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# **Overcoming the Digital Divide: SMS-Powered Crowdfunding Models for Marginalized Regions**

## **Abstract**

Crowdfunding literature primarily assumes the phenomenon as internet based. With the untapped potential of crowdfunding activities in marginalized regions, little is known of the viability of non-internet-based crowdfunding models in explaining crowdfunding success and how they compare with internet-based models. Non-internet-based crowdfunding models proliferate due to digital divide infringements. This research leverages fit-viability perspectives and crowdfunding literature to explain the significant differences in utilizing either model for crowdfunding. Based on our analysis, SMS-powered crowdfunding models offer a more equitable opportunity for success in terms of both social and economic readiness, as compared to internet-based models. We offer theoretical and practical implications to support our analysis.

**Keywords:** donation-based crowdfunding, digital inequality, fit-viability theory, comparative viability, marginalized regions, social entrepreneurship.

## 1. Introduction

Crowdfunding, initially established as a response to the 2008 financial crisis when banks were hesitant to provide capital to entrepreneurs, has primarily been examined as a concept that pertains to developed nations. However, the potential of crowdfunding to spur innovation and employment opportunities in marginalized regions has garnered attention as a potential means of promoting economic growth and development (World Bank, 2013). Following this conceptual bias, most definitions and theoretical contributions of crowdfunding studies assume internet accessibility and website acceptance as critical factors for successful crowdfunding campaigns (e.g. Zhang et al., 2020). However, this characterization presents a challenge to promoting crowdfunding activity in marginalized regions with relatively poor internet infrastructure, low internet penetration or lack thereof.

Wolf (2017) asserts that the digital divide imposes a limit on the ability of crowd fundraisers in internet-underserved (i.e., marginalized) regions to capitalize on the value of network externalities in crowdfunding. Low adoption rates of internet-based crowdfunding in marginalized regions could be attributed to the “digital divide” (World Bank Group, 2016). The digital divide, an aspect of digital inequality, refers to the gap between those that have and those that do not have access to new forms of information technology, including internet access, and the reliability of the internet (Dimaggio and Hargittai, 2001; Werle, 2005). The objective of digital divide literature has been to provide effective domain-specific ways of bridging the divide, and broadly reduce digital inequality (Hsieh et al., 2008; James & James, 2016). In broadening the definition and objectives of the digital divide, several technological phenomena have been championed such as digital phone and computer technologies (Forrestdoud, 2011; Techatassanasoontorn & Kauffman, 2005; Zheng & Walsham, 2021). However, the underpinnings of these technologies would still require internet accessibility to promote crowdfunding activities in addressing some of socio-economic inequalities.

The issue at hand pertains to the constrained perspective on the digital divide, which is predominantly centered on internet accessibility. However, this perspective overlooks the crucial role played by novel approaches in tackling socio-economic difficulties that are exacerbated by a dearth of specific technologies. In this regard, we look at theorizing about offline crowdfunding campaign which relies on SMS’ (Short Messaging Service) integration with a mobile platform and presents an opportunity for addressing socio-economic inequality associated with the digital-divide (James & James, 2016; Zheng, 2020; Zheng & Walsham, 2021). Such offline SMS-based platforms utilize local payment tools (i.e., mobile money) for crowdfunding campaigns without the need for internet availability among users. The extent to which SMS-based crowdfunding initiatives compare with internet-based crowdfunding platforms in terms of their efficacy remains an area that has been insufficiently researched. This is because of the widespread assumption that crowdfunding owes its existence to the advent of internet technology and the

emergence of Web 2.0, thereby leading to a lack of investigation into alternative forms of crowdfunding.

The present research is centered on the context of donation-based crowdfunding, with a focus on comprehending how marginalized regions, which are constrained by the digital divide phenomenon, attain success in crowdfunding. The study seeks to draw a comparison between the outcomes of such alternate crowdfunding initiatives and those that rely on the internet, which is often regarded as a key strategy to address the issue of inequality. The focus on donation-based crowdfunding context is motivated by the fact that “donating [for a worthy cause] is one of the oldest forms of crowdfunding in [marginalized and underserved regions of the world, especially many regions in Africa,] for financing projects” (N’Guessan et al., 2017, p. 3) and could help explain the viability of offline SMS-based crowdfunding platforms. Zhang et al., (2020) identified crowdfunding readiness as a critical success factor of donation-based crowdfunding campaigns. This study examines the notion of “readiness” or viability in the context of SMS and internet-based projects, using the fit-viability framework. The framework identifies three key dimensions of viability, namely economic readiness, social readiness, and IT infrastructure readiness (Larosiliere & Carter, 2016; T.-P. Liang et al., 2021). The study argues that these dimensions are crucial in predicting the success of projects operating in mobile and internet-based environments comparatively. (Larosiliere & Carter, 2016; T. Liang et al., 2007; Tjan, 2001). Therefore, we first ask whether *there is a significant difference in viability between internet donation-based and offline SMS donation-based crowdfunding platforms that affect crowdfunding success*. Second, we ask how *an understanding of the comparative viabilities between internet donation-based and offline SMS donation-based crowdfunding platforms shapes existing notions of fit-viability theory and digital inequality?*

Our research questions are evaluated through the lenses of the fit-viability theory, donation-based crowdfunding, digital divide, and inequality literature. Mainly, the focus of the extant literature on digital divide and inequality typifies functional aspects of bridging the digital divide gap (e.g. Brandtzæg et al., 2011; Zheng & Walsham, 2021) which provides innovative ways to extend technology accessibility and penetrability in marginalized regions in reducing socio-economic inequalities. While this functional intervention may be critical for the crowdfunding success in marginalized regions, we believe that focusing on the contextual essence of the donation-based crowdfunding phenomenon, for which one sees the need to functionally bridge the digital divide, reduces the barriers to attaining success especially in situations where existing alternative technologies abound and have wider adoption. This functionality is explained by the fit-viability theory as the fit between the technology platform and the capabilities of the organization applying that technology platform to ensure project success (Liang et al., 2007; Liang & Wei, 2004; Tjan, 2001). Since these technology platforms have already been appropriated to complete crowdfunding campaigns in our data, we assume fit and mobile (IT) infrastructure viability factors of the fit-viability theory to be absorbed in the model analysis and

focus only on the comparative viability of SMS-based and online donation crowdfunding models in our estimations.

We collected data from a platform (*www.mchanga.ke*) that records crowdfunding activities within a developing African region regarding both online-based and offline “SMS/USSD-based” crowdfunding models. We apply covariance-based structural equation and seemingly unrelated regression (SUR) models to our data to evaluate our hypotheses and answer the research questions. Our primary finding reveals that while there are significant differences in the viability of both crowdfunding models, SMS-based crowdfunding models offer project founders a better chance of crowdfunding success than internet models. Thus, the current research provides empirical evidence of the viability of the SMS crowdfunding model as a viable alternate funding platform. We also show that, in regions plagued by internet inaccessibility, the SMS crowdfunding model provides a sustainable bridge to reduce socio-economic inequality while simultaneously enhancing entrepreneurial activities in these marginalized regions. Thus, the SMS-based model offers project founders, disadvantaged by “digital-divide”, a real opportunity to share in the wealth made possible by crowdfunding and increase entrepreneurial capacity for economic growth within these regions.

The rest of the study proceeds as follows: The following section discusses the literature and study’s anchor theory. Based on the theoretical background, we develop a set of hypotheses to facilitate the viability or readiness comparison between two crowdfunding models. Next is the data and methods section. Next, we report our findings and then discuss the theoretical and practical implications of the study. We conclude by providing limitations and future research directions.

## **2. Theoretical Background**

### *2.1. Crowdfunding and the Digital Divide*

Crowdfunding can be defined as “the efforts by entrepreneurial individuals and groups – cultural, social, and for-profit – to fund their ventures by drawing on small contributions from a relatively large number of individuals using the internet, without standard financial intermediaries” (Mollick, 2014, p. 2). Crowdfunding is a decentralized fundraising approach that allows entrepreneurs, artists, and other individuals to secure funding for their projects by soliciting modest contributions from a large pool of backers, typically facilitated through digital platforms. In contrast to traditional funding models that rely on securing large sums of money from a limited number of investors, crowdfunding distributes the financial burden across a larger network of supporters, providing an alternative route to financial support that can democratize access to capital and empower new voices and ideas (Belleflamme et al., 2014). Essentially, three key components describe crowdfunding regardless of the type of crowdfunding: project founders (or entrepreneurs), crowd funders (i.e., backers or fundraisers), and crowdfunding

platforms which connect founders to funders (Yuan et al., 2016). Scholars also divide crowdfunding into four categories: donation-based crowdfunding, reward-based crowdfunding, peer-to-peer or crowdlending-based, and equity-based crowdfunding (Beck, 2012; Giudici et al., 2012; Kraus et al., 2016; Leimeister, 2012; Ziegler et al., 2018). This study focuses on donation-based crowdfunding which is defined as “a backer’s provision of funding to individuals, projects or organizations based on philanthropic or civic motives with no expectation of monetary or material rewards” (Shneor and Maehle, 2019, p. 1; Ziegler et al., 2018).

The availability of formal financial services in marginalized regions is characterized by a significantly low level of accessibility, primarily restricted to a limited proportion of the populace (Wolf 2017; Oruezabala and Peter 2016). Project founders in these regions often grapple with bureaucratic and unachievable credit requirements from traditional financing channels due to a lack of credible financial history, favorable credit terms and collateral facilities. Without access to such traditional financing channels, crowdfunding provides an alternate yet viable financing channel (Davies et al., 2018). Thus, due to the huge potential of crowdfunding in providing alternative funding to economic activities in developing regions, most people or entities – individuals, organizations, and entrepreneurs or as donors, customers, and investors – will see accessibility to viable crowdfunding platforms as a prime objective (Choy and Schlagwein, 2016). Funds raised on crowdfunding platforms provide essential financial resources to entrepreneurial, innovative, and charitable projects (Veronica et al., 2019), particularly, for individuals and entities with low income or limited access to formal financial services. Crowdfunding also offers an alternate avenue for quick mobilization of emergency funds in the event of a financial shock or difficulty (Belleflamme et al., 2013). Thus, crowdfunding serves as an essential financial technology with its benefits compensating for the inefficiencies of formal financial services (Oruezabala and Peter, 2016; Wolf, 2017).

Unfortunately, while the popularity and success of crowdfunding continue to soar in developed countries, the same cannot be said for developing parts of the world where the crowdfunding industry remains in its infancy (Prodigy Network, 2016). This is rather unfortunate as it presents a significant barrier to innovation in developing countries because of the lack of funds to provide vital resources to engage in technological and innovative projects (DiMaggio and Hargittai, 2001). Thus, in marginalized regions, the adoption and participation rates of crowdfunding are meager as the industry remains stuck in the developing phase with little progress to the growth and maturity stages (World Bank Group, 2016). However, the World Bank believes the potential of crowdfunding in such regions could amount to \$93 billion over the next 20 years (Prodigy Network, 2016).

To overcome challenges of high entry barriers to realizing estimated crowdfunding potentials, crowdfunding platforms operating in some marginalized regions are leveraging mobile technologies (Wolf, 2017). Extant literature has outlined the key role of mobile phone technology in addressing socio-economic developmental challenges in such regions, particularly

digital and financial inclusion (Abraham, 2006, Albiman and Sulong, 2016, James and Versteeg, 2007). One such mobile technology is the SMS functionality which was developed in the mid-1980's. This functionality runs on the second-generation (2G) mobile network and remains an essential communication innovation today, particularly for internet unserved and underserved regions of the globe (Acker, 2014). For many years, the concept of crowdsourcing has been a mainstay for labor-intensive projects in developing regions where technological resources are limited. With crowdfunding drawing on such crowdsourcing communal principles, only adapting to the context of funding (Shneor and Maehle, 2019), it is understandable why a 2G offline technology like SMS is still a welcomed technological resource in raising funds from the crowd. Even for people in developing regions having a mix of low-quality internet access and without internet, the integration and use of SMS mobile technology features with internet-based models could be a plausible approach (Liang and Wei, 2004). Therefore, we motivate the importance of the digital divide-based perspective of crowdsourcing as a comparative dichotomy of offline mobile crowdsourcing model (i.e., SMS/USSD-based model) and the internet or online-based model via their fits and viabilities towards funding project success in an econometric model. The broader premise is that combinations of online and offline efforts can support fundraising activities by tapping into different groups of prospective contributors. Hence considering how these two crowdfunding-based models compare should provide a better understanding and expand the impact of crowdfunding.

Minimizing the consequences of digital divide in marginalized economies through comparative evaluation of alternative donation-based crowdfunding models is important for the following reasons. First, it answers the call to move beyond “simplistic notions of digital divisions to examine the digital technology as implicated in complex and intersectional systems of power to improve our sensitivity to the positionality of individuals and groups within social orders” (Zheng & Walsham, 2021, p. 1). Second, exploring the comparative viability of technology platforms provides a theoretical avenue to theorize entrepreneurial growth in marginalized regions. Emphasizing the contextual essence of crowdfunding technology platforms in these marginalized regions could help establish understanding of how alternative viable donation-based crowdfunding model is sustained in the generation of new capital forms for entrepreneurial growth and innovation that could further reduce the consequences of digital inequality. Although many entrepreneurial ventures heavily rely on the power of the crowd and entrepreneurship has been one of the biggest winners with the emergence of the crowdfunding phenomenon (Allison et al., 2015; Ashta et al., 2015), the potential entrepreneurial growth in marginalized regions may not be fully-realized with persistent digital divide threat to growth sustenance of internet-based (online) crowdfunding models. Theorizing the consideration of alternative donation-based crowdfunding platforms provides an avenue to ameliorate this threat.

## *2.2. Offline Crowdfunding in Marginalized (Developing) Regions*

The concept of public fundraising- crowdfunding is not new in developing regions (Wolf, 2017). Scholars have noted that online crowdfunding models are not an entirely new concept, as the concept of crowdfunding in an offline form has existed for a long time prior to the emergence of online platforms (Berndt, 2016; Wolf, 2017). In fact, some have described online crowdfunding as being akin to new wine in old wineskins, with the primary difference being the migration of crowdfunding to digital platforms. Offline crowdfunding involves direct interactions or print media where backers donate funds to founders, and although it is an older form of crowdfunding, it remains a popular and impactful tool for entrepreneurs and founders in marginalized regions. In such regions, offline crowdfunding is often utilized as a financing mechanism for nonprofit fundraising campaigns, live crowdfunding events, and informal community loans (Chen and Givens, 2013; Gras et al., 2017; Rene Guy and Cedric, 2022).

Offline crowdfunding has become deeply ingrained in the societal context of marginalized regions, where it is often the default financing mechanism for entrepreneurship endeavors (Wolf, 2017). However, existing literature has predominantly focused on online crowdfunding, neglecting the potential of offline models that are critical for digitally disadvantaged regions (Adjakou, 2021; Chao et al., 2020). Thus, this study seeks to explore the viability of SMS-based crowdfunding within these contexts. We argue that SMS-based technology can provide a feasible means of support for offline crowdfunding models prevalent in marginalized regions. Given the stagnation of online crowdfunding growth in these areas, a viable SMS-based crowdfunding model has the potential to bridge the digital divide and alleviate the challenges associated with current offline models.

SMS donation, a form of mobile donation, has emerged as a component of offline crowdfunding that seeks to replicate the benefits of online crowdfunding (Choi and Kim, 2016). It involves donating funds through a text message, as donors send a keyword to a designated phone code, with the charges applied to their phone bill (Chen and Givens, 2013; Choi and Kim, 2016). SMS donation has become a preferred solution for fundraising in offline crowdfunding because of its ease of use. Furthermore, it leverages the increasing adoption of mobile phones in marginalized regions, where the text messaging function is a ubiquitous tool found in every phone model and does not require the use of Wi-Fi or mobile data. It is important to distinguish SMS donation from donations made through mobile applications, mobile websites, social media pages, mobile phones, or third-party crowdfunding applications for the purposes of this study (Chen and Givens, 2013; Choi and Kim, 2016).

In the past decade, the mobile industry in marginalized regions has experienced notable growth, particularly in sub-Saharan Africa where mobile technology and its associated services have been widely adopted (James & James, 2016; Kizza, 2013; T. Liang et al., 2007). This trend has positively impacted access to financial services and information, leading to reduced transaction



costs. Notably, a survey revealed that mobile phone subscribers in the sub-Saharan African region accounted for 46% of the population (James & James, 2016; Kizza, 2013). With 40% of the population being under 15 years, there is an optimistic outlook that mobile phone adoption will significantly increase in the next decade as the younger generation matures into adulthood and literacy rates improve. This growth trajectory underscores the potential of mobile technology in driving economic development and improving the livelihoods of people in marginalized sub-Saharan Africa.

The main objective is to establish an "offline" platform that allows individuals with limited or inconsistent internet access to benefit from local payment tools, such as mobile money, while also receiving customer support. Prior research indicates that there are challenges with internet accessibility and usage, as a significant percentage of individuals with mobile internet access do not utilize these services (Kizza, 2013). This points to a gap in both access and usage of the internet, which could be attributed to factors such as inadequate infrastructure, low affordability, and limited digital skills. While solutions to these challenges are being explored, the use of SMS-based crowdfunding offers a viable alternative for bridging the digital divide and providing access to crowdfunding for individuals without internet access or with unreliable internet connectivity. However, the effectiveness of this offline crowdfunding model has received limited attention, partly due to the prevailing belief that crowdfunding is primarily facilitated through the internet and Web 2.0. Nevertheless, evaluating the viability of alternative crowdfunding models is crucial for mitigating the effects of the digital divide in developing economies.

#### *2.4. Fit-Viability Perspectives and Crowdfunding Success*

Online crowdfunding in developing regions has been characterized by slow diffusion and low adoption rates (Adjakou 2021; Chao et al. 2020). Extant literature seeking to address the low adoption rates in developing regions has adapted several models for technology acceptance, including the technology acceptance model (TAM) (Davis 1989; Venkatesh and Davis 2000), the innovation diffusion theory (Rogers 1995), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003). These studies have examined the factors impacting user acceptance of new technology from different perspectives and contexts and strengthened technology acceptance research considerably (Adjakou 2021; Aryeetey 1997; Berndt 2016; Chao et al. 2020; Djimesah et al. 2022; Fuadi et al. 2020; Islam and Khan 2021; Li et al. 2018; Wolf 2017). However, these adoption theories developed in IS research discipline have focused on technological, environmental, organizational, and some social factors (Venkatesh et al. 2003; Venkatesh and Davis 2000). While these perspectives largely account for the variance in usage intention, there is the need to address the economic considerations of using technology and quantitative performance evaluation of such usage.

The fit-viability theory provides a useful lens to assess the success or performance of technologies such as SMS-integrated mobile commerce technologies (Liang et al., 2007; Liang

& Wei, 2004; Tjan, 2001). Task-technology-fit and viability considerations have roots in classical portfolio planning and reflect an organization's ability to capitalize on technology opportunities (Tjan, 2001). Tjan (2001) proposed fit and viability as two critical dimensions for evaluating organizational IT initiatives. The two dimensions form a simple matrix with fit as the horizontal axis and viability as the vertical axis. IT opportunities with high fit and high viability have the highest chance of project success. Fit is a qualitative measure that measures how well investment is aligned with the organization's existing processes, capabilities, and culture (2001). Task-technology fit is the extent to which the task needs (i.e., investments) align well with the capabilities of the technology (Liang & Wei, 2004). The main task for each crowdfunding campaign is to raise funds from the public and the technology system utilized is either the internet or SMS. Viability captures the payoffs from such investments or tasks (Tjan, 2001). Therefore, economic feasibility, social readiness of the organization, and IT infrastructure readiness have been theorized as viability measures for predicting the performance of IT initiatives or the project success (Liang et al., 2007; Liang & Wei, 2004).

For new ventures with limited capital resources and loose organizational structure, quantitative metrics on viability matter more than qualitative measures such as culture (Tjan, 2001). Such is the situation with crowdfunding ventures or campaigns. As an organizational level theory, we find the fit-viability theory suitable to our study considering that crowdfunding project teams form as pseudo-organizations with loose boundaries and porous structure whose expectation of funding success requires that the prevailing platform/ infrastructure is ready for crowdfunding. Even, in situations where project ownership is of sole-proprietorship nature, communicated project descriptions (or ideals) connote organizing themes for causes beyond individual usage of the IT platform.

Moreover, the need for the fit-viability perspective to explain crowdfunding success has been discussed in crowdfunding literature. For instance, Stevenson et al. argue that equity-based crowdfunding is contingent on perceived funding fit by entrepreneurs (2021). Veronica *et al.* discuss the viability of equity-based crowdfunding (2019). Therefore fit-viability perspectives can be leveraged to comparatively explore the viability differences in adopting SMS/USSD-powered (offline) model as against internet (online) model and the effects on crowdfunding success.

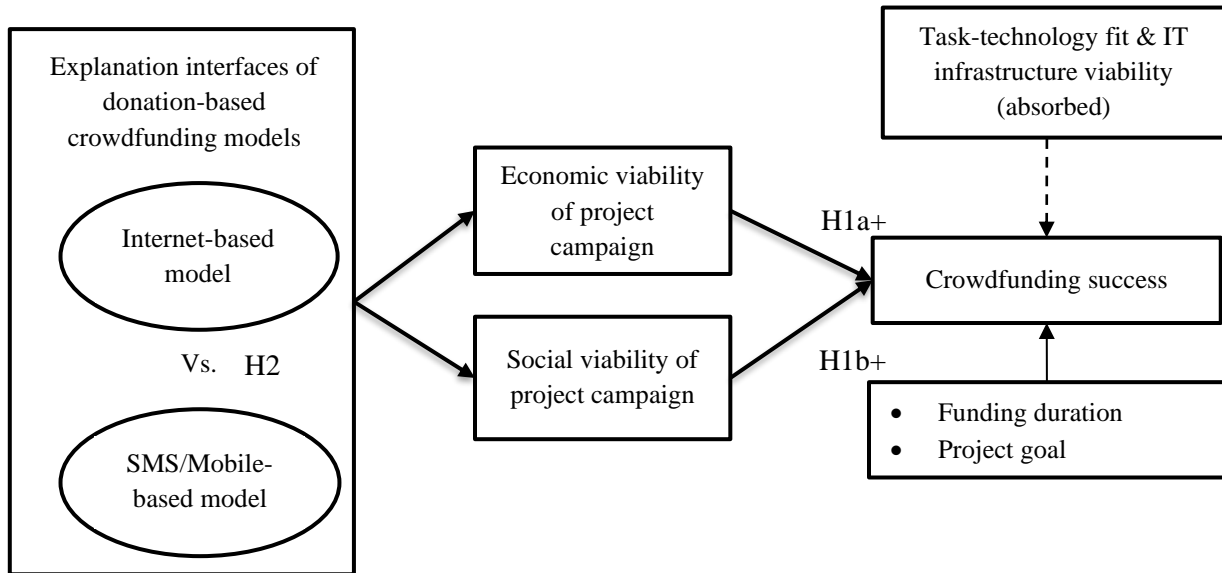
Mollick (2014) documents the need for balance when setting project goals in that unrealistic goals may result in project non-delivery if too little capital is raised. High project goals also make projects less likely to succeed (Mollick, 2014). These goals translate into the performance expectation of the campaign. A very successful campaign would have donations that meet or exceed the expected goal amount. Thus, a more appropriate measure of crowdfunding success would consider the amount raised against the expected goal amount. Next, we utilize fit-viability perspectives and the rich crowdfunding literature in developing the study's hypotheses to address the research questions.

### 3. Hypotheses Development

#### 3.1. Donation-Based Crowdfunding Viabilities and Crowdfunding Success

Fit-viability literature argues that the viability of the project or application is assessed through the impact of economic, organization and IT infrastructure readiness (Liang et al., 2007; Liang & Wei, 2004; Tjan, 2001). In terms of economic viability, two main considerations have been advanced, (1) the cost-benefit of the IT initiative and (2) transactions costs associated with the use of the technology which could be acquisition goals (Liang et al., 2007). The first is irrelevant to our study as crowdfunding campaigns leverage the existing platforms of the service providers and hence do not assess viability pertaining to IT investments or platform ownership. While transaction costs associated with use (by project backers and project owners) of internet-based platform is higher in marginalized regions, SMS-based usage may be associated with lower transactions costs and construe higher economic viability leading to positive impact on crowdfunding success. Transaction costs can include expenses such as internet access fees, fees for online payment systems, and other digital infrastructure costs required to facilitate transactions. In marginalized regions, the higher transaction costs associated with using internet-based platforms for crowdfunding may limit their economic viability, particularly for small-scale projects. However, SMS-based crowdfunding may offer a more economically viable alternative due to its lower transaction costs. By reducing these costs, SMS-based crowdfunding can increase contributions to crowdfunding campaigns, making it an affordable option for a broader range of people. This may increase the likelihood of crowdfunding success by lowering the financial barriers to entry for project owners and reducing the costs for backers to participate in the funding process. The underlying reasoning is that SMS-based crowdfunding can offer an accessible and cost-effective alternative that can enhance participation in crowdfunding campaigns, leading to comparable levels of economic readiness as internet-based crowdfunding platforms. This can be attributed to the reduction of transaction costs, particularly in marginalized regions, where SMS-based crowdfunding provides an affordable option by minimizing digital infrastructure expenses. As such we hypothesize that,

***H1a (The crowdfunding economic viability hypothesis): Crowdfunding campaign's economic readiness positively influences crowdfunding success in both SMS-based and internet-based models.***



**Figure 1. A model for comparing the viabilities of internet and SMS donation-based crowdfunding models**

The crowdfunding literature argues that large numbers of friends on online social networks are associated with crowdfunding success (Mollick, 2014). A relatively high number of backers for a project indicates a relatively high appreciation and involvement in the crowdfunding phenomenon. A large number of backers provides an inexpensive audience for project founders to access (Stanko & Henard, 2017). Word-of-mouth benefits also accrue from attracting large backers to support a crowdfunding project (Stanko & Henard, 2017). The common criteria for assessing organization viability are readiness of users to support the project indicated by their satisfaction, willingness and ability to use the IT platform (Liang et al., 2007; Liang & Wei, 2004). Therefore, more backers patronizing a project campaign would signal higher acceptability of using the platform to donate funds.

Liang and Wei (2004) suggest that the project backer's assessment of time and effort involved in using a crowdfunding platform may influence their funding behavior and hence the success of the crowdfunding campaign. Kuppuswamy and Bayus (2018) have observed a U-shaped behavioral pattern between project backers and crowdfunding success in reward-based crowdfunding platforms, which is attributed to the surge in fundraising activity at the start and end periods of the project funding. However, this relationship may not hold for donation-based crowdfunding platforms since they typically have open project end dates. Consequently, we hypothesize that there is a linear relationship between social readiness, organization viability, and crowdfunding success for both SMS/USSD and internet-based donation crowdfunding models. Further, SMS crowdfunding, in particular, has the potential to capture populations excluded from online crowdfunding platforms and may raise the level of social readiness comparatively, making it an effective alternative for crowdfunding campaigns. As such, we hypothesize that,

***H1b (The crowdfunding organization viability hypothesis):*** Crowdfunding campaign's social readiness positively influences crowdfunding success in both SMS-based and internet-based models.

### *3.2. Comparing Donation-Based Crowdfunding Models and Crowdfunding Success*

Projects description regarding offline models will be less congruent compared to online models because the internet-based platforms have dedicated pages where fundraisers or backers can go and read consistent communications. Unlike internet-based crowdfunding models, offline models are heavily dependent on traditional word of mouth and other unconventional means propagating project launch. Therefore, backers may be presented with inconsistent communications of project intent that may be far-removed actual objectives of the project founders or the project campaign. Inconsistent communications and lack of clarity in project objectives would signal a seeming lack of project quality, raising uncertainties about the founders' intent.

From transaction cost economy literature (Da Silva & Saes, 2007; Williamson, 1981, 2005), monitoring and coordination costs, transaction frequency, uncertainty, and asset specificity are some of the important factors that affect transaction costs. For instance, if high uncertainties remain about crowdfunding project objectives, backers will be unwilling to contribute to the project or contribute a fraction of what they originally intended. The crowdfunding literature (e.g. Mollick, 201) asserts that projects that signal higher quality are likely to be funded ensuring crowdfunding success. Thus, platforms that allow for clearly specified project objectives signal higher project quality and positively impact crowdfunding success but uncertainties negatively impacts economic viability (Liang et al., 2007) and consequently performance of the campaign. Therefore, we posit the following hypothesis comparing the viabilities between SMS/USSD donation-based crowdfunding model and the internet donation-based crowdfunding model:

***H2 (comparative model hypothesis):*** Compared to the SMS/USSD crowdfunding model, the overall viability of internet-based crowdfunding model is higher leading to a better crowdfunding success.

### *3.3. Omission Of Task-Technology Fit and IT Infrastructure Viability*

We explain the omission of task-technology fit and IT infrastructure viability from our research model. Each campaign group which represents a loose pseudo-organization capitalizes on the same available technology platform to raise funds. Since the main task of raising funds is well-aligned with the capabilities of SMS and internet platform capabilities, the effects of task-technology fit are fixed across different project campaigns and hence would have no impact on the performance of the campaign (i.e., the crowdfunding success).

IT infrastructure includes readiness of computing resources, information management and communication platforms. Similarly, because the task of raising funds is highly defined by

crowdfunding platforms, IT infrastructure viability is standardized across the different campaigns who use either internet-based or offline SMS-based. Hence, both task-technology fit, and IT infrastructure viability would be absorbed and unobserved factors in each of our comparative models.

## **4. Data and Methods**

### *4.1. Data Context and Data Collection*

The ideals of ‘crowdfunding’ are not a new phenomenon in the developing world. Specifically, countries in Africa have long-held cultural practices that allow funds or resources to be pooled from the public to support social and civic causes. However, for a continent where only 26% of its population has internet access (GSMA, 2020), adopting and participating in a modern “e-platform” crowdfunding system presents a considerable challenge. With the aim of evaluating the viability of the “SMS/USSD” offline crowdfunding model as an alternative to the online crowdfunding model, we collected cross-sectional data from the crowdfunding portal in Kenya using ScrapeStorm –software for data extraction following (Shah et al., 2020). The randomized context presents a fitting underpinning for comparing the two models on subjects with similar social constructions.

M-Changa, a Kenyan-based platform, is one of Africa's earliest and largest crowdfunding platforms. M-Changa is an online and SMS-based crowdfunding platform that allows individuals to register via mobile phone or online. Basically, M-Changa allows project founders to manage fundraisers on their mobile phones. The platform boasts of giving project founders the support to raise funds for individual needs, organizations, and businesses through mobile technology and mobile money. For the SMS-based model, potential backers with Safaricom MPESA, Airtel Money, or Equitel registered SIM cards can contribute. For the online-based model, potential backers can contribute via Paypal, Venmo, SimbaPay, and credit card.

### *4.2. Variable Operationalization and Sample Statistics*

Crowdfunding literature utilizes various metrics to measure project success (Zhou et al., 2018). Such metrics often include the number of backers, threshold levels, amount of funds donated, funding levels, and dummy variables representing project success and failure (Chen et al., 2016; Cumming et al., 2020; Datta et al., 2019; Parhankangas & Renko, 2017). However, a review of these studies shows a lack of grounded theoretical justification for choosing a particular success metric for use as a dependent variable. Based on fit-viability theory (Liang et al., 2007) and the crowdfunding literature, this study adopts relative funding level (percentage of project goal raised) as a measure of crowdfunding success to assess performance in each case. A project goal for raising money represents founders’ (pseudo-organizations’) beliefs of the project relevance and estimation of the resources needed to achieve the aim of the campaign – i.e., to complete future activities for which the funds are being sought. We argue that the ratio of actual funds

raised to expected funds (project goal) provides an estimation of project success or failure given founders' expectations how well the campaign should do. Furthermore, project success or failure reflects whether the target audience shares the same beliefs and expectations with the founder. These factors make percentage raised an important success metric as it provides an objective assessment of the project. Therefore, this study uses the ratio of funds raised to goal amount as a measure of project performance (i.e., crowdfunding success). If a project goal is \$500 and \$500 was raised, the ratio will be 1 indicating a higher crowdfunding success than if \$400 was raised, which will be a ratio of 0.8.

We used the natural log to transform all the independent variables and control variables to satisfy normality assumption for estimating regression models. Table 1 provides operationalized definitions for all the variables used in the estimations. Table 2 and 3 show the descriptive statistics of variables from the raw data before transformation.

**Table 1.** Variables and operational definitions

Variables	Definition
<b>Dependent variable</b>	
CrowdfundingSuccess	Ratio of actual funds raised to project goal amount
<b>Independent variables</b>	
LnBackers	Natural log of the number of people that donated to a project
LnAvgAmountPledgedPerBacker	Natural log of the intended goals amount divided by the number of backers associated with each project
<b>Control factors</b>	
LnFundingDuration	Natural log of the days between last funding date (used day of data collection) and the start date of the project
LnProjectGoal	Natural log of the expected amount set by the project founders at the inception of the project
ProjectDescriptionDummy	A dummy variable where 1 is for project with project description and 0 for projects with no project description

**Table 2.** Descriptive statistics for SMS-powered crowdfunding model variables

Variable	Obs	Mean	SD	Min	Median	Max
CrowdfundingSuccess	1,801	0.292	0.358	0.01	0.09	1.00
AmountRaised	1,801	1658.99	4,053.05	23.00	374	76,230.00
AvgAmountPledgedPerBacker	1,801	705.31	1850.67	0.81	144.32	37,300.00
Backers	1,801	150.00	762.69	1.00	36.00	19,060.00
FundingDuration	1,801	1,202.88	400.64	26.00	1198.00	3,107.00
ProjectDescriptionDummy	1,801	0.00	0.00	0.00	0.00	0
ProjectGoal	1,801	36,230.57	126,462.70	45.83	5,737	2,204,600.00

**Notes:** Standard Deviation (S.D.). Descriptive statistics on raw values before variable transformation

**Table 3.** Descriptive statistics for internet-based crowdfunding model

Variable	Obs	Mean	SD	Min	Median	Max
CrowdfundingSuccess	1,151	0.287	0.316	0.01	0.16	1.00
AmountRaised	1,151	2,671.00	4,860.8	23.00	698.00	51,628.00
AvgAmountPledgedPerBacker	1,151	433.56	1371.21	0.31	124.73	23,225.00
Backers	1,151	172.57	682.88	1.00	46.00	17,604.00
FundingDuration	1,151	1261.65	389.82	44.00	1079.00	3107.00
ProjectDescriptionDummy	1,151	1.00	0.00	1.00	1.00	1.00
ProjectGoal	1,151	14,140.00	25683.2	9	7300.00	410,475.00

**Notes:** Standard Deviation (S.D.). Descriptives statistics on raw values before variable transformation

#### 4.3. Estimation Model Specification and Tests

Following (Vulkan et al., 2016), we implemented a linear regression model to assess the hypotheses (i.e., H1a and H1b) for each model except hypothesis 2. The linear regression for H1 and H1b is specified as follows:

$$CrowdfundingSuccess_i = \beta_0 + \beta_1 LnAvgAmountPledgedPerBacker_i + \beta_2 LnBackers_i + \beta_3 LnFundingDuration_i + \beta_4 ProjectDescriptionDummy_i + \beta_5 ProjectGoal_i + \varepsilon \quad (1)$$



To perform the comparative hypothesis (H2) test, we used covariance-based structural equation (*sem*) modeling and assessed Wald tests for the equality of parameters (i.e., explanatory variables, intercepts, error variances) and joint Wald tests across the two models (Macdonald, 2016). We also run a robustness check on these differences using seemingly unrelated regression estimation (via the *suest* command in Stata) which combines the models and give a robust covariance matrix (Greene, 2003). The parameters of each equation in SUR are consistently and efficiently estimated by ordinary least squares and identical to the generalized least square estimation because the two equations have identical explanatory variables. The system of two linear equations for simultaneous estimation are specified as follows:

$$CrowdfundingSuccess_{1i} = \beta_0 + \beta_1 LnAvgAmountPledgedPerBacker_i + \beta_2 LnBackers_i + \beta_3 LnFundingDuration_i + \beta_4 LnProjectGoal_i + \mu_{1i} \quad (2a)$$

$$CrowdfundingSuccess_{2i} = \alpha_0 + \alpha_1 LnAvgAmountPledgedPerBacker_i + \alpha_2 LnBackers_i + \alpha_3 LnFundingDuration_i + \alpha_4 LnProjecGoal_i + \mu_{2i} \quad (2b)$$

where  $i = 1, \dots, m$  for project 1 to project m. The equations are seemingly unrelated because they are only related through the error terms  $\mu_{1i}$  and  $\mu_{2i}$  for SMS and internet crowdfunding models respectively.

## 5. Results

### 5.1. Main results

Table 4-6 present the ordinary least squares regression estimates of regressing crowdfunding success on social viability (backers) and economic viability (average amount pledged by a backer)

**Table 4.** Regression results for SMS-based crowdfunding model

Variables	(Model 1) CrowdfundingSuccess	(Model 2) CrowdfundingSuccess
<b>Control variable</b>		
<i>LnFundingDuration</i>	-0.19*** (0.02)	-0.09*** (0.01)
<i>LnProjectGoal</i>	-0.10***	-0.46*** (0.06)
<b>Direct effects</b>		
<i>LnAvgAmountPledgedPerBacker<sub>i</sub></i>		0.34*** (0.06)
<i>LnBackers</i>		0.47*** (0.06)

Constant	1.67*** (0.13)	1.50*** (0.11)
Observations	1,801	1,801
R-squared	0.38	0.56
Adjusted R-squared	0.37	0.55

**Notes:** Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 5.** Regression results for Internet-based crowdfunding model

Variables	(Model 1) CrowdfundingSuccess	(Model 2) CrowdfundingSuccess
<b>Control variable</b>		
<i>LnFundingDuration</i>	0.00 (0.02)	-0.03 (0.01)
<i>LnProjectGoal</i>	-0.07 (0.01)	-0.33*** (0.11)
<b>Direct effects</b>		
<i>LnAvgAmountPledgedPerBacker</i>		0.21** (0.11)
<i>LnBackers</i>		0.35*** (0.11)
Constant	0.22 (0.19)	0.95*** (0.16)
Observations	1,151	1,151
R-squared	0.11	0.42
Adjusted R-squared	0.10	0.42

**Notes:** Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 6.** Hypothesis tests results for SMS-based and internet-based crowdfunding models (H1a and H1b).

Hypothesized Relationships Based on Model 2	SMS-based model	Remarks	Internet-based model	Remarks

H1a	LnAvgAmountPledgedPerBacker → CrowdfundingSuccess	( $\beta= 0.34,$ $p=0.00$ )	Supported	( $\beta= 0.21,$ $p=0.048$ )	Supported
H1b	LnBackers → CrowdfundingSuccess	( $\beta= 0.47,$ $p=0.00$ )	Supported	( $\beta= 0.35,$ $p=0.00$ )	Supported
Post-Hoc Analysis					
	LnFundingDuration → CrowdfundingSuccess	( $\beta= -0.09,$ $p=0.00$ )	Valid	( $\beta= -0.03,$ $p=0.13$ )	Not Valid
	LnProjectGoal → CrowdfundingSuccess	( $\beta= -0.46,$ $p=0.00$ )	Valid	( $\beta= -0.33,$ $p=0.00$ )	Valid

**Notes:** \* $p = p\text{-value}$ .

The results in Table 7 and Table 8 show Wald tests for group invariance of parameters from the SEM estimation which enabled one-on-one comparison of viability parameters across the SMS-based model and internet-based model. Based on the results, we rejected the null hypothesis of equality in the means of all measurement coefficient. We could then assess hypothesis 2. Moreover, their coefficient sizes could be compared across the two models. Surprisingly, we find that social viability and economic viability have greater effect on crowdfunding success in SMS-based model than internet-based viability. This is contrary to our hypothesis 2. We discussed this finding later.

**Table 7.** Wald tests for group invariance of parameters based on SEM estimation.

Wald	$\chi^2$	df	$p > \chi^2$
Measurement on CrowdfundingSuccess			
<i>LnAvgAmountPledgedPerBacker</i>	241.19	1	0.00
<i>LnBackers</i>	277.79	1	0.00
<i>LnFundingDuration</i>	131.41	1	0.00
<i>LnProjectGoal</i>	638.75	1	0.00

**Notes:** Mean of Crowdfunding is restricted at 0 and variance restricted at 1. Degrees of freedom (df). Null hypothesis is that there are equal variances in the means of the parameters for both models

**Table 8.** Joint Wald test for each parameter class based on SEM estimation

	$\chi^2$	Df	$p > \chi^2$
mcoef	1282.91	4	0.000

**Notes:** mcoeff (measurement coefficients). The total degrees of freedom is 4 because 1 df is taken from each of the four mean comparison joint assessments as revealed by the total chi-square of 1288.35 in Table 7.

### 5.2. Robustness Tests and Post-hoc Analysis

We also run the models using seemingly unrelated regression (SUR) at robust standard errors to test for significant difference in the means of the parameters. The SUR method requires an initial OLS regression to compute residuals. Further, it allows for error terms to be correlated across the two model equations and provides more efficient estimates compared to the SEM results in Table 4 and Table 5. Like OLS, the SUR method assumes that all the regressors are independent variables, but SUR uses the correlations among the errors in different equations to improve the regression estimates making them more efficient. Our SUR estimation results in Table 9 are consistent with results from Table 4-6, providing strong support for hypotheses 1a and 1b.

**Table 9.** Results from simultaneous estimation of SMS-based and internet-based crowdfunding models in SUR

Variables	SMS-based model		Internet-based model	
	Crowdfunding Success [Invar]	SMSmodel _mean	Crowdfunding Success [lvar]	Internetmode l_mean
<i>LnAvgAmountPledgedPerBacker</i>		0.34*** (0.06)		0.21** (0.11)
<i>LnBackers</i>		0.47*** (0.06)		0.35*** (0.11)
<i>LnFundingDuration</i>		-0.09*** (0.01)		-0.03 (0.02)
<i>LnProjectGoal</i>		-0.46*** (0.06)		-0.33*** (0.11)
Constant	-2.86*** (0.04)	1.50*** (0.11)	-2.84*** (0.05)	0.95*** (0.16)
Observations	2,952	2,952	2,952	2,952

**Notes:** Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 11 presents the results for the joint Wald test of each parameter class. The first step in performing a Wald test in SUR is to run the full models simultaneously. There are four variables in each model resulting in 8 predictor variables for the joint comparison models test on crowdfunding success. The joint Wald test instructed Stata to test whether the coefficients for the

variables (listed below) are simultaneously equal to zero and that all the independent variables used to predict crowdfunding success are jointly significant our comparative modeling. In Table 11, chi-squared value of 3467.50 ( $df=8$ ) generated by the joint Wald test and associated  $p$ -value of 0.00 means we reject the null hypothesis (i.e., the coefficients of variables are not simultaneously equal to zero). The results in Table 10 and Table 11 revealed that including these variables in the comparative analysis 1) creates a statistically significant improvement in the fit of the model, 2) provides robustness to our findings from the covariance-based SEM and 3) shows that the two models are statistically different in their prediction of crowdfunding success.

**Table 10.** Wald test for equality of parameter across SMS-based and internet-based crowdfunding models in SUR estimation

Measurement on CrowdfundingSuccess	$\chi^2$	df	$p>\chi^2$
<i>LnAvgAmountPledgedPerBacker</i>	1.07	1	0.30
<i>LnBackers</i>	0.89	1	0.34
<i>LnFundingDuration</i>	6.18	1	0.01
<i>LnProjectGoal</i>	1.27	1	0.26

**Notes:** Null hypothesis is that parameter  $X_i$  in SMS-based equal to parameter  $X_i$  in internet-based model

**Table 11.** Joint Wald test for each parameter class simultaneous SUR estimation

	$\chi^2$	df	$p>\chi^2$
mcoef	3467.50	8	0.000

**Notes:** mcoeff (measurement coefficients)

Funding duration is significant in the SMS-based models and the effect on crowdfunding success is negative implying that the longer project campaigns run, the lesser the crowdfunding success. However, this effect is not applicable to internet-based crowdfunding model. Project goal is negatively associated with crowdfunding success in both models implying setting higher and unrealistic goals are detrimental to the success of the campaign. We estimate a single model with combined data from both SMS and internet model and included project description in the regression model. SMS-based campaigns had no project descriptions. We found no significant effect of the presence of project description in the model. Further textual analysis is required to ascertain the relative impact of project description on crowdfunding success. This result complement prior studies (Jiang et al., 2020; Zhou et al., 2018) that focus on the content of project description rather than its mere presence in a campaign

## 6. Discussion

SMS crowdfunding presents a viable alternative to traditional online crowdfunding methods, offering economic and social readiness to individuals confronting the digital divide (Matanji, 2019; Y. Zheng, 2020). Our empirical investigation highlights the efficacy of SMS crowdfunding as a plausible substitute for online crowdfunding methods in marginalized regions with limited internet access or low levels of technology adoption (James & James, 2016; Kizza, 2013). Unlike online crowdfunding methods, which require internet and banking access, the ubiquity of mobile phones makes it effortless for fundraisers to establish campaigns, receive donations, and monitor progress via text messages. We posit that the ease of use and accessibility of SMS crowdfunding render it a valuable option for fundraisers operating in these resource-constrained settings. That, SMS crowdfunding's effectiveness and suitability demonstrate its potential to democratize access to funding and promote financial inclusion, as well as drive social and economic readiness in under-resourced communities. Thus, our study accentuates the significance of seeking alternative solutions to the digital divide in underserved regions (Kizza, 2013; Y. Zheng, 2020).

Contrary to our initial hypothesis, our findings indicate that SMS crowdfunding not only presents a viable alternative but also a superior one to online crowdfunding. Our explanation is based on the fit-viability theory, which suggests that the success and sustainability of a technology depends on its compatibility with the existing infrastructure and its ability to meet the needs of users (Larosiliere & Carter, 2016; T.-P. Liang et al., 2021). The theory posits that the alignment between the technology and the socio-cultural, economic, and technical contexts in which it is used is crucial for its adoption and long-term use (T.-P. Liang et al., 2021). SMS crowdfunding is dominant in Kenya due to its compatibility with the country's mobile infrastructure and payment systems, its ability to meet the cultural and practical needs of users with limited access to digital devices and internet connectivity, and its simplicity and ease of use. We proposition that these factors contribute to the alignment of SMS crowdfunding with the Kenyan context, resulting in its superior adoption and sustainability compared to other crowdfunding platforms in the region.

SMS crowdfunding is a significant fundraising mechanism due to its compatibility with the country's mobile infrastructure and payment systems. The widespread use of mobile money services such as M-Pesa and the prevalence of mobile phones in Kenya make it easy for almost anyone to participate in SMS crowdfunding (Mas & Radcliffe, 2010; Mbogo, 2010). Additionally, we contend that SMS-based payment systems are more user-friendly and convenient than online payment systems, which can be complex and require technical knowledge, particularly for individuals with limited financial literacy. SMS-based platforms provide a straightforward and accessible means for individuals and organizations to access potential supporters and mobilize funds, even in areas with limited internet access or those who cannot afford digital devices. The support of mobile network operators, financial institutions, and

non-profit organizations also strengthens the viability of SMS crowdfunding campaigns by providing technical and financial resources. For example, Safaricom, the largest mobile network operator in Kenya, provides tools and resources to support SMS fundraising campaigns (Buku & Meredith, 2012). Therefore, the compatibility of SMS crowdfunding with Kenya's existing mobile infrastructure and payment systems plays a significant role in its adoption and sustainability.

SMS crowdfunding meets the cultural and practical needs of users in Kenya by tapping into the strong sense of community and the traditional practice of harambee, which involves coming together to support a common cause or goal (Oyugi et al., 2014; Wolf, 2017). SMS-based crowdfunding platforms offer a culturally relevant form of fundraising that reinforces existing social ties and relationships, leading to greater personal investment by supporters in shared projects. The ease with which SMS messages can be shared among friends and family members allows project information to spread quickly within tight-knit social circles (Markovich & Achwal, 2015; Matanji, 2019). This makes SMS crowdfunding a more effective means of penetrating existing social networks and connecting with potential supporters in marginalized societies compared to traditional crowdfunding platforms that may face challenges due to platform unfamiliarity, lower levels of trust in digital platforms, and a perceived lack of alignment with local cultural values and norms (Chao et al., 2020).

In addition to the benefits of penetrating existing social networks, SMS-based crowdfunding platforms also complement offline fundraising culture in Kenya (Gras et al., 2017; Salido Andrés et al., 2019; Stiver et al., 2015). For example, Kenyans' harambee fundraising tradition involves face-to-face interaction and collective contributions to a common goal. SMS crowdfunding can enhance this tradition by offering an additional means of communication and fundraising that can be used alongside traditional methods. Supporters can use SMS messages to coordinate offline fundraising events, such as community gatherings or door-to-door solicitation of donations (Markovich & Achwal, 2015). Overall, SMS-based crowdfunding platforms offer a culturally relevant and complementary form of fundraising that can strengthen existing social ties and relationships while overcoming the challenges of traditional fundraising methods. By leveraging the power of SMS messages, organizers can tap into the strong sense of community in Kenya and beyond to mobilize supporters and achieve shared goals.

The study also provides compelling evidence to support the notion that SMS crowdfunding is a financially sustainable option, particularly in developing countries like Kenya. SMS-based payment systems offer significantly lower transaction costs than online crowdfunding, which is crucial in facilitating greater financial benefit for both donors and recipients (Micheni et al., 2013). The lower transaction costs also make SMS crowdfunding more accessible to individuals and organizations with limited access to traditional financial services, thereby enhancing the potential for greater participation in crowdfunding campaigns (Micheni et al., 2013). SMS-based

platforms through robust mobile money services enable faster disbursement of funds, reducing the costs associated with holding funds for extended periods (Kizza, 2013; Markovich & Achwal, 2015; Mas & Radcliffe, 2010). This increases the financial viability of crowdfunding for specific projects, generating greater funding support from backers compared to online crowdfunding. In conclusion, the evidence presented in this study underscores the transformative potential of mobile technology in overcoming traditional fundraising barriers and expanding financial access in developing countries. The findings contribute to the ongoing discourse on digital inclusion and financial services and provide a compelling case for the adoption of SMS crowdfunding as a financially sustainable option for fundraising campaigns.

Our findings also suggest that there is a negative correlation between the duration of SMS-based crowdfunding campaigns and project success. SMS campaigns rely heavily on a sense of urgency and immediacy to prompt donors to contribute quickly (Eagle, 2010; Goecks et al., 2008). This urgency is particularly important when targeting low-income or marginalized communities where donors may have limited disposable income and are more likely to contribute when they feel a sense of urgency or a need to act quickly. However, if the campaign duration is too long, it may lose momentum and fail to gain the necessary traction to reach its fundraising goal. Additionally, sustaining engagement over a longer period can be challenging for SMS-based campaigns as SMS messages may not be as effective at maintaining interest and engagement over time. Donors may lose interest or become less responsive to campaign updates and donation requests. Therefore, it is critical for SMS-based crowdfunding campaigns to balance urgency with sustained engagement by setting a realistic fundraising goal and timeline, providing regular updates, and utilizing other communication channels to complement SMS messages and sustain engagement over a more extended period.

### *6.1. Theoretical Implication*

This study offers a valuable contribution to the crowdfunding literature by applying the fit-viability theory to assess and compare crowdfunding models (Beaulieu et al., 2015). As one of the few studies to do so, it provides empirical evidence for the extension of this theory's contextual application in the crowdfunding context (T. Liang et al., 2007; T.-P. Liang et al., 2021). The findings emphasize the importance of considering both fit and viability factors when designing and implementing crowdfunding strategies in marginalized communities. In particular, SMS-based crowdfunding emerges as a more viable and effective approach in marginalized contexts. The compatibility of SMS-based crowdfunding with local social networks and community ties, as well as its minimal technological requirements and accessibility, contribute to its superior viability and compatibility in these settings. Thus, our study provides important implications for crowdfunding practice and highlights the need for future research to further investigate the fit-viability framework in the context of crowdfunding.



The present study contributes to the literature on the in-group nature of marginalized societies (Isham et al., 2002) and underscores the efficacy of SMS-based crowdfunding platforms in tapping into the social networks and community ties that are deeply ingrained in these communities. This approach is consistent with the cultural values, norms, and traditions of marginalized societies, where social ties serve as a crucial source of support and protection in the face of economic and social challenges (Annen, 2001; Chao et al., 2020; Isham et al., 2002). By enabling the rapid dissemination of project information within tight-knit social circles, SMS-based platforms reinforce social ties and relationships, leading to increased engagement and support for crowdfunding campaigns. In contrast, online crowdfunding platforms may face difficulties in penetrating these social networks, as they are perceived to be disconnected from local cultural values and norms, and may not engender trust among potential supporters (Chao et al., 2020; Wolf, 2017). Overall, the findings of this study have significant theoretical implications for understanding the role of cultural relevance and community ties in shaping fundraising strategies in marginalized societies.

The advent of SMS-based crowdfunding adds a new dimension to the fundraising landscape, particularly in regions with limited access to digital devices and internet connectivity (DiMaggio & Hargittai, 2001). Extant literature on offline complementarities highlights the potential benefits of integrating online and offline fundraising strategies to enhance the success of crowdfunding campaigns (Gras et al., 2017; Ogwu et al., 2022; Salido-Andres et al., 2019), and SMS crowdfunding presents an opportunity to bridge this gap. Beyond the digital realm, SMS crowdfunding initiatives could be bolstered by supplementary offline engagements, such as community outreach programs, charity events, and word-of-mouth advocacy.

Our study contributes to the discourse on digital equity by providing insights on how donation-based crowdfunding can be leveraged to bridge the digital divide for socio-economically disadvantaged individuals, even among those with formal access to the internet (James & James, 2016; Kizza, 2013). The research also has significant implications for marginalized communities in addressing the digital divide. It challenges the notion that online platforms are always the superior choice when utilizing digital technologies for social and economic development (Adjakou, 2021; Bank, 2013; Beaulieu et al., 2015), emphasizing the importance of considering the local context and the unique challenges and opportunities presented by the digital divide. These findings underscore the need for a more nuanced and context-specific approach to digital development in marginalized communities. By recognizing the limitations and potential biases of digital technologies, researchers and practitioners can design more inclusive digital campaigns that leverage the strengths of different technologies and platforms to promote economic and social development, bridge the digital divide, and address the challenges faced by marginalized communities.

This study contributes a novel and valuable empirical evaluation of the offline crowdfunding model, which has been largely overlooked in prior qualitative and conceptual studies (W. Chen & Givens, 2013; Choi & Kim, 2016; Gras et al., 2017; Salido-Andres et al., 2019; Stiver et al., 2015; Y. Zheng, 2020). In contrast to online crowdfunding models, the scarcity of available data on alternative offline crowdfunding methods has limited previous research in this area. Our study addresses this gap and extends the fit-viability theory by providing an empirical comparative model to evaluate the fit and viability of offline crowdfunding particularly SMS fundraising. Our findings shed light on the effectiveness of offline crowdfunding and its complementarity with online crowdfunding, offering practical implications for practitioners and theoretical implications for researchers in the field of crowdfunding. Thus, our study contributes to the advancement of the literature on crowdfunding and provides a foundation for future research and practice.

Overall, this study adds to the growing literature on donation-based crowdfunding, digital divide and inequality, and the fit-viability perspective on IT-platform backed project success. Our results indicate that SMS-backed crowdfunding is a feasible option in comparison to online models, which can help reduce digital inequality and bridge the digital divide. Our empirical findings extend the definition of crowdfunding awareness proposed by Vaznyte et al. (2020), highlighting how SMS-based models can encourage support for entrepreneurial ventures and social projects in underserved regions. This study sheds light on the underlying motivations of individuals who back projects in these regions and contributes to a more nuanced understanding of the potential of offline crowdfunding. The fit-viability theory provides a framework for understanding how SMS crowdfunding in Kenya has been able to overcome traditional barriers to fundraising and increase financial access for individuals and organizations with limited resources. Its compatibility with existing infrastructure and ability to meet users' needs, combined with its demonstrated effectiveness and viability, make SMS crowdfunding a promising example of the transformative potential of technology in developing countries' financial services.

## *6.2. Practical Implications*

The present study underscores the significance of considering the broader social and cultural context in designing and implementing crowdfunding campaigns (Cho & Kim, 2017; H. Zheng et al., 2014), particularly in marginalized and developing communities. The findings demonstrate that the nature of social networks and community ties may vary widely across different contexts, and this can have profound implications for the effectiveness of crowdfunding platforms. As such, practitioners should consider the cultural factors that underlie the communities they aim to serve. This may entail the creation of platforms that are attuned to local customs and practices, as well as leveraging existing social networks and community ties to encourage engagement and support. Adopting a more nuanced and context-specific approach to crowdfunding can enable

researchers and practitioners to better appreciate the unique dynamics and factors that drive crowdfunding success in different communities.

Further, our findings complement prior studies on mobile money adoption (Eagle, 2010; Kizza, 2013; Mbogo, 2010; Micheni et al., 2013) by highlighting its potential to facilitate the use of SMS-based crowdfunding. The use of mobile money as a payment channel in SMS crowdfunding not only enhances the security and ease of donating but also provides an accessible payment method for individuals with limited access to formal financial services (Kizza, 2013). The combination of SMS-based crowdfunding and mobile money systems may have particularly salient implications for fundraising campaigns in marginalized communities, where access to traditional banking services is often restricted. Thus, the integration of SMS-based crowdfunding and mobile money systems represents a novel and potentially impactful approach to fundraising in underserved regions.

The study's findings challenge the assumption that the latest and most sophisticated digital platforms are always the best means of leveraging technology for social and economic development (Adjakou, 2021; Chao et al., 2020; Wolf, 2017). Instead, the study suggests that a more effective approach may involve leveraging existing mobile technologies, which are often more prevalent and accessible in marginalized and developing communities. By understanding the limitations and challenges of digital technologies, practitioners can design more effective and inclusive approaches to social and economic development that are tailored to the unique needs and circumstances of different communities. In particular, the study highlights the success of SMS-based crowdfunding platforms in Kenya, which suggests that practitioners should consider the potential of mobile and offline technologies to drive crowdfunding success in other contexts as well. Overall, the study's emphasis on context-specific approaches to technology and development underscores the importance of carefully considering the unique challenges and opportunities posed by the digital divide.

### *6.3. Policy Implications*

To address the digital divide in fundraising, it is crucial to ensure access to mobile technology, especially in developing countries where traditional computer-based platforms may not be accessible. Policymakers can prioritize mobile technology to provide inclusive crowdfunding opportunities to marginalized communities. Governments can invest as well as improve telecommunication and mobile money infrastructure to enable more individuals to participate in mobile-based crowdfunding platforms. This can have positive effects on economic growth, development, social and economic empowerment. Furthermore, supporting mobile-based crowdfunding platforms can stimulate innovation, entrepreneurial activity, and job creation in marginalized communities. Therefore, governments must give priority to enhancing access to mobile technology and improving telecommunication and mobile money infrastructure to

overcome the digital divide and establish inclusive crowdfunding ecosystems that support social and economic development objectives.

## **7. Conclusion**

The importance of crowdfunding cannot be understated: the financing mechanism presents marginalized communities with the opportunity to fund venture and charity projects. Guided by the fit-viability theory, this study adds to the plethora of conceptual and empirical literature on how to overcome the digital-divide and expand the crowdfunding market to developing regions. In this context, SMS crowdfunding provides an equitable chance in addressing digital inequalities by simultaneously enhancing access to, and relative success of crowdfunding projects. The study highlights the importance of embracing a nuanced and context-specific approach to crowdfunding. Practitioners should avoid relying on broad generalizations and assumptions, and instead prioritize local knowledge and understanding to design campaigns that are tailored to the unique cultural and social dynamics of the communities they are serving.

### *7.1. Limitations, and Future Work*

This study utilized the digital divide fit-viability framework to explore the compatibility of two crowdfunding models in a developing country. To provide more in-depth findings, future studies can categorize crowdfunding projects according to Mollick's typology (Mollick, 2014). This approach can reveal how different project types perform in SMS-powered and internet-based crowdfunding campaigns and identify factors that contribute to crowdfunding success in developing regions. Ultimately, incorporating Mollick's categorization scheme can deepen our understanding of the crowdfunding landscape in developing regions and inform the development of more effective crowdfunding strategies.

To address the absence of project descriptions in SMS-powered crowdfunding campaigns, future studies may explore the use of simulation mechanisms that can simulate the transmission of project information via SMS. By doing so, researchers can examine the impact of project descriptions on SMS-powered crowdfunding campaigns and compare it with their impact on internet-based crowdfunding models. Additionally, text analysis techniques can be employed to analyze the impact of project descriptions on internet-based crowdfunding models in developing regions. These complementary methods can provide a more nuanced understanding of the role of project descriptions in the success of crowdfunding campaigns and inform the development of effective crowdfunding strategies in developing regions.

To enhance the generalizability of research findings on the compatibility of SMS and online crowdfunding with the local context in developing regions, future studies should adopt a mixed-methods approach that integrates qualitative and quantitative research methods. In particular, employing methods such as in-depth interviews, focus groups, and case studies can yield a

nuanced and in-depth understanding of the experiences and perspectives of users and communities with these technologies. By doing so, the complex and context-specific factors that influence the adoption and success of these technologies, including the digital divide, can be more comprehensively examined. Ultimately, a multi-context analysis that incorporates both qualitative and quantitative methods can generate a more robust and evidence-based understanding of the compatibility of SMS and online crowdfunding with the local context in developing regions.

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