

Leveraging Digital Health Tools Within Project Portfolio Management for Scalable Community-Based Care

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Abstract

The integration of digital health tools into healthcare project portfolio management (PPM) has emerged as a transformative strategy to address systemic challenges in community-based care, particularly in underserved populations. This study explores how digital health tools, including electronic health records (EHRs), mobile health (mHealth) applications, telemedicine platforms, and predictive analytics, can enhance scalability, improve care coordination, and promote sustainability in healthcare delivery. Employing a qualitative research design, data were gathered through semi-structured interviews with 20 healthcare professionals engaged in community health initiatives across three states in Nigeria with significant health disparities. The findings demonstrate that digital tools significantly improve communication, optimize resource allocation, and enable real-time decision-making within PPM frameworks. However, persistent barriers, such as inadequate infrastructure, limited digital literacy, and insufficient training, hinder seamless integration. This research offers actionable insights for healthcare leaders, policymakers, and practitioners seeking to leverage digital transformation to optimize community-based care, emphasizing the need for robust training programs and infrastructure investments.

Keywords: *Digital Health, Project Portfolio Management, Community-Based Care, Electronic Health Records, Mobile Health, Telemedicine, Scalability, Healthcare Delivery, Underserved Communities.*

I. INTRODUCTION

The rapid digital transformation of healthcare has reshaped service delivery, offering innovative solutions to longstanding challenges, particularly in underserved communities where access to traditional healthcare infrastructure is limited (World Health Organization [WHO], 2021). The convergence of digital health tools and project portfolio management (PPM) provides a strategic framework for healthcare systems to manage multiple initiatives concurrently, align projects with organizational goals, and maximize impact. As the demand for community-based care grows due to aging populations, rising chronic disease prevalence, and persistent health disparities, the adoption of scalable, efficient, and data-driven approaches has become critical.

PPM is a structured methodology that enables healthcare organizations to coordinate multiple projects, optimize resource allocation, and evaluate outcomes against strategic objectives (Patanakul & Milosevic, 2009). When integrated with digital health tools—such as telemedicine platforms, mobile health (mHealth) applications, electronic health records (EHRs), and

predictive analytics—PPM can address key challenges in community-based care, including fragmented service delivery, limited access to specialists, and inefficient documentation practices (Mesko et al., 2017). These tools facilitate real-time data sharing, enhance patient engagement, and support evidence-based decision-making, ultimately improving care quality and accessibility (Topol, 2019).

Despite the promise of digital health, many healthcare systems face obstacles in integrating these technologies into PPM frameworks. Issues such as inadequate digital literacy, unreliable internet connectivity, and concerns over data privacy and governance continue to impede scalability and sustainability (WHO, 2022). This study investigates the effectiveness of leveraging digital health tools within PPM to enhance care coordination, improve decision-making, and support long-term scalability in community-based healthcare initiatives. By drawing on the experiences of healthcare professionals actively managing community health programs, this research provides a nuanced understanding of the opportunities, challenges, and

practical implications of digital health integration in structured project environments.

II. LITERATURE REVIEW

The integration of digital health tools into healthcare delivery has been extensively studied, with a growing body of evidence highlighting their potential to improve access, efficiency, and patient outcomes. Digital health encompasses a broad range of technologies, including EHRs, mHealth applications, telemedicine, and predictive analytics, each addressing specific gaps in healthcare systems (Mesko et al., 2017). EHRs, for instance, have been widely adopted to improve care continuity, reduce medical errors, and enhance data interoperability across providers (Adler-Milstein & Jha, 2017). Studies indicate that EHR adoption, driven by policies such as the U.S. HITECH Act, has led to significant improvements in hospital data management and care coordination (Adler-Milstein & Jha, 2017).

mHealth applications have emerged as powerful tools for patient engagement and health behavior modification, particularly in low-resource settings. Iribarren et al. (2017) conducted a systematic review of mHealth solutions, finding that mobile apps improve health literacy, medication adherence, and self-management among patients with chronic conditions. Similarly, telemedicine has transformed healthcare access by enabling remote consultations, reducing travel barriers, and expanding specialist availability in underserved areas (Wosik et al., 2020). The COVID-19 pandemic accelerated telemedicine adoption, with studies reporting increased patient satisfaction and reduced healthcare costs (Wosik et al., 2020).

PPM, while traditionally applied in industries such as engineering and information technology, has gained traction in healthcare as a method to manage complex, multi-project environments (Patanakul & Milosevic, 2009). PPM enables healthcare organizations to prioritize initiatives, allocate resources efficiently, and monitor performance across projects (Patanakul, 2015). The integration of digital health tools into PPM frameworks enhances these capabilities by providing real-time data, predictive insights, and improved communication channels (Topol, 2019). However, challenges such as resistance to technological change, limited training, and infrastructure disparities pose significant barriers, particularly in underserved communities (WHO, 2022).

The literature also highlights the importance of addressing the digital divide to ensure equitable access to digital health solutions. Rural and low-income populations often face barriers such as unreliable internet access and low digital literacy, which limit the effectiveness of digital interventions (WHO, 2021). Furthermore, data governance and privacy concerns remain critical, as

healthcare organizations must balance innovation with compliance to regulations such as the Health Insurance Portability and Accountability Act (HIPAA) (Mesko et al., 2017). This study builds on this literature by examining the practical application of digital health tools within PPM, focusing on their impact on scalability and sustainability in community-based care.

III. METHODS

➤ *Research Design*

This study employed a qualitative research design, utilizing a grounded theory approach to explore the implementation of digital health tools within PPM frameworks. Grounded theory was selected to generate insights directly from participants' experiences, allowing for the emergence of themes grounded in real-world practice.

➤ *Population and Sampling*

A purposive sample of 20 healthcare professionals was recruited from community-based health programs in three Nigeria states with high levels of health disparities: Lagos, Oyo and Ogun. Participants included project managers, clinicians, and digital health consultants, selected for their direct involvement in managing or delivering community health initiatives.

➤ *Data Collection*

Data were collected through semi-structured interviews conducted via video conferencing or phone calls between January and April 2024. An interview guide was developed to ensure consistency, covering topics such as tool usage, project coordination, and perceived impacts on care delivery. Open-ended questions allowed participants to share detailed insights and experiences.

➤ *Data Analysis*

Interviews were audio-recorded, transcribed verbatim, and analyzed using NVivo software. Thematic analysis was employed to identify recurring patterns and themes related to digital tool integration, project alignment, and care outcomes. Two researchers independently coded the data to ensure reliability, with discrepancies resolved through discussion.

➤ *Ethical Considerations*

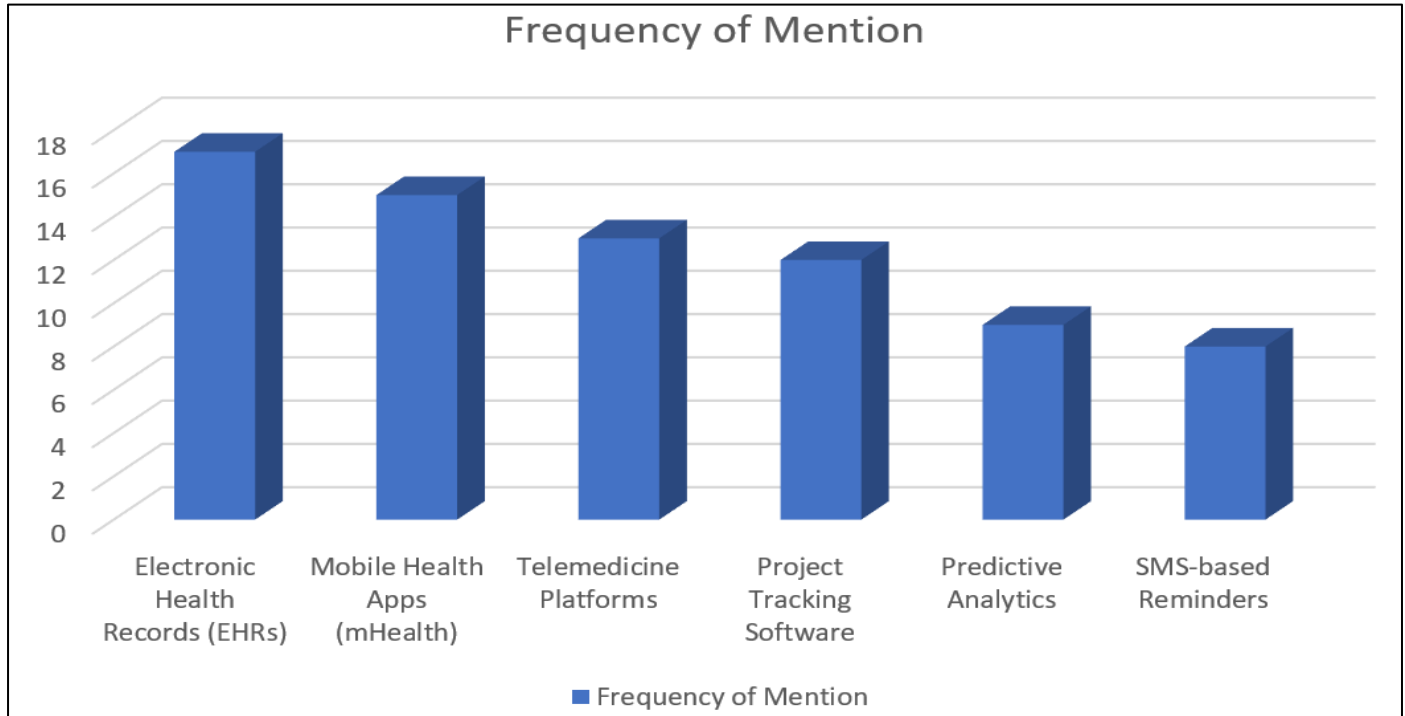
Informed consent was obtained from all participants prior to interviews. Confidentiality and anonymity were maintained by assigning pseudonyms to participants and storing data securely.

IV. RESULTS

The study identified a range of digital health tools and their impacts on community-based care within PPM frameworks, as summarized in Table 1.

Table 1 Digital Tools and Their Reported Impacts

Digital Tool Used	Impact Reported	Frequency of Mention
Electronic Health Records (EHRs)	Improved care continuity and data accuracy	17
Mobile Health Apps (mHealth)	Increased patient engagement and follow-up	15
Telemedicine Platforms	Broader reach to remote patients	13
Project Tracking Software	Better coordination across care teams	12
Predictive Analytics	Data-driven decision-making	9
SMS-based Reminders	Improved adherence to treatment plans	8



Participants frequently highlighted EHRs for their role in streamlining documentation and ensuring accurate patient records, which facilitated seamless care transitions. mHealth applications were praised for empowering patients through education and reminders, particularly for managing chronic conditions. Telemedicine platforms extended care to geographically isolated patients, while project tracking software improved team coordination and resource management. Predictive analytics supported proactive decision-making, and SMS-based reminders enhanced treatment adherence.

V. DISCUSSION

The findings underscore the transformative potential of digital health tools in enhancing community-based care within PPM frameworks. EHRs emerged as a cornerstone technology, aligning with prior research that emphasizes their role in reducing medical errors and improving care continuity (Adler-Milstein & Jha, 2017). For example, participants noted that EHRs enabled real-time access to patient histories, reducing duplication of tests and improving care efficiency. mHealth applications were instrumental in fostering patient engagement, particularly in underserved communities where access to in-person education is limited. This aligns with Iribarren et al.'s (2017) findings that mobile tools enhance health literacy and self-management.

Telemedicine platforms addressed geographic barriers, a critical issue in rural areas of Lagos, Oyo and Ogun. Participants reported that telemedicine not only expanded access to specialists but also reduced patient travel costs, reflecting trends observed during the COVID-19 pandemic (Wosik et al., 2020). However, the effectiveness of telemedicine was contingent on reliable internet access, highlighting the digital divide as a persistent challenge. Project tracking software and predictive analytics enhanced PPM by providing visibility into project performance and enabling data-driven resource allocation, supporting Patanakul's (2015) argument that PPM improves strategic alignment and operational transparency.

Despite these benefits, several barriers were identified. Insufficient training was a recurring issue, particularly among older staff who expressed discomfort with digital tools. Resistance to change was compounded by inconsistent funding for digital health platforms, which limited scalability. Infrastructure limitations, such as unreliable broadband in rural areas, further hindered implementation. These findings echo WHO's (2022) emphasis on the need for equitable infrastructure to maximize digital health's impact.

The study also revealed the importance of tailoring digital interventions to local contexts. For instance, SMS-based reminders were effective in communities with limited smartphone penetration, demonstrating the value

of low-cost, accessible technologies. These insights suggest that a one-size-fits-all approach to digital health integration is inadequate; instead, solutions must be customized to address specific community needs and resource constraints.

VI. CONCLUSION

The integration of digital health tools into PPM frameworks offers a promising pathway to enhance the accessibility, efficiency, and scalability of community-based care. By improving care coordination, patient engagement, and data-driven decision-making, these tools address critical gaps in underserved communities. However, overcoming barriers such as inadequate training, infrastructure disparities, and funding inconsistencies is essential to realizing their full potential. This study provides a foundation for future research and innovation, highlighting the transformative role of digital health in creating sustainable healthcare systems.

RECOMMENDATIONS

- **Develop Comprehensive Training Programs:** Implement standardized, ongoing training modules to build digital literacy and confidence among healthcare staff, with tailored support for older employees.
- **Invest in Infrastructure:** Expand broadband access and provide technology grants to community health centers, prioritizing rural and underserved areas.
- **Promote Flexible Funding Models:** Establish sustainable funding mechanisms, such as public-private partnerships, to support the adoption and maintenance of digital health platforms.
- **Customize Digital Interventions:** Design context-specific solutions, such as SMS-based tools for low-resource settings, to ensure equitable access and effectiveness.

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