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Title: Effect of Project Management Information Systems on Implementation of Orora Wihaze Project in Rwanda

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Abstract:

This study assessed the effect of project management information systems (PMIS) on implementation success of the Rwanda Orora Wihaze project. A census survey design was used among 130 stakeholders. Questionnaires and documentation were used in data collection. Descriptive and inferential statistics including correlation and regression analysis were utilized. Results showed PMIS infrastructure, quality, security and use positively influence project implementation. Additionally, 76.7% variation in project success was accounted for by PMIS elements. The study recommends organizations adopt PMIS, with focus on robust infrastructure and stringent quality assurance, to enhance project outcomes.

Keywords: project management, information systems, system quality, implementation, Rwanda

Introduction:

Increasing global competition means effective project management is crucial. However, projects worldwide continue battling budget and deadline overruns and unsatisfactory outcomes. Particularly in Rwanda's agricultural sector, lack of technology hampers productivity as outdated techniques persist. This study assessed the effect of project management information systems (PMIS) on the Orora Wihaze project spanning 8 Rwandan districts. The Orora Wihaze project has faced struggles such as issues like poor planning, documentation issues and time variations. These issues significantly stalled 32 out of 110 of the project's initiatives leading to termination.

Methodology:

A quantitative approach incorporated descriptive and correlational survey designs among the population of 130 project stakeholders, composed of staff and partners. Census sampling was suitable given the small size. The variables studied were the PMIS sub-components of infrastructure, quality, security and usage. Primary data collection relied on questionnaires and documents. Premised on related models such as the Technology Acceptance Model, analysis encompassed descriptive statistics. This looked at central tendencies and variation. Additionally, correlation analysis investigating relationships, plus regression modeling determining variable impacts were utilized.

Results and Discussion:

The findings revealed a positive medium strength Pearson correlation of 0.425** between IT infrastructure and project implementation success. This relationship was statistically significant ($p < 0.01$). The implication is that enhancements to IT infrastructure may contribute to gains in project implementation success, however the impact may not be as substantial as other integral factors at play.

Further regression analysis illuminated that incremental improvements of single units across the PMIS areas of infrastructure, quality, security and system usage corresponded to respective increases in project implementation success of 0.128, 0.500, 0.341 and 0.113 units.

Of note, system quality demonstrated the most sizable influence aligned with past literature. For example, Lee et al. (2018) cautioned that information defects undermine managerial decisions and hence recommended integrated systems to bolster output quality. The current findings confirm that with every one unit improvement in the quality of PMIS systems, organizations can expect a 0.5 unit boost in project implementation success.

Conclusion:

This study made important empirical contributions by quantifying the impact of project management information systems (PMIS) on implementation success of the Rwanda Orora Wihaze project, an understudied context.

Notable findings revealed statistically significant positive relationships between all PMIS components and project implementation outcomes. Specifically, regression analysis found that single unit improvements in infrastructure, quality, security and system usage corresponded with project implementation gains of 0.128, 0.500, 0.341 and 0.113 units respectively.

Additionally, the four PMIS variables collectively accounted for 76.7% of the variation in project success. This highlights the substantial role of IT systems in managing and facilitating the realization of project goals.

The conclusions underscore that organizations should leverage PMIS as an integral tool for optimizing project delivery and performance. Priority areas to address include building robust infrastructure foundations, enhancing quality assurance around information systems, strengthening system security, and promoting adoption across stakeholders through training and support.

By empirically substantiating the pathways and magnitude through which PMIS enhances project implementation success in the understudied locale of Rwanda, this research bridges important knowledge gaps. It directionally informs both scholarly understanding and applied practice regarding the high-yield areas to focus IT investments to amplify project management efficacy in this rapidly developing region.

Further studies can build on this work by investigating the remaining factors influencing variation in project success. Additionally, scholars should explore cultural nuances affecting uptake and impacts of PMIS implementation across Rwanda's diverse organizational landscape. Nonetheless, the current findings provide an impetus for the heightened integration of IT infrastructure to bolster project performance amidst the accelerating pace of digitization globally.

Recommendations

Based on the statistically significant positive relationships found between all PMIS components and project implementation success, it is recommended that organizations strongly consider adopting project management information systems to improve project outcomes.

Specific high-yield areas to target include:

Infrastructure Investments:

Allocate resources towards building robust IT infrastructure to enable PMIS performance - e.g. strong networks, ample data storage, backup systems. As connectivity expands globally, infrastructure shortfalls can severely constrain PMIS capabilities despite availability of software systems.

Quality Assurance:

Institute rigorous quality assurance practices around information systems supporting project management, including accuracy checks, relevance evaluations, consistency assessments and improving comprehensibility of system outputs. Managerial decisions are only as sound as the underlying information.

Security Protocols:

Prioritize and continuously strengthen IT security protocols through encryption, access control policies, frequent password changes, stringent cybersecurity frameworks and regular auditing procedures to protect sensitive organizational project data against rapidly evolving technological threats.

User Training Programs:

Conduct expansive and ongoing training programs alongside system rollouts to build stakeholder competency, ease adoption barriers and promote intent-to-use among project team members in applying PMIS tools. System advantages cannot materialize absent user acceptance and utilization.

Furthermore, future research should investigate why 23.3% of variation in Orora Wihaze project success remained unexplained to home in on potential sociocultural determinants unique to organizational contexts like Rwanda. Local nuances influencing team dynamics or technology acceptance may further need to be addressed to maximize systems usage. Nevertheless, by resourcefully implementing the foregoing recommendations centered on infrastructure, quality, security and training, institutions can amplify returns on IT investments in advancing project success.

Limitations

While this study on the effect of project management information systems (PMIS) makes important empirical and practical contributions, certain limitations provide opportunities for future research.

Firstly, the scope was restricted to only 130 stakeholders from the Rwanda Orora Wihaze project. While a census approach helped characterize this project, the findings may not extend fully to projects in other geographic locales or industrial sectors. Additional confirmatory work is hence

required to determine the generalizability of the impact magnitudes quantified here across myriad project types.

Secondly, data collection relied predominantly on self-reported questionnaires. The incorporation of objective administrative datasets around budgetary indicators or quality metrics can enrich the dimensions of project success analyzed in follow-up studies.

Additionally, the examination of IT systems was confined only to the overarching categories of infrastructure, quality, security and utilization. Future research can adopt more fine-grained measures around sub-components like network architectures, end-user experiences, interface designs or data protections to obtain highly targeted assessments.

Finally, the investigation explored only success seen during project implementation periods rather than long-term post-project outcomes. As organizations increasingly strategize projects within broader e-transformation initiatives, expanded research is imperative to uncover how institutionalizing IT systems for project execution shapes enduring performance.

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Conflicts of Interest

The authors have no conflicts of interest to disclose regarding the publication of this research. There was no external organizational or industry sponsorship provided for conducting this independent empirical study on project management information systems. The entire trajectory from conceptualization to analyses solely represented a partial fulfillment of graduation requirements for the Master's program in Project Management at the University of Kigali. All research decisions, methodological selections and submission choices occurred autonomously absent any undue institutional or private influencers. Thus, the underlying motive was purely academic rather than financial or otherwise.

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