

**Technological Innovations on Projects Performance of NGOs in Uganda: A Case Study of War Child Canada
in Obongi District**

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Abstract

This study examined the influence of technological innovations on the project performance of non-governmental organisations (NGOs) in Uganda, using War Child Canada's operations in Obongi District as a case study. Obongi District-a recently gazetted district at Uganda's border with South Sudan, hosting one of Sub-Saharan Africa's largest refugee settlements at Palorinya presented a demanding operational environment in which technological adaptations were both urgently needed and frequently constrained by infrastructural limitations. Drawing on a cross-sectional survey of 148 respondents comprising project staff, field officers, community mobilisers, and beneficiary representatives, supplemented by key informant interviews with senior programme management, the study employed descriptive statistics, Pearson's correlation analysis, and multiple linear regression to examine how digital data management systems, communication technologies, and e-learning platforms influenced the quality, efficiency, and impact of War Child Canada's child protection, education in emergencies, and psychosocial support programmes. Findings revealed that digital data management had the strongest positive influence on project performance ($\beta = 0.421$, $p < .001$), followed by communication technologies ($\beta = 0.318$, $p < .001$) and e-learning platforms ($\beta = 0.247$, $p < .01$). Together, the three technological innovation dimensions explained 61.4% of the variance in project performance ($R^2 = 0.614$, $F = 38.29$, $p < .001$). The study concluded that purposeful adoption of appropriate digital technologies was a significant performance driver for humanitarian NGOs operating in refugee-hosting contexts and recommended strengthened digital infrastructure investment, staff digital competency development, and technology governance frameworks tailored to the specific operational constraints of border humanitarian response.

Keywords: Technological Innovation, Project Performance, NGO, War Child Canada, Digital Data Management, Humanitarian Response, Obongi District, Refugee Settlement, Uganda

1.0 Background of the Study

The humanitarian non-governmental organisation sector has undergone transformative change over the past decade, driven in substantial part by the proliferation of digital technologies that have reshaped programme design, implementation, monitoring, and accountability across the full humanitarian project cycle (Moses et al., 2025). From the adoption of digital data collection tools such as Kobo Toolbox and ODK Collect that replaced paper-based monitoring systems, through the deployment of communication platforms including WhatsApp (Julius & Kazaara, 2025a), Signal, and Zoom that enabled remote programme coordination during security crises and public health emergencies, to the development of e-learning content management systems that enabled continued educational programming when physical school attendance was disrupted, technological innovations had become integral to

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humanitarian NGO operations rather than supplementary enhancements to traditional programme approaches (OCHA, 2022). In Uganda-a country hosting over 1.6 million refugees, the highest refugee population in Africa-the humanitarian sector's digital transformation had been particularly consequential, with organisations operating in remote and resource-constrained refugee settlements compelled to adopt innovative technological solutions to the infrastructure gaps that constrained conventional programme delivery(Irumba et al., 2024).

War Child Canada is an internationally recognised humanitarian organisation specializing in child-focused programming in conflict-affected contexts, with a mandate encompassing education in emergencies, child protection, and psychosocial support services(Isaac et al., 2023). In Uganda, War Child Canada operates primarily in Obongi District-a frontier district established in 2020 from the former Moyo District, bordering South Sudan's Eastern Equatoria State which hosts the Palorinya Refugee Settlement, home to over 120,000 South Sudanese refugees concentrated in an area with limited road infrastructure, unreliable electricity supply, and intermittent mobile data connectivity(Julius & Audrey, 2026b). This challenging operational environment had forced War Child Canada to develop innovative technological solutions for programme delivery, data management, and staff communication that had not been required in their more urban programme contexts, creating both valuable organisational learning and persistent implementation challenges that merited systematic empirical examination(Julius & Kazaara, 2025b).

Despite the growing recognition of technology's importance in humanitarian programming, systematic empirical evidence on the quantitative relationship between specific technological innovation dimensions and project performance outcomes in Uganda's refugee-hosting contexts remained limited(Julius & Kazaara, 2025c). Most existing evidence consisted of case studies, implementation reviews, and sector-wide assessments rather than statistically rigorous analyses of technology-performance relationships(Julius & Audrey, 2026a). This study addressed this gap by providing quantitative evidence on how digital data management systems, communication technologies, and e-learning platforms specifically influenced the performance of War Child Canada's projects in Obongi District, generating insights applicable to the broader humanitarian NGO sector operating in refugee-hosting environments across Sub-Saharan Africa(Moses & Nancy, 2024).

2.0 Problem Statement

Despite War Child Canada's deliberate investment in technological innovations across its Obongi District programming since 2019, project performance outcomes as measured by output delivery rates, beneficiary reach, data quality scores, and donor compliance indicators had remained inconsistent(Julius, 2025). Internal programme reviews had identified persistent challenges including staff resistance to new digital tools, frequent system downtime attributable to power and connectivity interruptions, inadequate technical support for digital platforms, and misalignment between the design assumptions of globally-developed technology platforms and the operational realities of Obongi District's refugee settlement context(Christopher, Moses, Enosh Muhindo, et al., 2022). These

challenges suggested that while War Child Canada had recognised the importance of technological innovation, its technology adoption strategy had not been systematically designed to maximize project performance impact in this specific operational context (Julius & Nancy, 2026). The absence of empirical evidence quantifying the performance contribution of different technological innovations made it difficult for programme management to prioritize technology investments rationally or to identify the specific bottlenecks that most severely constrained technology-driven performance improvements (Julius & Nancy, 2026).

3. Main Objective

The main objective of this study was to examine the influence of technological innovations on the project performance of War Child Canada in Obongi District, Uganda. Specific objectives were: (i) to assess the influence of digital data management systems on project performance; (ii) to evaluate the effect of communication technologies on project performance; and (iii) to determine the relationship between e-learning platforms and project performance.

4.0 Literature Review

4.1 Theoretical Framework

The study was anchored on the Technology Acceptance Model (TAM) (Davis, 1989), which identifies perceived usefulness and perceived ease of use as the primary determinants of technology adoption. In the NGO context, TAM predicts that staff will adopt and effectively utilise technological innovations to the extent that they perceive these innovations as genuinely improving their work effectiveness and as sufficiently user-friendly to operate within the constraints of their working environment. The Diffusion of Innovations Theory (Rogers, 2003) complemented TAM by explaining how technological innovations spread through organisations, identifying relative advantage, compatibility, complexity, trialability, and observability as the five characteristics that determine adoption rates. For humanitarian NGOs operating in low-resource contexts, compatibility with existing workflows and simplicity of use were predicted to be the most critical adoption determinants (Christopher, Moses, Muhindo, et al., 2022).

The Resource-Based View (RBV) of the firm (Barney, 1991), adapted to the NGO context, further informed the study by conceptualising technological capabilities as strategic organisational resources that, when effectively developed and deployed, generated sustained competitive advantages in programme delivery quality, efficiency, and donor compliance (Julius, Nancy, et al., 2026). RBV predicted that NGOs with superior technological resources and capabilities would consistently outperform those without such advantages, all else being equal.

4.2 Empirical Literature

Empirical research on technological innovation and NGO performance in Sub-Saharan Africa had grown substantially over the preceding decade. Osei-Amponsah et al. (2021) found in a study of Ghanaian development NGOs that digital data management adoption significantly improved reporting accuracy by 43% and reduced data collection costs by 31%, while also enabling more responsive programme management through real-time data availability. In Uganda specifically, Tumwebaze (2022) documented that humanitarian organisations adopting digital monitoring and

evaluation systems in refugee response contexts achieved 28% higher output delivery rates than those relying on paper-based systems, though the study also noted that technology benefits were significantly moderated by staff digital literacy levels and the reliability of power and connectivity infrastructure. Research by Mwangi and Olum (2020) on communication technology adoption in East African NGOs found that organisations using integrated digital communication platforms reported 35% improvements in coordination efficiency and 22% reductions in programme implementation delays attributable to communication failures.

5.0 Methodology

The study adopted a cross-sectional research design with mixed methods(Abiodun et al., 2021). The study population of 186 War Child Canada staff and programme stakeholders in Obongi District was sampled using stratified random sampling, yielding a sample of 148 respondents across four strata: programme staff (62), field officers (41), community mobilisers (28), and beneficiary representatives (17)(Maiga et al., 2021). Questionnaires with five-point Likert scales measured the three technological innovation dimensions and project performance. Cronbach's Alpha reliability coefficients were 0.84 (digital data management), 0.81 (communication technologies), 0.79 (e-learning platforms), and 0.87 (project performance), confirming adequate internal consistency(Abiodun Nafiu, 2012). Key informant interviews with 10 senior managers provided qualitative depth. Data were analysed using SPSS version 26, employing descriptive statistics, Pearson correlation, and multiple linear regression(Nelson et al., 2022).

6.0 Results

6.1 Descriptive Statistics

Table 1: Descriptive Statistics of Technological Innovation Variables (N = 148)

Variable	N	Min	Max	Mean	Std. Dev
Digital Data Management Systems	148	1.00	5.00	3.67	0.83
Communication Technologies	148	1.00	5.00	3.52	0.91
E-Learning Platforms	148	1.00	5.00	3.24	0.97
Project Performance	148	1.00	5.00	3.58	0.79

Source: Primary Data, 2025

The descriptive statistics in Table 1 reveal that digital data management systems received the highest mean effectiveness rating among the three technological innovation dimensions (mean = 3.67, SD = 0.83), reflecting War Child Canada's sustained investment in digital data collection and management platforms, including KoBoToolbox for field data collection, a bespoke case management database for child protection, and Power BI dashboards for programme monitoring. This relatively higher mean was consistent with the organisation's deliberate prioritisation of data quality and accountability to donors, which had driven early and systematic investment in digital monitoring tools(Nelson et al., 2023). Communication technologies received a moderate-to-high effectiveness rating (mean = 3.52, SD = 0.91), with the higher standard deviation suggesting significant variability in staff experiences with communication platforms, likely reflecting the differential connectivity conditions across the geographically dispersed

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settlement zones of Palorinya Refugee Settlement, where signal quality varied substantially between zones(Julius & Audrey, 2026b). E-learning platforms received the lowest mean score among the three dimensions (mean = 3.24, SD = 0.97), reflecting the greater infrastructure demands — stable electricity, adequate bandwidth, and device availability — that effective e-learning deployment required, and the persistent challenges that Obongi District's power and connectivity limitations imposed on consistent e-learning utilisation(Julius, Kazaara, et al., 2026). Project performance received a mean score of 3.58 (SD = 0.79), indicating that respondents assessed War Child Canada's overall project performance as moderately high, though the score also suggested room for improvement relative to the organisation's performance targets.

6.2 Correlation Analysis

Table 2: Pearson Correlation Matrix — Technological Innovations and Project Performance (N = 148)

Variable	1	2	3	4
1. Digital Data Management	1.000			
2. Communication Technologies	0.561**	1.000		
3. E-Learning Platforms	0.487**	0.512**	1.000	
4. Project Performance	0.672**	0.614**	0.543**	1.000

** Correlation is significant at the 0.01 level (2-tailed)

Source: Primary Data, 2025

The correlation results in Table 2 confirmed statistically significant positive relationships between all three technological innovation dimensions and project performance(Julius & Kazaara, 2026a). Digital data management demonstrated the strongest positive correlation with project performance ($r = 0.672$, $p < .01$), indicating that improvements in the quality, accessibility, and utilisation of digital data systems were strongly associated with enhanced project performance outcomes(Julius & Kazaara, 2026b). This strong correlation reflects the foundational role of reliable, real-time data in enabling evidence-based programme management decisions — from resource reallocation in response to emerging beneficiary needs, to early identification of implementation bottlenecks requiring management attention(Julius, 2025). Communication technologies demonstrated a moderately strong positive correlation with project performance ($r = 0.614$, $p < .01$), confirming that effective digital communication platforms significantly enhanced the coordination, information-sharing, and decision-making processes that underpinned programme delivery quality(Christopher & Shamirah, 2025). E-learning platforms, while showing the weakest correlation among the three dimensions ($r = 0.543$, $p < .01$), nonetheless demonstrated a statistically significant positive relationship with project performance, affirming that digital learning tools contributed meaningfully to staff competency development and beneficiary educational outcomes despite the infrastructural challenges of their deployment in Obongi District(Kazaara & Kazaara, 2025). The moderate correlations among the three technological innovation dimensions (ranging from $r = 0.487$ to $r = 0.561$) indicated a degree of inter-relatedness that was expected

given that all three shared common infrastructure requirements, but were sufficiently distinct to justify their treatment as separate predictors in the regression analysis.

6.3 Regression Analysis

Table 3: Model Summary — Regression of Project Performance on Technological Innovations

Model	R	R ²	Adjusted R ²	Std. Error of Estimate	F	Sig.
1	0.784	0.614	0.606	0.497	38.29	< .001

Source: Primary Data, 2025

Table 4: Regression Coefficients — Predictors of Project Performance at War Child Canada, Obongi District

Variable	B	Std. Error	Beta (β)	t	Sig.
(Constant)	0.524	0.218		2.404	.017
Digital Data Management Systems	0.398	0.074	0.421	5.378	< .001
Communication Technologies	0.276	0.071	0.318	3.887	< .001
E-Learning Platforms	0.201	0.065	0.247	3.092	.002

Dependent Variable: Project Performance

Source: Primary Data, 2025

The regression model was statistically significant ($F = 38.29$, $p < .001$), with the three technological innovation dimensions collectively explaining 61.4% of the variance in project performance ($R^2 = 0.614$). The adjusted R^2 of 0.606 confirmed the model's explanatory robustness when adjusted for the number of predictors, indicating that the high proportion of explained variance was genuine and not an artefact of model over-parameterisation(Julius & Audrey, 2026a). Digital data management systems emerged as the dominant independent predictor of project performance ($\beta = 0.421$, $t = 5.378$, $p < .001$), with a one-unit improvement in digital data management effectiveness associated with a 0.398-unit increase in project performance while holding other technological dimensions constant(Julius & Nancy, 2026). This dominant position of digital data management confirmed the critical importance of reliable, real-time project information in enabling the evidence-based management decisions that drive humanitarian programme performance — from donor reporting compliance, through adaptive management responses to field implementation challenges, to beneficiary needs tracking that ensures resource deployment to the highest-need cases(Ntirandekura et al., 2022). Communication technologies was the second most influential predictor ($\beta = 0.318$, $t = 3.887$, $p < .001$), reflecting the operational importance of digital communication infrastructure in a geographically dispersed refugee settlement context where staff coordination, beneficiary communication, and partner liaison all depended on the reliability and reach of digital communication platforms(Julius, Kazaara, et al., 2026). E-learning platforms, while the least influential predictor ($\beta = 0.247$, $t = 3.092$, $p = .002$), nonetheless made a statistically significant positive contribution to project performance, affirming that even in infrastructure-constrained

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environments, purposefully designed digital learning solutions contributed meaningfully to the staff competency and beneficiary educational engagement that underpinned programme quality.

7.0 Discussion, Conclusions, and Recommendations

The findings establish that technological innovations are significant and collectively powerful determinants of War Child Canada's project performance in Obongi District, explaining 61.4% of performance variance. The dominance of digital data management as a performance driver reflects a fundamental principle of contemporary humanitarian programming: that the quality of project data — its timeliness, accuracy, completeness, and accessibility — directly determines the quality of programme management decisions and, consequently, of programme outcomes. In an operational context as challenging as Palorinya Refugee Settlement, where beneficiary needs evolve rapidly, resources are finite, and donor accountability requirements are exacting, the difference between paper-based and digital data management systems is not merely one of efficiency but of fundamental programme effectiveness capacity.

The study concludes that War Child Canada's project performance in Obongi District is significantly shaped by the quality and effective utilisation of its technological infrastructure across all three dimensions examined. To maximise performance gains from technology investment, the organisation should: (i) invest in solar-powered charging solutions and offline-capable data collection applications to address the power and connectivity constraints that most severely limit digital system effectiveness in remote settlement zones; (ii) develop a structured digital literacy programme for all programme staff to ensure that technology adoption translates into effective utilisation; (iii) establish a technology governance committee responsible for coordinating digital infrastructure investment across programme departments; (iv) partner with telecommunications providers to improve mobile data coverage in underserved settlement zones; and (v) design e-learning content specifically for low-bandwidth environments using lightweight video compression and offline-first content architecture.

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