution's corporate mission and subsequent maintenance management processes. This relationship is vital for the efficient and long-term operation of existing and future facilities. They are apart from most other organisations. Consequently, the quality of university buildings directly influences the quality of education provided. [16] observed that universities possess a unique diversity of building types with complex operational needs and settings.

Consequently, the nature of the support infrastructure and the scope and type of the maintenance activities are influenced by the university's overall corporate mission. This study aims to examine the extent to which maintenance management is formally integrated into these foundational institutional directives.

1.1. Maintenance Theory

[17] argued that maintenance is compared to patient care in a hospital. This theory suggests that light treatment for light injuries directly relates to the patient needing light treatment. The same measures are applied to buildings with medium defects when patients need intermediate care before and after surgery. While on the one hand, patients become severely ill and require intensive care, on the other hand, buildings require regular maintenance and close monitoring. Consequently, this theoretical framework advocates for the need for both proactive and reactive maintenance strategies [18]. The theory emphasises one that frames infrastructure as a "patient" requiring continuous wellness management. It aligns beautifully with sustainability goals and could support diagnostic tools, user-centred planning, and performance benchmarks in the maintenance frameworks.

1.2. Building Maintenance Management

[19] [20] defined Maintenance management as a complex process involving organising, planning, directing, controlling, and coordinating maintenance services and activities to maximise return on investment. A balanced maintenance approach necessitates an equitable and unbiased management [13], [17].

Maintenance management has increasingly gained prominence as an essential tool in delivering better performance from buildings to satisfy users' requirements adequately [22].

1.3. University Corporate Missions in Tanzanian Universities

From a foundational vision, a corporate mission defines the institution's purpose and intended achievement methods. Generically, the provision and orientation of infrastructure components are intrinsically linked to their corporate mission statements and strategic endeavours. Consequently, the diverse activities of corporate institutions, often housed within and supported by their built environment, must be meticulously conceived, planned, constructed, and utilised as designed and finally diligently maintained [23].

The university's corporate strategy 2019/20-2029/30 of University A is to provide innovative and integrated learning, research, and public services that contribute to the national interest and beyond sustainability without compromising the quality of the environment, now and into the future. That of the University of B, for 2014-2023, identifies its mission as the unrelenting pursuit of scholarly and strategic studies, education, and training, and quality delivery of service for the development of self-reliant and sustainable socio-economic development. For College C, its Corporate Strategic Plan of 2014/15-2023/24 commits to providing high-quality training, research, and service in health and related fields and creating a highly organised and sustained socio-economic establishment in Tanzania and beyond. Corporate Strategic Plan 2019/20-2029/30 of *University A*, the corporate mission is to provide innovative and integrated learning, research, and public services that propel the development of the national interest and beyond sustainability without compromising the quality of the environment, now and into the future. *In its Corporate Strategic Plan of 2014-2023, University B identifies its mission as the unrelenting pursuit of scholarly and strategic studies, education, training, and quality service delivery to develop* self-reliant and sustainable socio-economic development. Similarly, *College C* in its Corporate Strategic Plan of 2014/15-2023/24, commits to top-quality training, research, and service in health and related fields and creates a highly organised and sustained socio-economic establishment in Tanzania and beyond. *University D*, guided by its Corporate Strategic Plan for 2013/14-2033, expresses its mission as 'to educate liberally and broadly qualified men and women to advance the frontiers of knowledge, disseminate it, and provide consultancy and advisory services to the public. Therefore, Tanzanian universities, as is the case elsewhere, are guided by corporate missions that share a common emphasis, articulated with distinct wording.

From the corporate mission, policies are derived for declaration of intent and guidelines to steer decisions and achieve desired objectives. The Estate Services Policy is the case in point, which, according to [24], has as its primary objective to improve the delivery of estate services efficiently and cost-effectively. The 2018 Estate Services Policy for the University further provides a framework that will facilitate operationalisation, specifically in building construction and infrastructure development, rehabilitation and maintenance of buildings, infrastructure and services, and equipment maintenance and repair. Similarly, University B established an Estates Services Policy in 2020 [25], including infrastructure and building rehabilitation provisions. These Estates Services Policies are typically derived directly from the university's broader corporate or strategic plans.

Despite these policy frameworks, reviews of university-built portfolios often reveal insufficient resources allocated

for the maintenance of buildings and associated infrastructure, leading to widespread despair. [26] explicitly attributes this disrepair to financial constraints, a reason that is always given indiscriminately. This excuse could be followed up even in other universities under study. Although allocating resources remains a critical challenge for planned and preventive maintenance, this study intends to look into other maintenance hurdles emanating from provisions of the corporate mission.

1.4. An Overview of Maintenance Management Practices in University Buildings

Maintenance in Tanzania universities and colleges is considered during the use of facilities, and even so, it is approached reactively [7]. It has been found that universities do not take a holistic approach to maintenance practice, translating what the corporate mission stipulates right through to planning, designing, implementation, and use. This action is often by default rather than design, resulting in poor maintenance accelerated by an inadequate budget set. A study by [1] on Nigerian universities in Lagos revealed that a lack of planned maintenance, inadequate maintenance policies, outdated security systems, and a shortage of qualified personnel significantly contribute to the deterioration of institutional facilities. These findings have led to maintenance challenges, such as the rapid deterioration of components, the incompatibility of new maintenance materials with old ones, and difficulties adapting spaces to meet emerging user requirements, as also reported in other cases [3], [10], [27], [28].

Historically, [29] notes that many public organisations, including public universities, regarded building maintenance as a necessary evil that would have no bearing on their core duties of running an educational institution. While [29] indicates that most Malaysian universities implement maintenance through corrective, periodic, and inspection-based approaches, these approaches often fail to deliver optimal value from building assets.

[30] states that the sustainability of a built facility depends upon its operation and maintenance, which is done by proper documentation and qualified professionals with the appropriate skills and knowledge.

[31] observed the absence of maintenance manuals in Nigerian higher education institutions. A maintenance policy and the subsequent plan are essential documents that guide maintenance programmes. A clear maintenance policy is essential, providing a framework for maintenance procedures [32]. The implementation of sound maintenance policies offers significant advantages, which require a thorough understanding from all stakeholders, particularly senior management and estate managers [32]. Establishing a maintenance policy ensures that buildings are maintained to be safe, healthy for the environment, comply with current legislation, and fit for their intended purpose [33], [34]. [35] points out that no statutory maintenance policy governing building maintenance requirements related to quality, health, and safety. Similarly, [36] found in a Tanzanian study that no policy enforces the minimum maintenance requirements. A maintenance plan is a guiding document for scheduling and implementing maintenance, detailing the necessary time, resources (including expert personnel), and budgetary allocations[37], [38], [39], [40].

1.5. Building Maintenance Frameworks

Several frameworks have been developed for building maintenance in higher learning institutions. Relevant to this study include: Improvement of maintenance practices using computerised Total maintenance management and system maintenance perspectives for Preventive maintenance practices, [32]; Maintenance strategies formulation, selection, and implementation [41]. An alternative maintenance management value-based model for university buildings [29]. A model of knowledge management concept for the management of buildings to improve the effectiveness of the building maintenance process and facility management [42]; maintenance management system (MMS) [33], Software, and maintenance program (guidelines) to improve the quality of maintenance of the buildings in educational institutions [43]. A Framework for Maintenance Strategic Planning. This framework links the maintenance function with the corporate strategy and integrates it with other functional areas. It ensures that top management integrates the organisation's mission, objectives, mission statement, and maintenance that reflect the situation [44]. It is this framework that the proposed framework in this study builds on for maintenance effectiveness.

2. Methodology

The research focused on Full-Fledged Universities and University Colleges in Dar es Salaam. This selection was pragmatic, given the significant increase in the number of such institutions in the region since the colonial era, reaching 11 by 2019 [45]. Furthermore, these institutions share similar climatic conditions (geographical location), which uniformly influence building deterioration over time. According to [46], Dar es Salaam city, situated at 6 51 S and 39 18 E, is categorised by a warm humid climate (tropical savanna-Aw). The annual mean maximum temperature varies between 29 ℃ and 32 ℃, while the annual mean minimum temperature varies between 19 ℃ and 25 ℃. The city's highest temperature is between December and March, while the cool period with relief in thermal stress is between June and September. Relative humidity remains high, about 75% most of the time, but it may vary from 55% daily to almost 100% at night [46].

Semi-structured interviews were employed to gather qualitative data. Purposive sampling was utilised to select key informants for interviews, specifically top management personnel (Vice-Chancellors (VCs) and Provosts). Due to the small number of available universities and colleges in the study area, this sampling strategy was considered appropriate. These specific respondents were chosen as they

are considered the primary custodians of university missions and possess reliable information pertinent to the study's objectives [47]. Only nine out of eleven universities and colleges initially targeted participated in interviews, with two declining to participate for what they termed as 'confidentiality reasons'.

A qualitative research strategy guided this study. It relied primarily on interviews with senior management. The interview method was chosen because it explored respondents' needs, desires, and perceptions, allowing for the collection of more detailed and accurate information than a questionnaire might have provided [48]. The researcher developed a set of questions designed to ascertain the extent to which the universities' corporate missions included maintenance and the methods used for carrying out and monitoring maintenance as guided by their Corporate Plans. Interviews were conducted primarily in person.

Content analysis was applied to the qualitative data analysis, following the recommendations of [49], [50]. NVivo 12 Plus software was used for data management and analysis. Responses from open-ended questions were transcribed into Microsoft Word™ as rich text files and subsequently imported into NVivo Version 12 Plus for thematic coding and analysis. In addition to interviews, relevant official documents were reviewed. These included University Corporate Plans (Mission statements), Strategic Plans, Maintenance Policies, Maintenance Plans, Estates Services Policies, and Action Plan Estates Services. These documents were instrumental in collecting data specifically focused on maintenance considerations, which helped to evaluate the extent of intervention as guided by respective Corporate Plans and to map the magnitude and status of maintenance implementation within each university. It is important to note that the absence of a specific maintenance strategic plan does not necessarily imply a lack of maintenance practice within university buildings. For confidentiality reasons, 'Case' numbers are used instead of actual university and college names throughout the study.

2.1. Ethical Considerations

An official letter from the researcher's university was obtained before data collection. This letter was intended to introduce the eleven universities and colleges in Dar es Salaam, facilitating access to information for study. Respondents were assured that their information was confidential and would be used solely for academic purposes before answering the research questions. Participation was voluntary, and respondents were given the option to decline. The researcher provided an email address to return responses. The use of offensive, discriminatory, or unacceptable language was strictly avoided during the distribution of the questionnaire and interviews.

Therefore, this section presents the population of the study, area of study, justification of the study population and area of the study, sampling techniques, research design, respondents, documents for review, tools used for data collection and analysis, and ethical considerations for conducting the research.

3. Results

3.1. Respondents' Profile

Out of the eleven targeted universities and colleges, nine (81.82%) participated in the interviews. Table 1 provides a detailed profile of the respondents, encompassing their demographics, professional backgrounds, positions, and years of experience. Most top management professionals interviewed were in planning roles or were academicians, with two respondents falling into these categories. The positions included Deputy Vice-Chancellor (DVC) and Planning Manager, with one respondent from each surveyed institution. Experience levels varied, with most respondents (three in each category) possessing between 1-10 years and 11-20 years of experience.

The nature of the respondents (qualifications and positions) may affect the type of responses given. This is especially true of the interpretation of the policy guidelines and the emphasis on the technical maintenance dictates for the university-built portfolio. For example, Figure 1, depicting the frequency of words generated from the Word Cloud, manifests the respondent's ill-informed perception of strategic maintenance ethos. One could interpret this as a decision maker's deficiency when making the right decision for strategic intervention in the maintenance management processes.

Table 1. Respondents' Profiles Participating in the Interview

Case	Profession	Position	Experience
1	Administrator	Administration Officer	1-10 Years
2	Planning officer	Director Planning and Finance (DPF)	11-20 Years
3	Political Science	Deputy Vice-Chancellor Planning, Finance and Administration (DVC PFA)	31-40 Years
4	Medical Doctor	Deputy Vice-Chancellor Planning, Finance and Administration (DVC PFA)	21-30 Years
5	Civil Engineer	Deputy Vice-Chancellor (DVC)	21-30 Years
6	Planning officer	Vice-Chancellor (VC)	11-20 Years
7	Academician	Planning Manager	1-10 Years
8	Academician	Deputy Vice-Chancellor (DVC)	1-10 Years
9	Planning and Resources Management	Planning Manager	11-20 Years

Figure 1. Word cloud for the University's Corporate Plan in line with the University Building Maintenance

Table 2. Crosstab for Institutions' Strategic Plan for Cases

Strategic Plan	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Action Plan Estates Policy	1	0	0	0	0	0	0	0	0
Estates Services Policy	1	0	0	0	1	0	1	0	0
Maintenance Manual	0	0	0	0	0	0	0	0	0
Maintenance Plan	1	1	1	1	1	1	1	0	1
Maintenance Policy	1	1	0	1	0	0	1	0	1
Medium-term Rolling Strategic Plan	1	1	1	1	0	1	1	1	0

Table 3. Matrix Coding Query indicating the frequency of discussion on the Strategic Plan with respective Cases

Strategic Plan	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Action Plan Estates Policy	1	0	0	0	0	00 0	0	0	0
Estates Services Policy	4	0	0	0	3	0	1	0	0
Maintenance Manual	0	0	0	0	0	0	0	0	0
Maintenance Plan	1	2	2	1	1	3	2	0	3
Maintenance Policy	1	4	0	2	0	0	1	0	5
Medium-term Rolling Strategic Plan	1	2	2	2	0	1	1	2	0

3.2. University Corporate Plan in Line with Maintenance

This segment examines the interplay between the University Corporate Plan (Mission) and maintenance practices, particularly where there is a Strategic Plan. These strategic plans comprise various components such as an Estates Services Policy, Maintenance Policy, Action Plan, Medium-term Rolling Strategic Plan, Maintenance Plan, and Maintenance Manual. Collectively, these strategic plans serve as a roadmap for the maintenance of university buildings. Data was collected from respondents across the nine surveyed universities and colleges in Dar es Salaam.

Table 2 presents a cross-tabulation indicating the extent to which universities have systematic procedures in their Corporate Plans concerning mission statements related to the maintenance of university buildings, strategic objectives, and specific strategic plans.

Collected data show that all nine (9) universities have Corporate Plans. Only one (1) university has an Action Plan Estates Policy; three (3) universities possess an Estates Services Policy; none of them have a Maintenance Manual; eight (8) universities have a Maintenance Policy; five (5)

universities have a Maintenance Policy, and seven (7) have a Medium-term Rolling Strategic Plan.

Table 3 provides insights into the frequency with which the 'Cases' (universities) are referred to within their respective Strategic Plans.

3.2.1. Action Plan Estates Policy

Only case 1 has a frequency count of "1" for consideration in the Action Plan Estates Policy. This suggests that only this university has formalised its approach to maintenance through such a plan, underscoring the significant emphasis placed on maintenance within this institution. During an interview with top management, the majority said, "*We don't have an Action Plan for Estates Policy, as a result, we carry out reactive maintenance in our university at a high cost*". This indicates that the budget is not adequately prepared, resulting in high costs due to ad hoc maintenance.

3.2.2. Estates Services Policy

Only three (3) cases have been reported in the discussion of Estates Services Policy issues regarding the maintenance of university buildings. These are Case 1 with a frequency of "4", Case 5 with a frequency of "3", and Case 7 with "1". Less incorporation of maintenance in university missions is justified by the availability of a few estate services policies in universities and colleges. During the interview, Top management stated that "*we don't have Estates Serves policy, which is why we carry ad hoc maintenance with emergency budget*". This justifies the lack of knowledge to prepare the document and negligence in prioritising maintenance.

3.2.3. Maintenance Manual

Notably, no cases have been presented or discussed in the maintenance manual. During the interview,

Top management stated that "*we don't have a maintenance manual, thus we carry out ad hoc maintenance with emergency budget and no asset specification*". This justifies negligence by top management in requesting a maintenance manual after construction.

3.2.4. Maintenance Plan

Eight cases have frequency, as discussed in maintenance plans. For cases 6 and 9, the highest frequency is three. The frequency is determined by discussing how the maintenance plan fits into maintenance practices. A higher frequency suggests a greater emphasis on the maintenance plan as a guideline for building maintenance implementation. These findings highlight the varying degrees to which universities consider maintenance plans for their buildings. During the interview, top management agreed that they have a maintenance plan derived from the corporate or strategic plans. They said, "W*e have a maintenance plan, but the problem is how to implement it. We implement maintenance when needed. The university sets a yearly maintenance budget to maintain the facilities*, resulting in ad hoc and inadequate maintenance.

3.2.5. Maintenance Policy

The higher the frequency, the higher the emphasis on adhering to and considering maintenance policy for university and college buildings, such as Case 9, with a frequency of "5. The results indicate that maintenance in university and college buildings is not as important. During the interview, top management said, "*Maintenance policy issues stipulate how maintenance should be implemented. We incorporate maintenance within the university's corporate mission through a maintenance policy and guidelines. We use all construction experts during construction to ensure that the buildings are fit, suitable, and of a high standard, at least lasting for ten years without demanding major repairs".*

3.2.6. Medium-Term Rolling Strategic Plan

The following cases each show a discussion frequency of "2" concerning their medium-term rolling strategic plans. While these plans are discussed, the observed inadequacy in maintenance, often stemming from reactive approaches, suggests that less emphasis is practically placed on these plans for addressing university maintenance issues. *"We have it, and within our five-year strategy plan, we have addressed issues related to university building maintenance," others said 'Maintaining buildings is the rebirth of meeting our university mission; however, there is no maintenance section. Therefore, maintenance is not considered*.

3.2.7. Word Cloud Analysis: University Corporate Plan and Building Maintenance

Figure 1 presents a word cloud for the most frequently discussed terms related to aligning university corporate plans with building maintenance. The size of each word's font directly correlates with how often they are discussed in the interviews.

Notably, "**Maintenance**" emerged as the most prominent term because it is the study topic. Secondly, the perceived criticality among respondents for university and college buildings in Tanzania must be understood. The three following terms in rank are followed. According to the respondents, these are 'Buildings', 'Plan', 'University', and 'Equipment'. Terms directly related to the Corporate Plan have received little emphasis! This is a pointer to the system deficiency in the strategic approach to maintenance management based on the institution's corporate mission and subsequent maintenance management processes. This deficiency reinforces the central importance of planned maintenance, policy integration, budgeting, and facility management in university environments. Therefore, the word cloud suggests a systematic undervaluation of proactive maintenance in higher education institutions, despite its critical role in sustaining infrastructure and quality education.

4. Discussion

The findings of this study reveal that all universities' Corporate Plans have a common purpose of existence as

places of advanced learning, planning their structures and objectives to focus on a variety of academic programmes, research, and community service. For a university to perform its core functions effectively, it should be supported by appropriate and adequate physical surroundings (built environment). These include lecture rooms/theatres, libraries, laboratories, research hubs, infrastructure, and other outdoor spaces. The design and functionality of these spaces directly impact the training experience. The study was interested in following up on the design, implementation, and use of these spaces from the Corporate Mission point of view.

The findings indicate that maintenance is not fully integrated into the corporate mission of the surveyed universities. Each institution had shortcomings in the various key maintenance documents. This highlights a systemic gap in integrating maintenance considerations within their core corporate directives. This omission contributes significantly to the observed prevalence of inadequate and reactive maintenance practices. For instance, only Case 1 had an Action Plan for Estates Policy, suggesting a limited formal integration of maintenance into the corporate mission across most institutions. This observation is consistent with the concerns expressed by [29] regarding prioritising maintenance in university settings. Although Case 1's Action Plan for Estates Policy provided a framework for rehabilitation and maintenance, its implementation was reportedly hindered by budgetary constraints, lack of expertise, and insufficient maintenance knowledge. This often resulted in ad-hoc maintenance practices and overall inadequate maintenance in cases 2 through 9. These impacts of neglecting comprehensive action plans are consistent with the comments of [4,6,10,24], who linked them to increased maintenance costs.

Furthermore, only Cases 1, 5, and 7 reported an Estates Services Policy. The general absence of such policies in other institutions is associated with poor maintenance. This is consistent with findings from [1], who attributed similar issues to a lack of documentation knowledge and an inadequate budget. This argument is further supported by [27], who observed that an insufficient budget often attracts corrective and reactive maintenance. Further, despite owning the Estates Services Policy, Cases 1 and 5 faced the challenge of failure to control the limited government resources allocated, a situation linked to reactive maintenance practices.

The absence of maintenance manuals across all surveyed cases was significant. This is consistent with observations by [31] in Nigerian higher education institutions. This lack of document preservation was attributed primarily to the age of some buildings, particularly those constructed during the colonial era, making document preservation difficult. Moreover, it was not established practice among major contractors to hand over maintenance manuals upon project completion.

Most universities (Cases 1 to 7 and 9) reported having maintenance plans, which theoretically should facilitate the systematic upkeep of their buildings. However, their implementation has encountered challenges such as budgetary constraints and a lack of knowledge on how maintenance should be integrated into the pre-design phase of projects. These challenges are similar to those identified by [33]; Nigeria's lack of an independent maintenance authority, poor governance, and inadequate feasibility studies in national planning are among the reasons. Contrary to the perspectives of scholars like [35] who linked successful maintenance to formalised implementation plans, institutions still conducted maintenance inadequately. The existence of the plans was confirmed by senior management, but difficulties in their practical implementation were noted. For instance, University A's (2019) corporate plan, Section 5, specifically addresses the maintenance of existing university buildings.

Similarly, Cases 1, 2, 4, 7, and 9 indicated the presence of maintenance policies, contrasting with [34] findings, which show that these universities primarily engaged in corrective maintenance. This reliance on reactive approaches is also supported by [23,24,30]. Budgetary limitations and a lack of knowledge regarding pre-design maintenance integration in institutions like Case 1, Case 2, and Case 4. This observation is consistent with the arguments [4,6,10,24] put forward.

Furthermore, many universities (Cases 1, 2, 3, 4, 5, 6, 7, and 8) reported having a medium-term rolling strategic plan, which typically includes a maintenance section as the basis of maintenance policies. However, maintenance quality has remained suboptimal at these universities. The analysis suggests that these medium-term rolling strategic plans concerning university maintenance issues are not given enough practical attention, despite their theoretical importance.

The reviewed documents indicate that maintaining existing university buildings and infrastructure is part of the university's corporate mission. However, the widespread issue of inadequate maintenance can be attributed to a lack of maintenance knowledge among implementers and senior management. This argument is supported by [30].

The study effectively utilised the patient theory as an analogy for building maintenance, as advocated by [14,15]. This theory states that building maintenance can be like caring for a patient in a hospital, with the level of care varying based on the patient's condition. They are similar to patients needing light treatment for minor injuries. Buildings with medium defects that require intermediate care mirror patients in pre- and post-operative situations. Lastly, severe building conditions requiring routine maintenance and detailed monitoring are comparable to those of critically ill patients requiring intensive care. This theoretical lens effectively highlights the need for varying maintenance intervention levels based on the built assets' condition and criticality.

From above discussions; Everyone from the top management to the bottom level must follow the maintenance plan and manual directives. Everyone means the people or section that is appointed for maintenance purposes such as Estate Managers, maintenance coordinators, directors, Heads of department, deans and lecturers. Systematic gaps in integrating maintenance consideration within their core corporate directives must be fulfilled, and it can be done by reward and punishment policies, special training focusing on the relationship between the surrounding environment and academic growth, and relating to students' future careers.

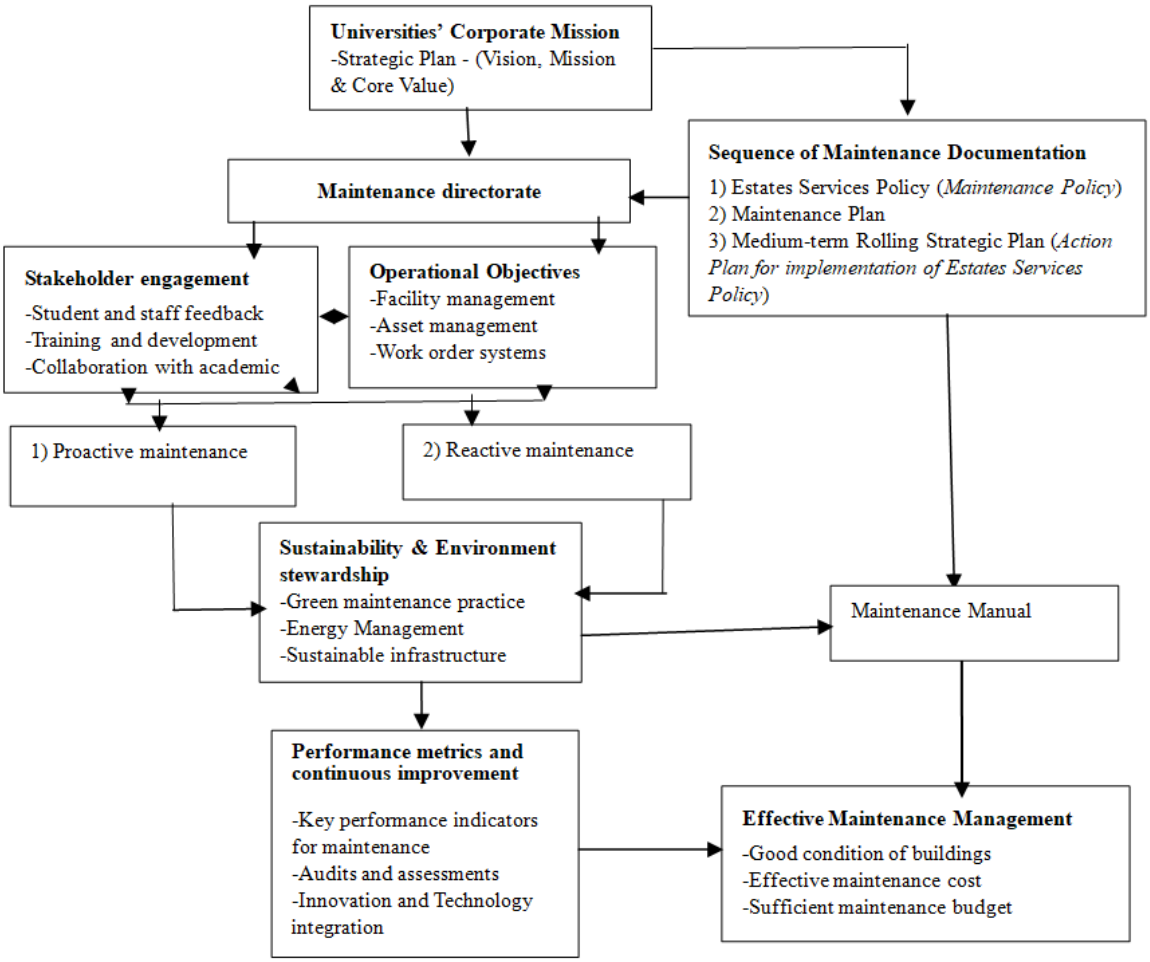

Figure 2. The proposed developed university's corporate mission framework is aligned with maintaining universities and colleges in Tanzania

Also, the following is the developed framework presenting university's corporate mission framework aligned with maintenance operations, integrating strategic, operational, and sustainability goals to ensure university infrastructure, resources, and services support its academic mission obtained from findings of the study.

Figure 2 presents the developed university's corporate mission framework, which is aligned with maintenance operations and integrates strategic, operational, and sustainability goals to ensure university infrastructure, resources, and services support its academic mission, as obtained from the study's findings.

This framework developed includes the incorporation of maintenance within the university's corporate mission in Tanzania, which considers supporting the built environment, contrary to a framework developed by [29], [38], [40]. The framework comprises university missions, maintenance sections and documents, Performance metrics and continuous improvement, Stakeholder engagement, Operational Objectives, and Sustainability & environmental stewardship. The argument relates to the study by [41]. The frameworks developed add knowledge on how building maintenance in universities is carried by incorporating maintenance in university' corporate mission.

5. Conclusions

This study shows a significant lack of integration of maintenance management within the corporate missions of universities in Tanzania. This incomplete incorporation is primarily attributable to several interconnected factors: the scarcity of comprehensive maintenance documents, the absence of explicit maintenance sections within university and college corporate mission statements, a lack of knowledge regarding this integration, insufficient involvement from top management in maintenance affairs, and pervasive budgetary constraints, as also justified in the Top Management interview conducted. For effective building maintenance in Tanzanian universities, and to genuinely fulfil their missions, it is imperative that corporate missions and maintenance documents explicitly state how maintenance will be carried out and by whom. Furthermore, top management must assume responsibility for undertaking university corporate missions rather than considering operationalisation for operational managers. It also aims to create a conducive environment in university buildings, motivating students, teachers, and other workers to join the university. The maintenance budget must be strategically aligned with the university's maintenance plans, with priority given to maintenance.

While several universities in this study possess various maintenance policies, the prevailing practice remains reactive rather than proactive. Despite the observed prevalence of maintenance plans, their implementation is often inadequate. A stronger association between the university's mission and maintenance, especially supported by top management, is essential for the successful execution of a maintenance plan execution. It stresses the need to include dedicated maintenance sections in strategic documents describing maintenance procedures. The findings show a missing link between the university's corporate mission and the maintenance plan. The prominence of "maintenance" in the word cloud further emphasises its perceived importance by university stakeholders. The university building maintenance department needs skilled maintenance experts to manage the university building effectively. The availability of realistic maintenance plans and adequate budgets will significantly contribute to the successful implementation of maintenance, reducing the degraded condition of university buildings. Ultimately, the findings of this study reflect the importance of top management's proactive maintenance decisions, as articulated through universities' corporate missions.

The framework developed may be helpful to the university for effective maintenance management, as per Figure 2. The framework developed will reduce maintenance problems when effectively applied by top management, estate managers, and maintenance practitioners because it gives the right path to incorporating maintenance within universities' corporate mission.

This study strongly suggests that university corporate missions must explicitly incorporate maintenance for the efficient and sustainable maintenance of universities and college buildings.

Disclosure

The authors declare that they have no known competing interests to declare.

REFERENCES

[1] S. O. Oyenuga, O. E. Akinsola, P. O. Hussaini, and A. O. Fatokun, "Maintenance of university facilities in developing country: Case study of Lagos State University Ojo Nigeria," *Mediterr. J. Soc. Sci.*, vol. 3, no. 11, pp. 69–75, 2012, doi: 10.5901/mjss.2012.v3n11p69.

[2] M. Mendonça, *Developing teaching and learning in Mozambican higher education : a study of the pedagogical development process at Eduardo Mondlane University*, no. 56. 2014.

[3] J. N. Mkilania, "Factors affecting best maintenance practice in Tanzania public sector," *International Journal of Mechanical Engineering and Technology*, vol. 7, no. 3. pp. 139–149, 2016.

[4] A. D. ADAMU and W. SHAKANTU, "CONDITION ASSESSMENT OF STUDENT HOSTEL BUILDING ON CAMPUSES OF FEDERAL UNIVERSITIES IN NORTH-CENTRAL NIGERIA," *J. Constr. Proj. Manag. Innov.*, vol. 6, no. 1, pp. 1330–1338, 2016.

[5] A. I. Kanuti and S. Alananga, "Occupiers' Maintenance Initiatives in Government Owned Housing Units in Dar es Salaam Tanzania," *Int. J. Constr. Eng. Manag.*, vol. 6, no. 4, pp. 133–147, 2017, doi: 10.5923/j.ijcem.20170604.02.

[6] O. Joseph Oyewale, "Facility Management of Nigerian Universities: Case of University of Lagos, Lagos and the Bells University of Technology, Ota, Nigeria," *Int. J. Built Environ. Sustain.*, vol. 5, no. 2, pp. 134–144, 2018, doi: 10.11113/ijbes.v5.n2.257.

[7] T. A. Gwimile, "Holistic maintenance management for higher learning institution buildings in Tanzania," *Int. J. Build. Pathol. Adapt.*, 2024, doi: 10.1108/IJBPA-06-2024-0121.

[8] P. Michael, "The Value of a Good Maintenance Management System," Facilities Management Resources Magazines and Periodicals. Accessed: Feb. 26, 2019. [Online]. Available: http://www.fmlink.com/ProfResources/Magazines/artical.cgi?FM world:fmworld1220.html.

[9] A. Adejimi, "POOR BUILDING MAINTENANCE IN NIGERIA: ARE ARCHITECTS FREE FROM BLAMES? Being paper presented at the ENHR International conference on "Housing: New Challenges and Innovations in Tomorrow's Cities" in Iceland between 29," pp. 1–15, 2005.

[10] K. S. Zeni and G. J. Kikwasi, "Factors affecting maintenance cost of public buildings: case study of Tanzania Buildings Agency and National Housing Corporation," *Int. J. Build. Pathol. Adapt.*, vol. 41, no. 5, pp. 905–1098, 2023, doi: 10.1108/IJBPA-08-2021-0107.

[11] A. Hauashdh, J. Jailani, I. Abdul Rahman, and N. AL-fadhali, "Building maintenance practices in Malaysia: a systematic review of issues, effects and the way forward," *Int. J. Build. Pathol. Adapt.*, vol. 38, no. 5, pp. 653–672, 2020, doi: 10.1108/IJBPA-10-2019-0093.

[12] A University, "Action Plan Estates Policy," *university press*. pp. 1–18, 2018.

[13] E. I. Khalid, S. Abdullah, M. H. Hanafi, S. Y. Said, and M. S. Hasim, "The consideration of building maintenance at design stage in public buildings: The current scenario in Malaysia," *Facilities*, vol. 37, no. 13–14, pp. 942–960, 2019, doi: 10.1108/F-04-2018-0055.

[14] K. Adeyeye, P. Piroozfar, M. Rosenkind, G. Winstanley, and I. Pegg, "The impact of design decisions on post occupancy processes in school buildings," *Facilities*, vol. 31, no. 5, pp. 255–278, 2013, doi: 10.1108/02632771311307142.

[15] O. A. Lateef, "Building maintenance management in Malaysia," *J. Build. Apprais.*, vol. 4, no. 3, pp. 207–214, 2009, doi: 10.1057/jba.2008.27.

[16] A. L. Olanrewaju and A. R. Abdul-Aziz, *Building maintenance processes and practices: The case of a fast developing country*. 2015. doi: 10.1007/978-981-287-263-0.

[17] P. Syagga and J. Malombe, "Development of Informal Housing in Kenya: Case Studies of Kisumu and Nakuru Towns," Nairobi, Kenya, 1995.

[18] N. Matindi, "An investigation on the influence of housing maintenance -culture in the management of public housing in

Nairobi," Nairobi University, 2013.

[19] S. H. Zulkarnain, E. M. A. Zawawi, M. Y. A. Rahman, and N. K. F. Mustafa, "A review of critical success factor in building maintenance management practice for university sector," *World Acad. Sci. Eng. Technol.*, vol. 77, no. 5, pp. 195–199, 2011.

[20] E. M. A. Zawawi, S. N. Kamaruzzaman, Z. Ithnin, and S. H. Zulkarnain, "A conceptual framework for describing CSF of building maintenance management," *Procedia Eng.*, vol. 20, pp. 110–117, 2011, doi: 10.1016/j.proeng.2011.11.145.

[21] W. F. Wong, A. Olanrewaju, and I. P. Lim, "Key determinants of building maintenance in hospitals: the perspective of maintenance personnel," *Facilities*, vol. 40, no. 13/14, pp. 879–894, 2022, doi: 10.1108/F-03-2022-0039.

[22] M. A. Akomolafe, F. O. Ajao, and O. W. Oyewo, "Assessing the Efficiency and Effectiveness of Maintenance Management Practices in Selected Private Institutions," vol. 24, no. 2, pp. 46–51, 2023.

[23] A. David and N. Manop, "Issues in Building Maintenance: Property Managers'Perspective," *J. Archit. Eng.*, no. December, pp. 117–132, 1999.

[24] A University, "Final MTRSP 2020-2025 from 57th Council - internally reviewed Dec2019." 2019.

[25] University of B, "University of B Estates Services Policy," *Estates Serv. Policy*, 2020.

[26] A University, "ARU MAINTINANCE PLAN." 2017.

[27] K. Agyekum, A. M. A. Dompey, H. Pittri, and E. A. Botchway, "Design for maintainability (DfM) implementation among design professionals: empirical evidence from a developing country context," *Int. J. Build. Pathol. Adapt.*, 2023, doi: 10.1108/IJBPA-06-2023-0078.

[28] A. A. E. Othman and A. R. Kamal, "A framework for enhancing building maintainability through facilitating early suppliers' involvement in the design process," *J. Eng. Des. Technol.*, vol. 22, no. 4, pp. 1231–1256, 2024, doi: 10.1108/JEDT-02-2022-0090.

[29] A. L. A. Olanrewaju, M. F. Khamidi, and A. Idrus, "Quantitative analysis of defects in Malaysian university buildings: Providers perspective," *J. Retail Leis. Prop.*, vol. 9, no. 2, pp. 137–149, 2010, doi: 10.1057/rlp.2010.2.

[30] J. H. . Lai, "Building operation and maintenance: education needs in Hong Kong," *Facilities*, vol. 28, no. 9/10, pp. 475–493, 2010, doi: 10.1108/02632771011057206.

[31] O. Blessing, J. Richard, and A. Emmanuel, "Assessment of building maintenance management practices of higher education institutions in Niger state – Nigeria," *J. Des. Built Environ.*, vol. 15, no. 2, pp. 1–14, 2015, doi: 10.22452/jdbe.vol15no2.4.

[32] S. K. Sharma, "Maintenance reengineering framework: a case study," *J. Qual. Maint. Eng.*, vol. 19, no. 2, pp. 96–113, 2013, doi: 10.1108/13552511311315922.

[33] B. F. Ogunbayo, C. O. Aigbavboa, W. D. Thwala, O. I. Opeoluwa, and D. Edwards, "Validating elements of organisational maintenance policy for maintenance management of public buildings in Nigeria," *J. Qual. Maint. Eng.*, 2022, doi: 10.1108/JQME-05-2021-0039.

[34] P. J. Cobbinah, "Case Study of Selected Institutions in the Ashanti Region of Ghana," Kwame Nkrumah University of Science and Technology, Kumasi, 2010.

[35] B. P. Issn, "Effective Maintenance Policy As a Tool for Sustaining Housing Stock in Downturn Economy," *J. Build. Perform.*, vol. 1, no. 1, pp. 93–109, 2010.

[36] A. J. Karwima, "Development of policy framework for the assessment of the condition and maintenance of buildings in Tanzania," Ardhi University, 2009.

[37] N. Gohardani, T. A. Klintberg, and F. Björk, "Turning building renovation measures into energy saving opportunities," *Struct. Surv.*, vol. 33, no. 2, pp. 133–149, 2015, doi: 10.1108/SS-09-2013-0034.

[38] S. G. Mong, S. F. Mohamed, and M. S. Misnan, "Key strategies to overcome cost overruns issues in building maintenance management," *Int. J. Eng. Technol.*, vol. 7, no. 2, pp. 269–273, 2018, doi: 10.14419/ijet.v7i2.29.13330.

[39] N. Wahi, R. Mohamad Zin, V. Munikanan, I. Mohamad, and S. Junaini, "Problems and Issues of High Rise Low Cost Housing in Malaysia," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 341, no. 1, 2018, doi: 10.1088/1757-899X/341/1/012027.

[40] A. I. Che-Ani and R. Ali, "Facility management demand theory: Impact of proactive maintenance on corrective maintenance," *J. Facil. Manag.*, vol. 17, no. 4, pp. 344–355, 2019, doi: 10.1108/JFM-09-2018-0057.

[41] R. S. Velmurugan and T. Dhingra, "Maintenance strategy selection and its impact in maintenance function: A conceptual framework," *Int. J. Oper. Prod. Manag.*, vol. 35, no. 12, pp. 1622–1661, 2015, doi: 10.1108/IJOPM-01-2014-0028.

[42] A. Almarshad, I. Motawa, and S. Ogunlana, "Knowledge management for public building maintenance in Kuwait," *Assoc. Res. Constr. Manag. ARCOM 2010 - Proc. 26th Annu. Conf.*, no. September, pp. 877–886, 2010.

[43] F. M. C. Ferreira and H. A. de Souza, "Management for maintenance of public education," *Gest. e Prod.*, vol. 28, no. 1, pp. 1–17, 2021, doi: 10.1590/1806-9649.2020V28E4894.

[44] U. Al-Turki, "Methodology and theory a framework for strategic planning in maintenance," *J. Qual. Maint. Eng.*, vol. 17, no. 2, pp. 150–162, 2011, doi: 10.1108/13552511111134583.

[45] The Tanzania Commission for Universities, "State of University Education in Tanzania 2018," Dar eS Salaam, 2019.

[46] M. M. Baruti, M. W. Yahia, and E. Johansson, "Spatial and temporal variations of microclimate and outdoor thermal comfort in informal settlements of warm humid Dar es Salaam, Tanzania," *Heliyon*, vol. 10, no. 1, pp. 1–14, 2024, doi: https://doi.org/10.1016/j.heliyon.2023.e23160.

[47] M. Saunders, P. Lewis, and A. Thornhill, *Research Methods for Business Students*, 4th ed. London: Prentice Hall, Pearson, 2007.

[48] C. R. Kothari, *Research methodology: methods and techniques*, 4th Editio. New Delhi: New Age International (P) Ltd, 2019.

[49] S. Andrew, Y. Salamonson, and E. J. Halcomb, "Integrating mixed methods data analysis using NVivo: An example examining attrition and persistence of nursing students," *Int. J. Mult. Res. Approaches*, vol. 2, no. 1, pp. 36–43, 2008, doi: 10.5172/mra.455.2.1.36.

[50] V. Braun and V. Clarke, "Thematic analysis, APA Handbook of Research Methods in Psychology," *APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological.*, vol. 2. pp. 57–71, 2012.