Review of Managerial Science
https://doi.org/10.1007/s11846-025-00939-1

ORIGINAL PAPER

Everyday entrepreneurship in poverty: a focus on the networks of the developing world

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Received: 1 May 2025 / Accepted: 6 September 2025

Abstract

Slums are singled out as 'outposts' of inescapable clutches of poverty. This widely held assumption overlooks everyday entrepreneurship in slum–based networks of donated community asset vouchers (CAVs). Utilising the closeness centrality literature, we examine 185,227 transactions involving 4972 slum entrepreneurs across 60 Kenyan shanty towns. Leveraging the panoramic view afforded by their closeness centrality position in their networks, they establish a slum system of economic and social interactions based on timed CAV circulations. This contributes to research by extending the concept of networks to incorporate closeness centrality in unusual slum–based CAV networks with economic, policy, and social implications for over a billion people the UN–Habitat categorises as inhabitants of slums or shanty towns scattered across many parts of the developing world.

Keywords Everyday entrepreneurship · Poverty · Community asset vouchers · Networks

JEL Classification L14 · L26 · O17 · O55

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Published online: 24 September 2025

1 Introduction

Existing entrepreneurship research recognises networks as 'wellsprings' of essential resources nascent businesses draw upon for their sustainable development (Anderson and Jack 2002; Hallen et al. 2020; Sytch and Tatarynowicz 2014; Wang et al. 2022). Within this scholarship, there is also near–universal agreement that the basis upon which resources embedded in superior networks are generated and exchanged depends on how those involved, including individuals, businesses, and institutions, relate to each other (see Chell and Barnes, 2000; Halevy et al. 2019; Hernández–Carrión et al., 2020; Lechner et al. 2006). Scholarly research elsewhere acknowledges that relationships emerging in such communities of economic and social interactions take different forms ranging from the creation of 'small worlds' or cliques, strategic alliances, dyadic and triadic relationships, vertical as well as horizontal ties (Aldrich and Kim 2007; Ba et al. 2023; Borgatti and Everett 2000; Gulati et al. 2012). The guiding principles of reciprocity, benevolence, and goodwill have been mentioned as the backbone sustaining such types of linkages (Gervasi et al. 2022; Molm et al. 2007; Schilke et al. 2021). However, an issue that research has yet to consider relates to how individuals are forced to rely on everyday entrepreneurship in slums relate socially and economically in networks of donated community asset vouchers (CAVs), one would consider non–superior networks. Everyday entrepreneurship is used in this study to describe everyday actions associated with entrepreneurial engagement to avert pressing economic and social hardships and in a poverty setting (Lent 2020). Thus, focusing on issues associated with everyday entrepreneurship in non–superior networks of people facing poverty (see Hossein 2013) is important as they dominate many regions of the developing world home to over a billion people (UH–Habitat, 2023a, b)

Against that backdrop, this study develops theoretical explanations at the intersection of entrepreneurship and poverty in the context of slum–based networks of CAVs. CAVs are a form of a digital community currency established on a block–chain like platform and are often donated to poor communities to complement the scarcity of fiat money (Kuk et al. 2022; Ruddick 2023). Their use is often limited by geographical location (Mattsson et al. 2023; Zapata Campos et al. 2023). Considering that CAVs are territorially–confined, this study extends the network theory's concept of closeness centrality to develop theoretical explanations to account for how individuals engaged in everyday entrepreneurship access, preserve (hold), and use CAVs. Academic work on slums identifies the desperation caused by restricted employment prospects and access to essentials as a force behind everyday entrepreneurship in slums (Mahadea and Zogli 2018). Drawing on this phenomenon–theory interface, we advance new perspectives that account for subtle interrelationships between CAV usage, entrepreneurial individuals, and slum communities (cf. Abubakar et al., 2019). For this research endeavour, the following research question guides the inquiry of this study:

How do individuals engaged in everyday entrepreneurship alleviate their economic and social hardships in slum–based networks of donated community asset vouchers?

This phenomenon theory–driven question requires a focus on entrepreneurship and networking. From that perspective, a focus on slum–based networks and systems in Kenya's expansive slum regions (see UN–Habitat 2023a, b) provided us an opportunity to address the question above fully. Documentary evidence suggests that Kenya's rapid urbanisation created towns in which government resources were insufficient to support township residents (UN–Habitat 2023a, b). The urbanisation programme led to sprawling informal settlements in the form of slums. In that context, the study draws attention to individuals at the core of everyday entrepreneurial activities in unique networks characterised by poverty and a donated medium for enabling localised social and economic exchanges. In doing so, it contributes to research in the following ways.

First, the findings of this study contribute to network theory (Borgatti and Halgin 2011). From our research results, we deduce theoretical explanations of how individuals involved in everyday entrepreneurship leverage the panoramic view presented by their closeness centrality position in a slum system of economic and social interactions to influence the circulation of CAVs in their poverty scenario. This extends the concept of closeness centrality (Brandes et al. 2016) to account for how entrepreneurial individuals in slum–based CAV networks obtain, preserve, and influence the circulation and flow of donated CAVs. Through our empirical results, we were able to identify that their proactive behaviour at the height of endemic cycles of poverty exhibited uncharacteristically high–order cognitive abilities engendered by their acute awareness of their social surroundings (Morris and Tucker 2023; Morris et al. 2018). Thus, we contribute new knowledge showcasing the essence of entrepreneurship as a mindset needed to tackle poverty (Chikweche and Fletcher 2017; Sutter et al. 2019).

Second, the findings of this study contribute contextual insights (Morris et al. 2023; Simba 2024). Our test results uncover complex interrelations reflecting patterns of localised economic and social slum systems bound by ties peculiar to networks of donated CAVs in a poverty scenario. From that perspective, its findings contribute theoretical explanations based on indigenous knowledge to discern interactions embedded in localised economic and social slum systems. This is also consistent with recent research calls advocating for contextualising theory building in entrepreneurship and management research (Simba 2024; Welter 2011; Wickert et al. 2024).

Third, the findings of this research have far–reaching implications. With over a billion people estimated to be living in slums or slum like conditions (UN–Habitat 2023a, b), they encourage debate on social reforms targeted at alleviating poverty in such a way that enables equal and sustainable communities and cities. Focusing on such societal–level reforms can potentially lead to policies that foster equal access to resources and prosperity for all, particularly for disadvantaged communities. For researchers, the new theoretical explanations about closeness centrality in slum–based networks suggest the need for more research to explore everyday entrepreneurship actions sustaining poor neighbourhoods.

While extensive research on the role of intermediaries in networks (e.g., Burt and Merluzzi 2016; Goyal and Vega–Redondo, 2007; Valente and Fujimoto 2010) has been successful in describing the relational dynamics they create, it has, however,

based its analysis on superior networks (Chell and Barnes, 2000; Lechner and Dowling 2003; Zaheer and Bell 2005). This approach has overlooked the interrelationships in networks established in slums, particularly those involving donated financial resources. This oversight of social interactions in such a large community necessitates research that produces theoretical explanations to depict how they relate economically and socially, as a priority.

Indeed, and to that end, we develop theoretical explanations at the phenomenon–theory interface to describe everyday entrepreneurship involving individuals who occupy central positions in slum networks (Freeman 1978; Hallen et al. 2020). Specifically, we develop the concept of closeness centrality (Brandes et al. 2016) to decipher the behaviours and actions entrepreneurially–minded individuals exhibit in unusual networks of community asset vouchers common in poor neighbourhoods. Such an approach is essential, especially when the goal is to develop alternative theorizations of networking in non–superior networks of CAVs embedded in poverty scenarios. Indeed, it provides a robust theoretical basis for developing an understanding of the mindsets of individuals involved in everyday entrepreneurship in slums. Moreover, this approach advances the understanding of how they systematically leverage a panoramic view, presented by their closeness centrality position in slum systems of complex economic and social interactions, to influence the circulation of CAVs. This contributes new perspectives to the extant research on networks and entrepreneurship by conceptualising closeness centrality in non–superior networks involving donated CAVs and everyday entrepreneurship. That is very important as it addresses an unsubstantiated assumption in research in which the poor are often associated with lacking economic know–how or creative capacities.

2 Hypotheses development

The hypotheses for this inquiry centre on a unique phenomenon involving everyday entrepreneurship in slums or slum–like conditions. They elaborate on the mindset adopted by individuals who occupy seemingly central positions in slum–based networks. Unlike superior networks endowed with abundant tangible and intangible resources (Soetanto and Jack 2013), slum–based networks feature donated community asset vouchers. Against that backdrop, we theorise how, in slums, individuals engaged in daily entrepreneurship accumulate reserves of these vouchers to empower them to influence their circulation within their impoverished neighbourhoods. To articulate their everyday entrepreneurship and position in networks established in these impoverished neighbourhoods, we begin our hypotheses by defining how they accumulate a crucial medium of exchange—donated community asset vouchers—despite their poverty situation. Building insights into their economic and social interactions based on how they utilise donated community asset vouchers rarely feature in mainstream research, yet as previously stated, there is a community of a billion people reported to be living in slums or slum-like conditions across the developing world (Davis 2006; UN–Habitat 2023a, b).

2.1 The essentials of slum life

Research suggests that exclusion and deprivation are prominent features in the life experiences of many slum dwellers (Huchzermeyer 2011; Satterthwaite 2001). Compared with the life chances of inner–city dwellers, the United Nations noted that the opportunities of a decent living for those who live in slums are significantly lower (McFarlane 2012; UN–Habitat 2023a, b). The world humanitarian body points to their reduced capacity to secure formal employment due to a lack of social capital and lower education levels as the primary reasons (UN–Habitat 2003, 2008). Explained in another way, their systematic exclusion from 'regular society' is mediated by signifiers of social class, education levels, and high unemployment (Barinaga 2022; O'Donnell, 2020; Rudewicz 2020). Previous studies reveal that the majority of slum residents have only one viable option to escape urban poverty: a challenging, unstable rural life, where infrastructure and services are lacking, and personal freedoms are increasingly limited (de Soto 2000; O'Donnell, 2020).

The United Nations suggest that slum dwellers have limited access to regular sources of finance to develop their own enterprises (UN–Habitat 2003, 2008). Banks do not usually have branches in slums, and if they do, the lack of legally registered collateral often excludes all, including the most well–off slum dwellers, from obtaining loans (UN–Habitat 2003, 2008). Notwithstanding this dire situation slum dwellers must confront in their day–to–day living, community–based currencies have provided them a lifeline (Kuk et al. 2024; Mattsson et al. 2023; Viano 2024).

Research suggests that this type of currency is generally promoted to ensure that a bigger part of savings and local income circulates within the local community (Michael and Hudon, 2015; Bendell et al. 2015). Such currencies represent grassroots innovations developed on a bottom–up approach—a contextualised mechanism that enables sustainable development through directly responding to a local situation and the interests of the communities involved (Barinaga 2022; Ruddick 2011; Seyfang and Smith 2007). Community currencies, including but not limited to *Sarafu, Eco–pesa, Community Asset Vouchers* (see Ruddick 2011, 2023; Kuk et al. 2022) function as vital mediums enabling everyday entrepreneurship. They are grassroots financial innovations (Seyfang and Longhurst, 2013) that help to keep money circulating within a particular locality (Mattsson et al. 2023). Crucially, they promote alternative pathways to socio–economic development (Kiaka et al. 2024). Thus, we propose the following hypotheses.

H1 Community asset vouchers enable slum dwellers to accumulate (gain) financial resources necessary to sustain their livelihoods through everyday entrepreneurship in their impoverished neighbourhoods.

2.2 A proactive mindset in a poverty scenario

As highlighted in the text for the first hypothesis, the conditions in most slums are deplorable (Rudewicz 2020). Research identifies that these settlements have the most deplorable living and environmental conditions characterised by inadequate water supply, squalid conditions of environmental sanitation, hazardous location,

overcrowded and dilapidated habitation, as well as economic and social deprivation (Arimah 2010; Bird et al. 2017; Davis 2006; McFarlane 2012). These poverty scenarios are known for their severe resource shortages (Simba et al. 2021). However, McFarlane (2012) has shown that such contexts also trigger high–order cognitive capabilities among affected groups, inspiring them to preserve and deploy often scarce resources in a way that maximises potential returns. Against the backdrop of despair, research describes slums as 'outposts' of encouragement and endurance where inventiveness and entrepreneurship define livelihoods and survival (Seabrook, 1996).

In view of that and the central argument developed in this study, it is possible that slum conditions provide proactive individuals the impetus to be entrepreneurial—acquiring, holding, and preserving essential resources as they engage in their everyday entrepreneurship (Kuk et al. 2024). For example, research identifies that in community currency–inspired programmes, inventive individuals stimulate local everyday trade and consumption in such a way that addresses unmet local needs (Sillen 2017). This is important for people living in slums or slum–like conditions who are often cash–strapped (Kuk et al., 2021). Community currency vouchers provide impoverished neighbourhoods with a supplementary means of exchange, enabling them to trade and access essential commodities (Ruddick and Mariani 2013). Crucially, these vouchers not only provide an alternative source of finance for impoverished areas but also permit adventurous individuals to accumulate savings to invest in their local businesses (Sillen 2017). Ruddick and Dissaux (2017) propose that community asset vouchers are central in social and economic exchange systems in rural and informal settlements (slums). Most importantly, their ability to replace often scarce fiat money means they provide an alternative means for accessing essential commodities. In a sense, a community currency functions as a currency for daily use, affording those engaged in everyday entrepreneurship the chance to generate sales, augment savings, and make vital business investments (Camilla 2019; Sillen 2017). Thus, we propose:

H2 Proactive individuals residing in slums utilise community asset vouchers for their everyday entrepreneurship, consequently generating surplus vouchers for ongoing business.

2.3 Networks of community asset vouchers

While our second hypothesis emphasised how individuals involved in everyday entrepreneurship in slums or slum–like conditions leverage community currency vouchers for profitable social and economic exchanges, the third hypothesis illustrates how their closeness centrality in community asset voucher networks gives them an advantage (Brandes et al. 2016; Burt and Merluzzi 2016). Indeed, due to their position in networks of community asset vouchers, these everyday entrepreneurs have a panoramic view of the social interactions in their surroundings (Borgatti 2005; Borgatti and Everett 2000; Brandes et al. 2016). The wider literature on networks describes the benefits associated with nodes that occupy a central position in deliberately established networks (Borgatti and Halgin 2011; Fernandes and Ferreira

2022; Gulatiet et al., 2000; Owen–Smith and Powell, 2004). Within this literature, it is widely acknowledged that nodes occupying a central position in a network have the opportunity to exploit the advantages provided by indirect ties through direct ties (Ahuja 2000; Larrañeta et al. 2020). Moreover, their central position is known to give them the ability to acquire diverse and non–abundant knowledge from other network alters (Phelps et al. 2012; Wang et al. 2019). Based on this logic, it is plausible to suggest that proactive slum dwellers, embedded in networks of community asset vouchers, can influence their circulation because of their broad perspective and awareness of the economic and social dynamics within their impoverished environments. Thus, the following hypothesis is proposed.

H3 Slum dwellers engaged in daily entrepreneurship accumulate reserves of community asset vouchers due to their closeness centrality, granting them a comprehensive view and awareness of the economic and social interactions within their CAV networks.

Considering that community asset vouchers are limited by geographical location (Mattsson et al. 2023; Zapata Campos et al. 2023), it can be difficult to ascertain whether individuals engaged in everyday entrepreneurship may also function as a bridge. In spatial connections that characterise slum contexts, network bridging or brokerage defines how a node functions as a conduit connecting diverse networks and nodes within and beyond their immediate proximity (Halevy et al. 2019; Obstfeld et al. 2014). The broader literature on brokerage tends to focus on the implications and extensions of brokerage structure, as well as the relative merits of closed and open networks involving large organisations (Ahuja 2000; Burt 1992). This literature centres its debate on complex and dynamic settings involving brokerage intensity, or the relative effort and range of brokerage behaviours (i.e., *tertius gaudens, tertius iungens*, and conduits) at a given broker's disposal, and the ratio of *tertius iungens* and *tertius gaudens* activity (Obstfeld et al. 2014). Whilst this concept is frequently discussed in the literature, from the standpoint of a large organisation or firm, we propose the following hypothesis to test its impact, or lack thereof, in CAV networks established in poverty scenarios.

H4 Slum dwellers who engage in everyday entrepreneurship leverage their brokerage position in CAV networks to accumulate community asset vouchers.

2.4 Everyday entrepreneurship in slums

Considering the daily struggles for survival associated with slums (Kuk et al. 2024), everyday entrepreneurship involving essential commodities defines the livelihoods of many people living under slum–like conditions (Thieme 2015). Indeed, everyday entrepreneurship is an integral part of survival in slums (Fisher 2012). Due to the constant search for essential commodities in slums, entrepreneurism is unavoidable (McFarlane 2012). In impoverished contexts, it becomes a repetitive process frequently resulting in localised communities of economic and social exchanges (Doyle 2017). The majority of local enterprises appear to defy the fundamental logic

of entrepreneurship by investing in available capital, applying specialised skills, and generating profit whilst accepting risk (Berner et al. 2012; Orwa et al. 2019). In addition to our theorizations in H2 of the essence of the closeness centrality position of slum entrepreneurs in CAV networks, their repeated access and creative use of community asset vouchers enhance their entrepreneurship capabilities, seizing or creating business opportunities (Thieme 2015). Based on that assumption, we reason that:

H5 The more slum entrepreneurs utilise community asset vouchers, the more they create opportunities, enabling them to influence trade in their poor neighbourhoods.

3 Conceptual framework

Figure 1 is based on the assumption that community asset vouchers provide a baseline for the economic and social interactions unfolding in slum–based CAV networks. It illustrates how proactive individuals, presented as slum entrepreneurs in Fig. 1, play an influential role in which they sustain livelihoods through pivoting on CAVs and everyday entrepreneurship in slum–based CAV networks. The overarching assumption is that, given their closeness centrality position in slum–based CAV networks, they leverage a panoramic view presented by their closeness centrality position in their networks to establish a slum system of economic and social interactions based on timed CAV circulations.

4 Methodology

4.1 Sample and data description

The research population consists of 19,892 slum dwellers situated in 60 Kenyan slum communities (Mqamelo 2021). These communities are located in rural and

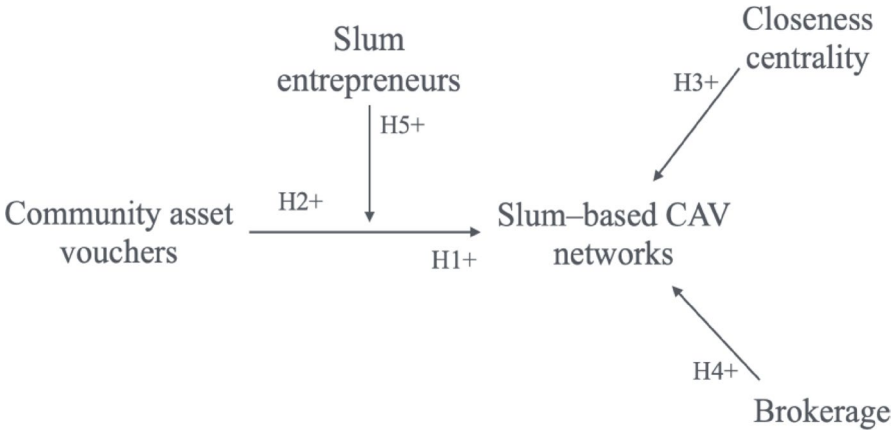

Fig. 1 Conceptual framework

peri–urban regions, including the county of Mombasa and Nairobi metropolitan areas (Barinaga and Zapata Campos 2023; Ruddick 2011). Between April 2022 and July 2023, residents carried out 199,907 transactions using community asset vouchers to purchase and sell goods, labour, and other essential services. Furthermore, both Table 1 and Fig. 2 emphasise the skewness in this distribution.

As shown in Table 1, less than 25% of these slum dwellers use CAVs more than twice a month, with the majority (75%) using CAVs only occasionally. Additionally, most individuals vary their CAV usage on a monthly basis. Consequently, the CAV network we focus on is dominated by a few active users who generate multiple transactions or create connections between clusters (Burt and Soda, 2021), as shown in Fig. 3. The networking map in Fig. 3 also indicates that a few slum dwellers established a large number (V3943) of ties in these CAV networks, while others had minimal connections.

In addition to providing an overview of CAV usage, Table 2 below presents the digital wallet balances of entrepreneurial slum dwellers who participated in slum–based CAV networks. These balances act as a proxy for the financial gains of this group of proactive dwellers. Table 2 illustrates the distribution of their gains as of July 2023.

The median gain is 6.80 Kenyan shillings (KES), equivalent to 0.05 USD. Only 25% of slum dwellers were able to significantly benefit from transacting in CAVs within their locality. The maximum gain recorded was 559,089 KES (4,276 USD), a notable amount in counties or villages where people live on less than 2 USD a day. Given that the focus of this research was on how CAVs can contribute to poverty reduction in slums, we restrict our sample to the 25% of users who consistently

Table 1 Percentile distribution of monthly transactions

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. summarize monthly_transactions, detail
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Monthly_transactions

Percentiles		Smallest		
1%	1	1		
5%	1	1		
10%	1	1	Obs	45,790
25%	1	1	Sum of Wgt.	45,790
50%	2		Mean	4.365735
		Largest	Std. Dev.	10.16493
75%	2	179		
90%	9	193	Variance	103.3259
95%	21	207	Skewness	6.021664
99%	52	217	Kurtosis	55.51843

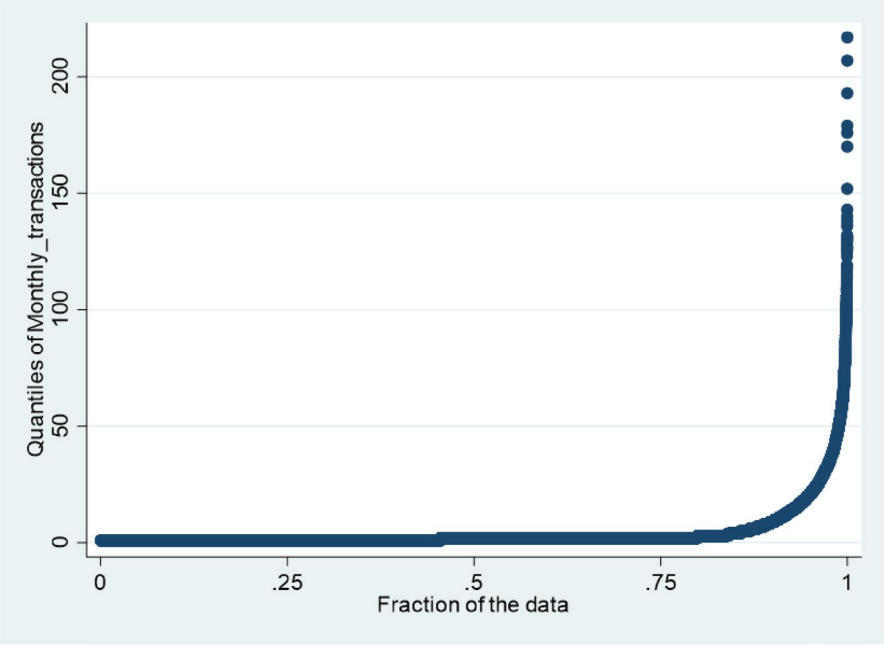

Fig. 2 Cumulated distribution of monthly transactions

enhanced their financial yield by utilising CAVs. GMM enabled us to gain a thorough understanding of how the previous wallet balance, combined with the prior position in the CAV network, relates to the increase in the current wallet balance for the 25% of users who generate significant profits from utilising CAVs.

Dependent variable: The dependent variable is the balance of CAVs in the wallets of entrepreneurially–minded slum dwellers taken at the end of each month during the period from April 2022 to July 2023.

4.2 Independent variables

Number of monthly transactions for month t–1: If CAV transactions are profitable, the number of those transactions in t–1 should influence the increase of the wallet balance. We labelled this variable "monthly".

Closeness centrality for month t–1: Closeness centrality, first introduced by Freeman (1978), measures path lengths within a network. It is a widely used centrality measure (Fershtman and Gandal 2011; Aalbers et al. 2013; Iacobucci and Hoeffler 2016). According to Freeman (1978), a node's closeness centrality is calculated as the sum of its graph–theoretic distances from all other nodes, where the distance between two nodes is defined as the length of the shortest path connecting them. Where g is the number of CAV users in the network and $d(ni, nj)$ is the *geodesies* linking CAV users ni and nj.

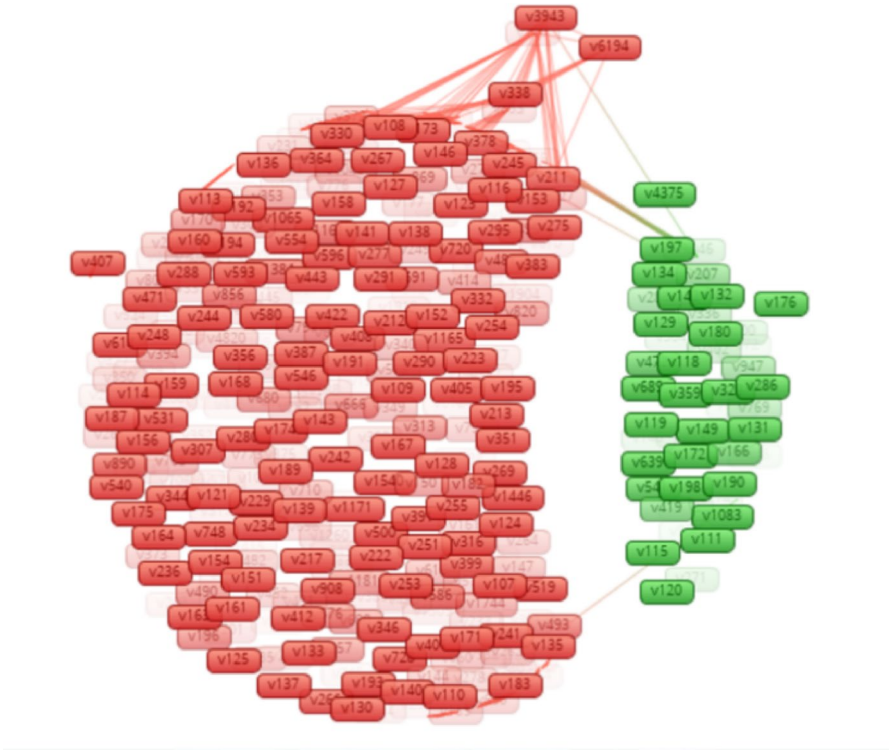

Fig. 3 The network of CAV users

Table 2 Wallet balance of entrepreneurial slum dwellers at the end of July 2023

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. summarize balance, detail
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balance

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	23,142
25%	3.752733	0	Sum of Wgt.	23,142
50%	6.804793		Mean	94.30561
		Largest	Std. Dev.	3750.175
75%	17.26325	28484.73		
90%	79.23158	38121.68	Variance	1.41e+07
95%	239.1211	93992.47	Skewness	143.8668
99%	1370.33	559088.8	Kurtosis	21351.03

$$Cc() = \sum_{j=1}^{g-1} d(\ni, nj)$$

Combining the distances of all reachable related CAV users, excluding the focal ones (g–1), provides the total closeness score for CAV user *ni*. The closeness centrality of a user is determined by the sum of the centralities of other members they are connected to. A user linked to many well–connected individuals will have a high closeness centrality, while a member connected to only a few poorly connected individuals will have a low centrality. This measure is standardised: a user has the shortest path length (i.e., is closest) to related users when the index is one, and the longest path length when the index is near zero. Borgatti (2005) identified that closeness centrality can be seen as an indicator of the inverse time until information arrives through the network. Thus, users with high closeness centrality scores are well–positioned to seize opportunities for buying or selling products at the most valuable time.

Unlike the *eigenvector* centrality used by Keil et al. (2010), closeness centrality has two advantages (Bonacich 2007). First, closeness centrality does not require any assumptions about the network's shape, while *eigenvector* centrality cannot be used if the network has two or more components that are isomorphic images of one another. Thus, closeness centrality can be measured readily, whereas eigenvector centrality necessitates analysis of network properties. Therefore, the closeness centrality measure enabled us to distinguish the effects of (1) centrality and (2) the number of past transactions, in keeping with the aims of this study. We labelled this variable "closeness".

Betweenness centrality for month t–1: Betweenness centrality indicates the control an entrepreneurial CAV user has over transactions between other CAV users. A CAV user who addresses matters of availability, location, and timing can exert control over both their suppliers and customers. Conversely, if the member occupies a peripheral position, their betweenness centrality measure will be diminished. Betweenness centrality (Freeman,1979) measures the number of times a CAV user acts as an intermediary on the shortest path between two others, thus representing the degree of mediation a CAV user has between two other CAV users. This measure is particularly suitable for studying power in networks because betweenness centrality represents how one can increase the dependency of others. Betweenness centrality can be defined as the likelihood that the circulation of goods between two CAV users passes through a given CAV user (Borgatti and Everett 2006):

$$Bc(vi) = \sum_{k=1}^{g} \sum_{j=1}^{g} \frac{gkj(vi)}{gkj}$$

where $g_{ik}(vi)$ is the total number of geodesic paths between nodes *i* and *k* that pass through the node vi and g_{kj} is the total number of paths between nodes *k* and *j*. We termed this variable "betweenness".

Wallet balance for month t–1: This balance represents the financial resources of each member and thus their ability to spare. We termed this variable "wallet".

4.3 Control variable

GMM is an autoregressive model that accommodates the lack of quasi–stationary control variables (Roodman 2007). Consequently, this study only controls for monthly inflation, which presents high volatility.

Monthly inflation rate variation: Inflation tends to accelerate the circulation of any payment mode. Simba et al. (2023) highlight how African merchants anticipate price increases and replenish stock levels before selling at a price that accounts for inflationary changes. They carry inventories to improve the cost–effectiveness of their businesses. Consistent with that, the variation of the monthly inflation rates in slum–based networks is taken into account, thus enabling slum entrepreneurs to improve their wallet balances. Using data from the Central Bank of Kenya, we controlled for monthly inflation variations assessed on a year–on–year rolling basis. We labelled this variable "IR".

Table 3 below shows the basic statistics for the sample. The wallet balance shows a high disparity. The standard deviation is twice the mean of the variable, and the difference between the *max.* and the *min.* This highlights the spread of the wallet balance among the proactive or entrepreneurial group of slum dwellers in our sample. The average number of monthly transactions is 110. The low standard deviation suggests that the values taken by this variable are clustered around the mean. An analysis of the distribution of position variables in the CAV user network reveals that closeness exhibits a higher mean and dispersion compared to betweenness. Finally, the monthly inflation variations assessed on a year–on–year rolling basis vary from − 1.29% to 0.91% encouraging speculative stock building. The spread (i.e. the difference between the max and the mean) of this variable is 2.2% which is more than three times the mean.

4.4 Generalised method of moments model

To examine how the number of entrepreneurial CAV users' relationships and their positions in the CAV network impact their wallet balance, the GMM System developed by Blundell and Bond (1998) is employed. Firstly, an autoregressive model is utilised to account for each CAV user's previous wallet balance, which may influence their current financial situation and the number of relationships in the CAV user network. Secondly, the generalised method of moments (Arellano and Bond 1991) provides estimators suitable for situations with few time periods and many individuals; independent variables that are not strictly exogenous (i.e., correlated with past and possibly current errors); fixed effects; and heteroskedasticity and autocorrelation within individuals (Roodman 2007). However, Blundell and Bond argue that for

Table 3 Basic statistics of the variable of the study

Variables	Mean	Standard deviation	Min	Max
wallet	139,835.5	279,488.41	17.263	558,088.8
monthly	110	17.07	2	217
closeness	0.131	0.066	0.044	0.258
betweenness	0.021	0.005	0.009	0.076
IR (%)	− 0.73	0.791	− 1.29	0.91

highly persistent series, the GMM estimator in the system (GMM System) is more suitable.

The econometric model's validity requires testing (1) first–order and second–order serial autocorrelation of the residuals using the Arellano and Bond test; and (2) the validity of lagged variables used as instruments due to the over–identifying restrictions of the Hansen test. According to Roodman (2007), a large collection of instruments, even if individually valid, can be collectively invalid in finite samples because they over–fit endogenous variables. Therefore, the time span for instruments is limited to the two preceding years. To address missing values, the approach of Holtz–Eakin et al. (1988) is followed: a set of instruments from the second lag of the dependent variable is developed, one for each time period. These instruments are then compressed into a single vector to generate a meaningful moment condition. A robust two–step GMM System with a finite–sample correction to the reported standard errors is used, as without this correction, the standard errors tend to be severely downwardly biased (Windmeijer 2005).

5 Results

Table 4 below highlights the factors influencing the current wallet balance of the last quartile of CAV users. Regardless of the SYS–GMM model's considerations, the current wallet balance is positively and significantly impacted by the wallet balance. H1:

Table 4 The effects of prior wallet balance and position in the CAV user network on the current wallet balance

	Model I SYS-GMM	Model II SYS-GMM	Model III SYS-GMM	Model IV SYS-GMM
Prior wallet balance	0.3762***	0.2411***	0.3071***	0.3425***
Prior number of transactions		0.5737***		
Prior closeness centrality			0.3151***	
Prior betweenness centrality				0.1023*
Monthly inflation rate variation	0.2055***	0.1294**	0.2031**	0.1544**
Constant	2.7562*	2.6411*	2.0722*	2.6387*
Year dummies	*included*	*included*	*included*	*included*
Hansen test $\chi 2$ (*p-value*)	0.261	0.358	0.322	0.373
Arrelano-Bond test for AR(1)	− 3.61***	− 4.28***	− 3.07***	− 3.51***
Arrelano-Bond test for AR(2)	0.86	0.62	0.41	− 1.34
Number of instruments	45	45	45	45
Number of observations	54 372	54 372	54 372	54 372
Number of groups	1034	1034	1034	1034

*$p<0.1$, **$p<0.05$, ***$p<0.01$. Two-step SYS-GMM (Generalized Method of Moments) estimation with finite-sample correction and robust standard errors. The dependent variable is the current monthly wallet balance of the last quartile of CAV users. Prior wallet balance is the wallet balance the month before. Prior number of transactions is the number of purchases or sales made in the previous month. Closeness centrality is our measure of centrality of each CAV user of the last quartile. Prior betweenness centrality measures the control a CAV user had over transactions between other CAV users the month before. Monthly inflation rate variation controlled for monthly inflation variations assessed on a year-on-year rolling basis. All the variables are normalised

Community asset vouchers enable slum inhabitants to accumulate (gain) financial resources necessary to sustain their livelihoods through everyday entrepreneurship in their poor neighbourhoods, is validated.

Model II indicates that timely CAV transactions are profitable for these individuals, as the number of transactions impacts the current wallet balance positively. Additionally, Model III emphasises a comparable impact of the previous closeness centrality on the present wallet balance. The closer an individual is to other CAV users, the more s/he seizes opportunities to buy or sell products at the most opportune times. Therefore, ***H3:*** *Slum dwellers engaged in daily entrepreneurship accumulate reserves of community asset vouchers due to their closeness centrality, giving them a comprehensive view and awareness of the economic and social interactions within their CAV networks* is validated. Finally, Model IV reveals that prior power within the CAV users' network only influences the wallet balance at a 10% significance level. In that regard, our study does not demonstrate how slum dwellers engaging in everyday entrepreneurship benefit from a brokerage position. This outcome is chiefly connected to the attributes of the networks we scrutinized previously.

Basic statistics have demonstrated that the mean and standard deviation linked to betweenness are low. Consequently, the network of CAV users is not typified by positions of power, and CAV users invariably possess a solution to circumvent brokers endeavouring to profit from their positions. Based on that assessment, ***H4:*** *Slum dwellers who engage in everyday entrepreneurship leverage their brokerage position in CAV networks to accumulate community asset vouchers* is inconclusive.

The SYS–GMM models I to IV have underscored how previously accumulated CAVs, the prior number of relationships, or the prior centrality in the CAV networks have a direct effect on the current wallet balance of entrepreneurial CAV users in our sample (see Table 5). We elected to deepen the analysis by observing how these variables combine to influence the current wallet balance of entrepreneurial CAV users. This result reinforces the notion that CAV transactions are profitable for entrepreneurial CAV users in our sample (H2).

Finally, the positive co–efficient associated with the interaction of the prior wallet balance and prior closeness centrality shows the complementary effect of these two variables on the current wallet balance. This effect is highly significant, indicating that centrally positioned entrepreneurial CAV users strategically utilise the CAVs they have previously accumulated to seize opportunities to purchase and sell essential products. On that basis, H5: The more slum entrepreneurs utilise community asset vouchers, the more they create opportunities enabling them to influence trade in their deprived neighbourhoods is therefore validated.

5.1 Robustness check

The findings we present are robust to the varied specifications of the SYS–GMM models implemented. These varied specifications principally relate to the lag effect of the variables and hence the number of instruments utilised.

Table 5 The combined effects of the prior wallet balance, prior number of transactions and centrality on the current wallet balance of CAV users

	Model V SYS-GMM	Model VI SYS-GMM
Prior wallet balance	0.2032***	0.2802***
Prior number of transactions	0.2249**	
Prior closeness centrality		0.110**
Prior wallet balance x Prior number of transactions	− 0.1371**	
Prior wallet balance x Prior closeness centrality		0.3634***
Monthly inflation rate variation	0.1561**	0.211**
Constant	2.7081*	1.5123*
Year dummies	*included*	*included*
Hansen test $\chi 2$ (p-value)	0.342	0.322
Arrelano-Bond test for AR(1)	− 3.08***	− 3.42***
Arrelano-Bond test for AR(2)	0.33	0.64
Number of instruments	46	46
Number of observations	54 372	54 372
Number of groups	1034	1034

*$p<0.1$, **$p<0.05$, ***$p<0.01$. Two-step SYS-GMM (Generalised Method of Moments) estimation with finite-sample correction and robust standard errors. The dependent variable is the current monthly wallet balance of the last quartile of CAV users. Prior wallet balance is the wallet balance the month before. Prior number of transactions is the number of purchases or sales made in the previous month. Closeness centrality is our measure of centrality of each CAV user of the last quartile. Monthly inflation rate variation controlled for monthly inflation variations assessed on a year-on-year rolling basis. All the variables are normalised

6 Discussion and conclusions

Unlike traditional networks in which pooled resources have universal application, donated community asset vouchers are geographically restricted (Mattsson et al. 2023; Zapata Campos et al. 2023), they are designed to support impoverished communities in a specific location, forming networks of donated community asset vouchers as described in this study. Despite this limitation in their usage, they enable impoverished communities to engage in economic and social interactions described in this research as everyday entrepreneurship within their proximity (Kuk et al. 2024). Their interactions can best be characterised as everyday entrepreneurship, stemming from their daily struggles involving the buying and selling of essential items such as food, water, education and medicine. In that context, entrepreneurially–minded individuals or slum entrepreneurs observed in this study leveraged community asset vouchers to engage in everyday entrepreneurship (Cogan et al. 2022; Fisher 2012; Johannisson 2020). Considering their resource–constrained environment (slum or slum–like conditions) characterised by spatial connections, these entrepreneurial individuals drew upon a scarcity mindset, encouraging them to accumulate and conserve community asset vouchers innovatively (Abubakar et al., 2019; Grant 2010; Halbesleben et al. 2014; Witell et al. 2017). The manner in which they established community asset

voucher reserves was timely and had an impact on their circulation in social and economic interactions within their impoverished neighborhoods.

The reserves of community asset vouchers they established granted them a robust position within their community. In a way, they functioned as the focal point of economic and social interactions in their surroundings. This notion is counterintuitive. The assumption in the networking literature that entrepreneurs are often closely associated with brokers, because both are agents presumed to benefit from bridging structural holes (e.g., Christopoulos and Ingold, 2015) is that entrepreneurs are often closely associated with brokers, because both are agents presumed to benefit from bridging structural holes. However, in slum–based contexts, this is further from reality because entrepreneurially–minded individuals involved in everyday entrepreneurship act as double agents (Simba et al. 2025). From that perspective, and considering the role they play in these rarely studied networks of donated financial resources, their behaviours and actions contribute to the literature on networking and entrepreneurship in several ways.

First, the connections and linkages they establish provide a new dimension that extends the concept of networks (Borgatti and Halgin 2011; Huggins et al. 2020) to incorporate networking and actions and behavior combining agent and broker roles in networks established in slums or slum–based conditions (Hallen et al. 2020). Particularly in geographical locations where networks are constructed using donated financial resources, such as community asset vouchers. The behaviours and actions they exhibit as they manoeuvre to extract the most from their geographically restricted financial resources in their daily economic and social interactions lead to new theoretical explanations. Drawing from the literature on centrality in networks (Burt and Merluzzi 2016), these explanations help advance understanding of how slum entrepreneurs engage in everyday entrepreneurship in impoverished neighbourhoods, utilising the panoramic view and their agent/broker roles offered by their central position in a slum system of economic and social interactions to impact the circulation of community asset vouchers. Such knowledge expands the concept of closeness centrality (Brandes et al. 2016) as it defines ways in which entrepreneurial individuals in slum–based CAV networks obtain, preserve, and influence the circulation and flow of donated CAVs (Bals et al. 2023). Moreover, despite high levels of persistent poverty, the networking and entrepreneurial behaviours and actions of these entrepreneurs showcase unusually high–order cognitive abilities bolstered by their acute awareness of their impoverished surroundings (Morris and Tucker 2023; Morris et al. 2018). In some way, this emphasises the core of entrepreneurship as a mindset for tackling poverty (Anwar et al. 2022; Chikweche and Fletcher 2017; Sutter et al. 2019).

Second, the context in which slum dwellers display entrepreneurial behaviour and actions holds some significance (Newbert et al. 2022; Morris et al. 2023; Simba 2024). Their intricate interrelationships reflect patterns within localised economic and social slum systems, connected by distinctive links in networks of donated community asset vouchers in deprived neighbourhoods. In keeping with that reasoning, we contend that researchers relying on universal theories risk overlooking the richness and distinctiveness of unconventional research settings (Bruton et al. 2022). Therefore, this study employs indigenous knowledge to present theoretical explanations for understanding interactions within localised economic and social slum systems. This is also consistent

with recent research calls advocating for contextualising theory building in entrepreneurship and management research (Simba 2024; Welter 2011; Wickert et al. 2024).

Studying networks of donated community asset vouchers in slum or slum–like conditions offers unique insights into the economic and social interactions that the traditional literature on networking often overlooks. Accordingly, this study has shown that in such conditions, entrepreneurially minded individuals work hard to build reserves of donated community asset vouchers. Considering the scarcity and need for essential goods and services, their ability to acquire, hold, and time the use of donated community asset vouchers places them at the centre of their slum–based networks. As demonstrated in this study, their networking and entrepreneurial behaviours and actions offer a novel theoretical perspective, indicating that even in dire poverty, entrepreneurship can serve as a channel to alleviate economic and social hardship in underprivileged communities. Thus, as previously stated, this study contributes theoretically by extending the concept of networks to incorporate entrepreneurial behavior and action in rarely studied entrepreneurial contexts. Similarly, the study engendered scholarly conversation within the context as opposed to relying on universal theoretical frames that are less–sensitive to context. Arguably, such theoretical and contextual understanding is essential for policymakers, academics, and social commentators as slums or slum–like conditions are estimated to be home to over a billion people worldwide.

6.1 Implications for policy and practice

The findings of this research have social, practical, and academic implications. With over a billion people estimated to be living in slums or slum–like conditions (UN–Habitat 2023a, b), this research stimulates debate on social and policy reforms. Consistent with the UN Sustainable Development Goals, such socially transformative initiatives should concentrate on alleviating poverty in ways that cultivate equitable and sustainable communities and cities. Focusing on such societal–level changes can potentially lead to a new agenda that fosters equal access to resources and prosperity for all, especially for disadvantaged communities. For academics, the new theorizations regarding closeness centrality in slum–based networks suggest the need for more research to explore everyday entrepreneurial actions and behaviours sustaining poor neighbourhoods.

6.2 Limitations and suggestions for future research

Like any other research endeavour, our study has its limitations. Despite the limitations of our research, it presents opportunities for future study. Indeed, and given the diversity of potentials and limitations highlighted by Deniz et al. (2019) future research can explore other developing world contexts, including parts of Africa, Asia, and Latin America, to draw comparisons in terms of similarities or differences in behavior and actions among individuals living in slums or slum–like conditions.

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