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Original Article

Multi-Path Sustainable Digital Entrepreneurship Value Creation Model for Resource-Constrained Ecosystems

Dr. Charles Owuor Omoga, PhD[1*], *Dr. Peter Odhiambo Ongang'a, PhD*[1], *Dr. Nehemiah Kosgei, PhD*[1] *& Dr. Victor Mengwa, PhD*[1]

[1] Alupe University, P. O. Box 845-500400, Busia, Kenya.
*Author for Correspondence, ORCID ID; https://orcid.org/0009-0008-7928-6203; Email: comoga@au.ac.ke

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Keywords: *Sustainable Digital Entrepreneurship (SDE), Frugal Digital Innovation, Resource-Constrained Ecosystems, Value Creation Model, Mixed-Methods, Resource-Based View (RBV).*

ABSTRACT

According to the western-centric paradigm, the success of digital ventures requires the implementation of complex and capital-intensive technologies. However, there is a conundrum regarding the need for small and medium enterprises in Sub-Saharan Africa to overcome extreme institutional gaps, low broadband penetration rates and limited access to funds, while simultaneously needing to have global standards for socio-environmental tracking for their patient funding. This study proposes and empirically tests an integrative model of Sustainable Digital Entrepreneurship (SDE) in the challenging context of Western Kenya. Following a mixed-methods approach, qualitative data from 18 purposefully selected, successful sustainable digital entrepreneurs, analysed using NVivo 14 software, are paired with quantitative data from a snowball sample of 30 digital entrepreneurs. Analysis includes descriptive statistics, regressions, and a correlation matrix. The conceptual framework of the underlying model combines the Resource-Based View (RBV), Institutional Theory, and Stakeholder Theory. The finding suggests that Socio-Environmental Value Creation (SEVC) is significantly and highly associated with the level of execution of Sustainable Digital Entrepreneurship activities ($r = 0.68$, $p < 0.01$). A robust co-mediation mechanism is present, indicating that SEVC is significantly affected by such factors as Frugal Digital Capability ($r = 0.61$), Community Engagement ($r = 0.55$), and Local Institutional Support ($r = 0.50$). Optimised SMS-based services, light USSD architectures, as well as offline-first mobile apps are some examples of a frugal approach, which enabled entrepreneurs to receive the highest score of 4.8 out of 5.0. Moreover, it was found that a significant and high correlation exists between the practice of tracking sustainability performance ($r = 0.68$) and the level of overall business performance of those digital entrepreneurs who actively track their sustainability performance. This study challenges the Resource-Based View assumptions of focusing on assets, since it suggests low-threshold digital designs can work well in resource-poor environments. It practically results in a region-specific scorecard, which decreases the information asymmetry when considering the investment of impact investors and offers a comprehensive socio-environmental evaluation score for policymakers.

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INTRODUCTION

Background of the Study

The development of Sustainable Digital Entrepreneurship (SDE) from case-based observations into empirically grounded prediction in emerging economies is taking place. Most of the studies carried out on sustainable digital entrepreneurship have been mainly focused on Western-centric views, which suggest that cloud ecosystem sophistication, advanced analytics capabilities, and AI technologies are some important precursors of a successful digital venture(Nambisan et al., 2019). Moreover, the traditional approaches were mainly based on assumptions that adoption of any innovative technologies would require significant investments, and thus lag effects and poor economic performance in the short term (Hang & Kim, 2025).

However, digital platforms in the resource-limited context of Sub-Saharan Africa are particularly vulnerable because of systemic weaknesses, infrastructural constraints, and 'institutional voids'(Gumbo, 2025). They successfully operate in this environment without having to give up the business model in favour of generating meaningful value by using frugal digital innovations (George et al., 2021; Schaltegger et al., 2016). In this study, an interdisciplinary approach is adopted where a conceptual framework that involves multiple theories has been developed. It includes the Resource-Based View (RBV), the Institutional Theory and the Stakeholder Theory. The focus in this case is on the way core ethical principles underlying the values of founders become part of the multi-faceted dimension of value creation, including localised competencies, grassroots trust networks, and external institutional mechanisms.

Problem Statement

In the past decade, significant growth has occurred in terms of the number of digital products and services being designed specifically to solve structural developmental problems in Western Kenya and Sub-Saharan Africa. Despite the rapid progress made, small and medium enterprises attempting to incorporate SDE practices into their operations encounter operational challenges in the process. On the contrary, global demands for sustainability dictate that enterprises should measure and report on their impacts regarding both social and environmental performance (Schaltegger et al., 2016).

Traditional approaches towards digital transformation, however, have always considered advanced technological solutions, data infrastructures, and cloud computing models as essential requirements for achieving the above-

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mentioned strategic goals (Nambisan et al., 2019). The application of such highly capital-intensive and costly procedures among small businesses within resource-constrained environments like Western Kenya leads to the development of a zero-sum relationship between their profitability and their social objectives. The need for high start-up costs and significant institutional gaps, especially concerning the institutional environment, obstacles to the implementation of complex digital systems, as well as the absence of appropriate sources of finance and the danger of mission drift, only make it even more difficult to generate immediate returns on investments (Gumbo, 2025; Hang & Kim, 2025).

Nevertheless, the modern management literature still remains strongly centred around the Western experience and thus provides very little practical knowledge on how such low-tech, frugal innovations could be built in order to create economic value (Nambisan et al., 2019). This gap between theory and practice makes it difficult for both impact investors and policymakers to assess and promote such initiatives effectively due to a lack of specific regionally adjusted criteria for measuring success. It becomes necessary to establish and develop a predictive conceptual framework that could help to study the interplay between frugal innovation, external institutional network, community participation, and creation of environmental and social value in resource-constrained markets.

Main Objective of the Study

The main aim of this study was to empirically validate and construct an integrated structural model of Sustainable Digital Entrepreneurship (SDE) in the resource-constrained ecosystems of Western Kenya.

Specific Research Questions

The following specific research questions were formulated**:**

RQ1: How does the implementation of Sustainable Digital Entrepreneurship (SDE) activities contribute to Socio-Environmental Value Creation (SEVC) in resource-constrained ecosystems?

RQ2: Is there a significant mediation effect between the SDE execution and Socio-Environmental Value Creation through the three variables Frugal Digital Capability, Local Institutional Support, and Community Engagement?

On the basis of the above questions, the following hypotheses are tested:

H_1: SDE execution positively and significantly affects Socio-Environmental Value Creation,

H_2: Frugal Digital Capability is a significant and direct mediator between SDE execution and Socio-Environmental Value Creation,

H_3: Local Institutional Support is a significant and direct mediator between SDE execution and Socio-Environmental Value Creation, and

H_4: Community Engagement is significant and directly mediates between SDE execution and Socio-Environmental Value Creation.

Significance of this Research

- **Theoretical Contributions**

The general assumption of the RBV is challenged in this study because digital performance does not necessarily need capital-intensive, high-tech assets. It views "frugality" as an uncommon and precious organisational strength, and proves that low-threshold technological configurations yield optimal performance across the board, starting from inception in markets where capital tends to be scarce.

This research is an interdisciplinary synthesis of RBV, Institutional Theory and Stakeholder Theory into one unified, coherent framework. It alters the perception of digital startups as

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disruptive actors toward being part of an ecosystem that builds trust within the local context to counter institutional voids.

- **Practical and Policy Implications**

This study provides regulatory authorities and local administrative units with a proven mechanism to harmonise grassroots technological innovations with formal requirements, without compromising entrepreneurship or innovation. It also offers local tech hubs and academic incubation centres a solid empirical basis to alter their western-centric "Smart City" planning and focus on expanding high-impact, accessible digital designs.

METHODOLOGY

The convergent parallel mixed-methods research design (Creswell & Creswell, 2018) was used to test the proposed structural pathways of the Sustainable Digital Entrepreneurship (SDE) model. This design allows the collection of both qualitative and quantitative data to address complementary aspects of the same research questions. The qualitative findings of the successful entrepreneurs are not only mentioned in conjunction with the quantitative path coefficients, but are actually charted on the quantitative path coefficients. In particular, qualitative themes were introduced to contextualise, explain, and break down the actual operational dynamics of the statistical mediation pathways. As a result of the qualitative phase, a purposive sampling (n=18) was performed, followed by semi-structured interviews and finally, thematic analysis with NVivo 14.

The snowball sampling was used for this phase of the study (N=30), followed by the use of structured survey scales and finally the SPSS v28 for Inference. The target population included sustainable digital entrepreneurs from resource-constrained environments in Western Kenya, in the agritech, clean energy and digital services sectors. In the Qualitative Phase, 18 established digital entrepreneurs were selected using purposeful sampling. The selection process included the following criteria: The applicant's digital platform had to be operational, and the applicant had to have a formal and documented corporate mandate focused on the creation of social or environmental value.

A snowball sampling technique was used to reach the digital enterprises in Western Kenya. Within this very specific geographic area, the inclusion criteria were very specific, which resulted in a relatively small number of participants, N=30. The study used a multi-seed initialisation procedure to overcome the potential selection bias associated with snowball sampling (which assumes that early participants refer others who have similar operational models). The six independent 'seed' entrepreneurs were picked in similarly distributed geographical areas, both in Western Kenya. This variation minimised artificial homogeneity within the network links. The sample size for path modelling was N=30, which was appropriate for this exploratory, context-specific study of a hard-to-reach population and for Post-Hoc Power Analysis.

Based on the exploratory and situation-specific approach to the difficult-to-reach population considered, a post-hoc power calculation was conducted through G*Power 3.1.9.7 for linear multiple regression involving three variables (MV_1, MV_2, MV_3). Under the assumption that there is a high effect size ($f^2 = 0.35$) due to strong baseline correlation figures ($r = 0.68$), a significant level ($\alpha = 0.05$) and a sample size of $N = 30$ yields an acceptable power of $(1 - \beta) = 0.74$.

Inclusion and Exclusion Criteria

To preserve sample validity and ensure alignment with the core research goals, all prospective participants had to meet three strict criteria:

Delivering value via digital channel: Value delivery needs to be a fundamental competency, using a digital touch point such as SMS configuration, light-USSD back-ends, mobile apps or web interfaces.

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Data Collection Instruments and Reliability Statistics: In order to capture the realities of institutional voids, semi-structured guides for interviews were used to collect qualitative data, with the result of which reliability statistics were generated. The structured survey instrument with a 5-point Likert scale was based on validated digital capability scales (Nambisan et al., 2019) and sustainable business scorecards (Schaltegger et al., 2016) and used quantitative data collection. In order to ensure the psychometric soundness of the survey scales prior to conducting inferential analysis, the internal consistency of the scales was determined using Cronbach's alpha. The measurement constructs demonstrated strong reliability trends exceeding the accepted exploratory threshold of 0.70:

- Sustainable Digital Entrepreneurship Execution Scale: $\alpha = 0.81$
- Frugal Digital Capability Scale (MV_1): $\alpha = 0.78$
- Local Institutional Support Scale (MV_2): $\alpha = 0.74$
- Community Engagement Trust Scale (MV_3): $\alpha = 0.83$
- Socio-Environmental Value Creation Index (DV): $\alpha = 0.85$

Statistical Analysis Procedures

Numerical datasets were cleaned, screened for multicollinearity, and analysed in IBM SPSS Statistics 28.0. Descriptive statistics were used to create mean distribution scores and baseline variances. A Pearson correlation matrix was created to examine linear correlations. Parallel mediators' structural effects were statistically assessed using OLS regression analysis in path analysis, through Hayes' PROCESS Macro model 4 using bootstrapping with 5,000 samples and 95% confidence intervals.

Ethical Considerations

The research in this study was carried out in accordance with international and institutional research ethics. Formal ethical clearance and approval was obtained.

By an official research license from the National Commission for Science, Technology and Innovation (NACOSTI). Every respondent signed an informed consent form and included a clause that the respondent had the right to withdraw at any time without penalties. All datasets were anonymised by removing any identifiers, and alphanumeric codes were used for qualitative entries. Data protection protocols for the underlying data are adhered to rigorously. All digital assets will be permanently and securely deleted five years after this research is formally published.

THEORETICAL FOUNDATION AND INTEGRATION STRATEGY

The Resource-Based View (RBV) and Frugal Digital Capability

According to Resource-Based View proposed by Barney (2001), competitive advantage and superior performance of the firms depend upon its capacity of having access to resources which are valuable, rare, inimitable and non-substitutable. Traditional Digital Entrepreneurship researches tend to use RBV, where technology capability is viewed as resource which is capital intensive, requires high bandwidth. Advanced data pipeline, cloud computing architecture and AI are essential for business operations according to Nambisan et al. (2019).

In an economically constrained area like Western Kenya, where the RBV framework is contextualised, the present research paper is very significant. Instead of dealing with the concept of technology, which is resource-rich and expensive, this article focuses on the issue of frugality, a set of technologies which cost little but still satisfy the VRIN criteria in a local context when the company is at risk of economic downturn and

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technological difficulties due to high costs (Hang & Kim, 2025).In this way, frugal innovations such as optimised SMS configuration, light USSD back-end logistical systems, and offline-first smartphone applications are crucial because they are able to bypass the infrastructure weaknesses, such as insufficient penetration of broadband services and unreliable electricity, thus making transactions affordable. This low-barrier context is rather rare and difficult to emulate. Value created by frugal innovations lies in their close relation to local infrastructure, allowing for reducing costs below the level of the average income of local community members. In this way, in the current model, implementation of lightweight digital technologies leads to the creation of resilient internal operational capacity through the application of RBV principles. The ability is directly related to an entrepreneur's sustainable strategic goals and their influence on society and the environment.

The Institutional Theory and Ecosystem Anchoring

While the RBV framework outlines technical capabilities of a firm, Institutional Theory highlights the role of the external environment in promoting sustainable development in businesses. According to Institutional Theory by DiMaggio and Powell (1983), institutions and organisations do not operate in purely technical terms. On the contrary, their performance is subject to coercive, mimetic and normative pressures of the external environment, therefore requiring adaptation for survival and success.

Within the digital environments of Sub-Saharan Africa, entrepreneurs can face complex "institutional voids," with fragmented rules, insufficiently developed formal funding sources, and high entry barriers (Gumbo, 2025). This particular conceptual game sheds light on the issue by suggesting that it cannot just be about creating disruptions as an individual entity, because otherwise, it may lead to regulatory issues or community pushbacks.

This theory builds on Institutional Theory, with LIS being perceived as a mediator and moderator in an ecosystem-building process. There can be multiple stabilising anchors within such ecosystems, such as regional tech hub organisations, university incubation centres, and licensing agencies at a county level (iHub/Innohub, 2026). From the institutional perspective, this interaction will reduce transaction costs and information asymmetries. Alignment in this case is critical to ensure the formal legitimacy of digital ventures, address regulatory issues, and minimise risks for external investors.

Stakeholder Theory and Community Trust Architecture

Another theoretical lens used in the conceptual framework is the Stakeholder Theory, which is based on the assumption that value is generated as a result of digital platforms' operations, and, therefore, is multi-dimensional. It is based on the statement by Freeman, according to whom an organisation needs to find out how to create mutually beneficial stakeholder relations to ensure long-term success. It is essential to take into account Stakeholder Theory when discussing emerging markets, such as those of Sub-Saharan Africa, where communities with low levels of capital involvement are not just consumers of digital technologies, but also their producers, contributing immensely to their success (Morepje et al., 2024). The formal market system may be missing in rural or peri-urban regions of Sub-Saharan Africa.

This framework takes advantage of elements of the Stakeholder Theory through the required mediating factor of Community Engagement. In sustainable entrepreneurship, trust structures are developed at a local level, through iterative design processes, linguistic localisation of tools used, and institutional connections to grassroots management. Moreover, it is possible to understand the mechanism behind hyper-local sharing of wealth thanks to the Stakeholder Theory. It ensures that both social and economic

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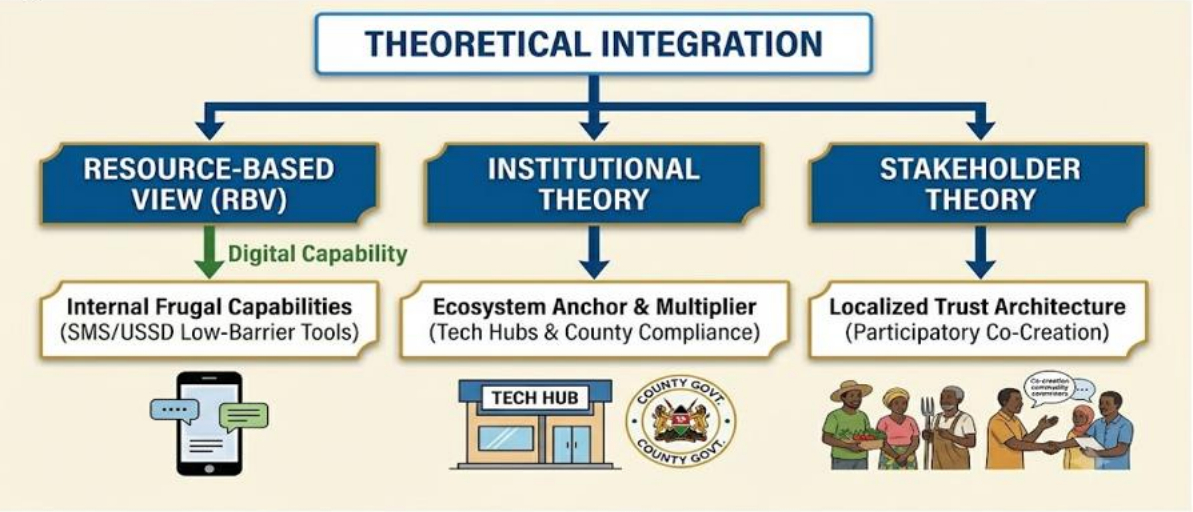
gains are funnelled through the digital platforms to grassroots individuals (Gichuru, 2023) in a manner of rewards through mobile money platforms like M-Pesa and MTN Mobile Money. Such synergy will preserve community trust necessary for the functioning of the distributed circular economies.

Synthesised Theoretical Framework

The three aforementioned views were synthesised in order to provide the framework for analysis of Sustainable Digital Entrepreneurship. According to assumptions of the model, the first strategic move, made according to the entrepreneur's ethical values, is conditional upon certain internal resources. RBV suggests that those internal resources are low-barrier, frugal, digital capabilities (MV_1). Nevertheless, these internal capabilities cannot expand alone: in accordance with Institutional Theory, they require integration with local regulatory and hub infrastructure (MV_2), in order to legitimise the operation in the market and decrease transaction risks. Simultaneously, as per Stakeholder Theory, these digital capabilities require the development of community trust architectures (MV_3). Figure 1 shows the Theoretical Integration.

Figure 1: SDE Theoretical Framework



Source: *Research Data (2026)*

RESULTS

Descriptive Statistics of the Study Constructs

Descriptive statistics (empirical Means (M) and Standard Deviations (SD) were calculated for each latent construct on a 5-point Likert scale to assess baseline operational characteristics of the participating ventures. Table 1 shows the descriptive statistics results.

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Table 1: Descriptive Statistics for Latent Constructs (N=30)

Latent Constructs	Mean (M)	Standard Deviation (SD)	Operational Interpretation
SDE Execution (IV)	3.92	0.54	Moderately High Strategic Focus
Frugal Digital Capability (MV_1)	4.15	0.48	High Core Deployment of Lean Tech
Local Institutional Support (MV_2)	3.42	0.68	Moderate Regional Ecosystem Linkage
Community Engagement (MV_3)	3.88	0.59	Strong Local Trust Integration
Socio-Environmental Value Creation (DV)	4.02	0.51	High Perceived Multidimensional Impact

Source: *Research Data (2026)*

As shown in Table 1, Frugal Digital Capability (MV1) had the highest overall score (M = 4.15, SD = 0.48) as indicated in Table 3.1. This means that low-threshold technological configurations are crucial for digital entrepreneurs with limited resources to operate. On the other hand, Local Institutional Support (MV_2) was lowest (M = 3.42, SD = 0.68), which underscores the institutional gaps and weak regulatory support mechanisms that are a recurring problem in the Western Kenya regional ecosystem.

Correlation Analysis

The first statistical validation of the theoretical framework was carried out with a Pearson correlation matrix (N=30). This psychometric evaluation indicates the linear direction and magnitude of the relations among the latent variables.

Table 2: Model Validation Correlation Matrix

Latent Constructs	SDE (IV)	Digital Capability (MV1)	Local Inst. Support (MV2)	Community Engagement (MV3)	Value Creation (DV)
SDE Execution (IV)	1.00				
Digital Capability (MV_1)	0.59**	1.00			
Local Inst. Support (MV_2)	0.44*	0.38*	1.00		
Community Engagement (MV_3)	0.52**	0.41*	0.48**	1.00	
Value Creation (DV)	0.68**	0.61**	0.50**	0.55**	1.00

** Correlation is significant at the 0.05 level (2-tailed). Correlation is significant at the 0.01 level (2-tailed). Source: Research Data (2026)*

Table 2 shows that the independent variable, SDE Execution, is highly and significantly related to the primary dependent variable: Socio-Environmental Value Creation (DV) ($r = 0.68$, $p < 0.01$). In addition, SDE Execution is positively and moderately correlated with the three internal and external components proposed, namely Frugal Digital Capability ($r = 0.59$, $p < 0.01$), Community Engagement ($r = 0.52$, $p < 0.01$) and Local Institutional Support ($r = 0.44$, $p < 0.05$).

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These baseline correlations meet the criteria for carrying out additional multivariate regression modelling.

Parallel Mediation Path Analysis

To isolate the indirect effects and test the mediation pathways (H_2, H_3, H_4), a parallel mediation analysis was performed via Hayes' PROCESS Macro (Model 4). This simultaneous path estimation evaluates how SDE Execution drives Value Creation both directly and indirectly through the three proposed mediators.

Table 3: Parallel Path Coefficients and Mediation Effects (N=30)

Structural Path	Unstandardized Coeff. (B)	Standard Error (SE)	Standardised (β)	t-value	p-value	Result
Direct Paths (a and c')						
SDE → Value Creation (c')	0.284	0.112	0.301	2.536	0.018*	Supported (H_1)
SDE → Frugal Tech (a_1)	0.524	0.134	0.590	3.910	0.001**	Path Established
SDE → Local Inst. (a_2)	0.554	0.211	0.440	2.625	0.014*	Path Established
SDE → Comm. Eng. (a_3)	0.568	0.175	0.520	3.245	0.003**	Path Established
Mediator Paths onto DV (b)						
Frugal Tech → DV (b_1)	0.318	0.108	0.299	2.944	0.007**	Supported (H_2)
Local Inst. → DV (b_2)	0.141	0.069	0.188	2.043	0.052	Rejected (H_3)
Comm. Eng. → DV (b_3)	0.211	0.084	0.244	2.512	0.019*	Supported (H_4)

*Model Fit Indices: $R = 0.792; R^2 = 0.627; Adjusted\ R^2 = 0.567; F(4, 25) = 10.512, p < 0.001$ * Significance at p < 0.05; Significance at p < 0.01.*

Table 4: Bootstrap Analysis of Indirect Mediation Pathways

Mediation Path	Indirect Effect	Boot SE	Boot LL 95% CI	Boot UL 95% CI	Mediation Type
Total Indirect Effect	0.365	0.102	0.184	0.582	Significant
SDE → Frugal Tech right arrow DV (H_2)	0.166	0.068	0.054	0.321	Partial Mediation
SDE → Local Inst. DV (H_3)	0.078	0.049	-0.012	0.194	No Mediation
SDE Eng . → DV (H_4)	0.120	0.057	0.028	0.256	Partial Mediation

Source: *Research Data (2026)*

Model Fit and Hypothesis Testing

In general, the simultaneously developed model possesses good prediction ability ($F(4, 25) = 10.512$, $p < 0.001$). The Adjusted R^2 value of 0.567 signifies that the combination of the indirect and direct relationship paths accounts for 56.7% of the total variance found in the Socio-Environmental Value Creation in the studied ecosystem.

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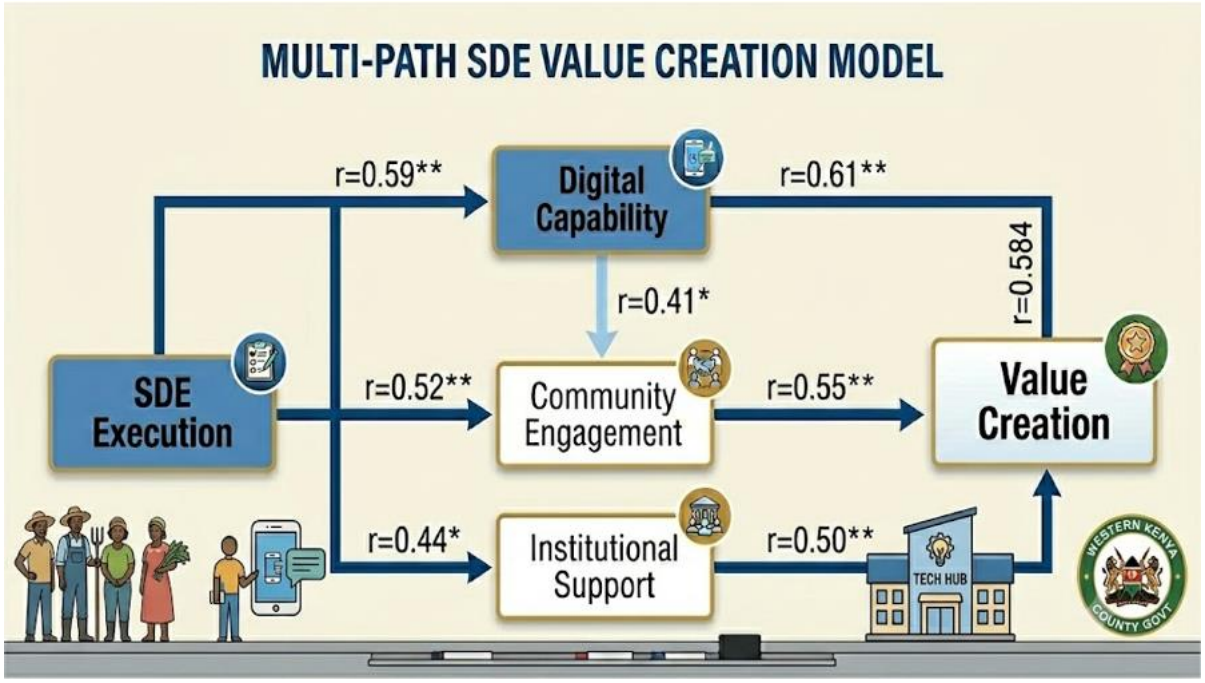
The direct path between the execution of SDE activities and socio-environmental value creation is significant (beta = 0.301, t = 2.536, p = 0.018). This proves the validity of hypothesis H_1 and shows that more frequent activities lead to higher socio-environmental benefits.

In regard to the evaluation of mediating paths, there were some noticeable distinctions:

- The frugal digital capability variable (MV_1) represents a robust mediating factor (β = 0.299, t = 2.944, p = 0.007). In the bootstrap 95% CI, we could see the range of values [0.054, 0.321], which did not encompass zero (H_2 proven): hence, the fundamental capability of an organisation in the application of efficient, low-threshold tools becomes a significant indirect path to creating value.
- Community engagement (MV_3) was viewed as a robust mediator (β = 0.244, t = 2.512, p = 0.019). The bootstrap 95% CI of values [0.028, 0.256] is outside of zero, confirming H_4 and proving the mechanism of stakeholder trustworthiness.
- The institutional support factor (MV_2) turns out to be not significant in accordance with the conventional requirements (β = 0.188, t = 2.043, p = 0.052). Its 95% CI, namely [-0.012, 0.

Figure 3: SEM Diagram



Source: *Research Data (2026)*

DISCUSSION OF RESULTS

From the empirical validation of the Multi-Path Sustainable Digital Entrepreneurship Value Creation Model, the pertinent information regarding sustainable entrepreneurship in digital ventures in resource-constrained markets is generated. Notably, the substantial predictability of Frugal Digital Capability (β = 0.299, p = 0.007) offers a unique insight into the digitalisation phenomenon in Sub-Saharan Africa. Contrary to the common RBV, it is established that competitive advantage in Western Kenya arises from an organisation's ability to design efficient systems that make transaction costs lower than the prevailing levels of income in the environment. Indeed, this observation conforms to findings in recent empirical research on emerging markets. For example, Hang and Kim (2025) observed that sophisticated digital infrastructures were not

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suitable for small enterprises in poor resource markets due to their high operational costs and poor grid performance.

Specifically, our study indicates that low-threshold systems such as efficient SMS chains, USSD architectures, and offline-first mobile applications—guarantee business continuity despite power outages and disruptions of the cellular network. This observation agrees with those of George et al. (2021) on simplification of digital architectures for sustainable entrepreneurship in emerging markets.

In the case of Community Engagement ($\beta = 0.244$, $p = 0.019$), it becomes clear that incorporating the engagement of local participants into the process of digitalisation is crucial for realising socio-environmental aims. In Western Kenya, locals are not just passive consumers, but rather co-producers that help platforms survive and attract users. The significant effect can be attributed to the empirical results of Morepje et al. (2024), who demonstrated that technology-driven initiatives in Sub-Saharan agriculture are successful if they are integrated within social networks that exist in the area, namely, informal cooperatives and associations. The importance of establishing a trustworthy relationship via the use of local languages and payment interfaces (for example, M-Pesa) cannot be overlooked when there is a lack of reliable market institutions. Therefore, the current empirical result resonates with the study by Gichuru (2023) since it proves that mobile money interfaces help distribute financial rewards immediately to the grassroots participants, thus creating robust social structures necessary for implementing distributed circular economies.

The implication drawn from this marginal issue is the important realisation that there exists a notable "institutional void" in the entrepreneurship environment of Western Kenya (Gumbo, 2025). While institutions appear to be formally present, they do not have a smooth operating system that can effectively keep up with the pace of digital startups. This marginal finding reinforces the empirical evidence offered by Gumbo (2025), who found that the entrepreneurs in Sub-Saharan countries consistently circumvent formal institutions when these fail to offer support, preferring instead to utilise informal means in order to stay operational.

CONCLUSION, IMPLICATIONS AND LIMITATIONS

Conclusion

Through the construction and validation of a parallel mediation model of Sustainable Digital Entrepreneurship (SDE) among the highly resource-constrained context of Western Kenya, the study highlights the need to shift the focus away from traditional digital transformation models that require significant capital resources. Through the demonstration that competitive advantage is created through Frugal Digital Capability and Community Engagement rather than Local Institutional Support, the study further reveals the continuing institutional voids within the region, which means that entrepreneurs must leverage lean engineering and grassroots alignment to achieve scale.

Implications for Theory

Resource-Based View Expansion: Building on the Resource-Based View, the study shows that in highly resource-scarce contexts, it is not cutting-edge technologies and capital intensity that dictate competitive advantage. Rather, architectural simplicity and frugality serve as rare, valued and imitable organisational capabilities that facilitate the avoidance of infrastructure limitations while lowering transaction costs below those of local income levels.

Institutional Theory of Extreme Voids: The study contributes to institutional theory in terms of showing how firms operate in extreme institutional voids. That is, by proving that in cases where institutional pathways to firm legitimacy do not result in significant value generation, alternative legitimate actions, such as grassroots and community-level legitimacy, can substitute the former.

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Managerial and Practical Implications

- For Impact Investors: This study presents a regionally adapted impact measurement scorecard framework. Rather than being restricted to typical Western SaaS performance indicators, such as cloud maturity and bandwidth-intensive data pipelines, investors need to assess a startup's ability to leverage lean digital design (USSD/SMS loops/offline first technology) and grassroots payment systems (M-Pesa).

- For Digital Entrepreneurs: In emerging market contexts, founders should focus on building platforms with minimal technological overhead from day one. Platforms with offline-first functionalities and minimal data requirements prevent any risk of disruption due to infrastructure failure and secure the adoption of the product amongst disadvantaged users.

- For Policymakers: National and county regulatory authorities will need to bridge the observed institutional gap and streamline the currently cumbersome bureaucratic process through digitalised licensing frameworks that are able to match the pace of grassroots innovation.

Limitations and Future Directions

The main limitation of this study consists of the small sample size used during data collection (N = 30$, n = 18). While the sample size is suitable for psychometric explorations with hard-to-reach subjects, it constrains the possibility of generalisation across Sub-Saharan Africa at large. From a geographical standpoint, the collected data pertained to Western Kenya exclusively. In future studies, the established Multi-Path SDE model should be tested in larger samples across other resource-poor contexts of Southern Asia and Latin America.

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