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E-grocery supply chain innovation and financial inclusion: A framework

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Abstract

This paper explores the contextual influences of financial inclusion on e-grocery supply chain innovation. In particular, we explore how diverse financial models spur e-grocery supply chain innovations in a historical apartheid context of South Africa's township and rural communities. The unique context of e-grocery retail companies and the inherited structures of apartheid townships in South Africa present a peculiar context where unfamiliar economic models and prohibited business activities present deep insights into how such markets function. Using the multi-case study approach, eight semi-structured interviews were conducted with grocery retailers that use mobile applications. Data were analyzed using ATLAS.ti. The findings show that bank payment options have not been designed with e-grocery adoption and supply chain innovation in mind. The evidence further shows that the financial inclusion options given specific enablers provide a platform for e-grocery markets to adopt e-business, innovate their business models, subsidize payment infrastructural costs, and minimize e-customers' transactional trust and privacy concerns. This according to the findings, enables small firms to reach the digitally challenged market, whilst bridging the digital divide.

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1. Introduction

Within the supply chain finance (SCF) literature, the optimization of working capital among different actors in the supply chain seems to be the most dominant theme of discussion [1]. Few studies within this theme have attempted to link SCF to the SCF models at the base of the pyramid (BoP) markets, as financial inclusion is considered the biggest impediment with regard to access to formal financial channels and market expansion in such markets [2, 3]. In South

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Africa for example, the merits of financial inclusion in terms of economic development and inclusive growth are widely acknowledged by policymakers and researchers. Yet almost no attempts are being made to understand this challenge within the supply chain context. In this paper, we specifically look at the significance of the gulf between the grocery supply chain models and the economic legacy of the apartheid system.

Using the context of e-grocery adoption, this paper seeks to explore how supply-side financial models foster demand-side e-grocery supply chain innovations in a historical apartheid context of South Africa; in particular, the payment options for the township and rural communities that have spurred supply chain innovation. The dominant e-grocery retailers in South Africa are Shoprite, Pick n Pay, and Woolworths [4]. More recently, however, thirteen (13) emerging e-grocery retailers, namely, Spazapp, Grocerease, Y-shop, Buy Grocery Online, Zulzi, Vuleka, Smartsentials, Onecart, Sisonke Africa, StockUp, Washesha, Wumdrop, and Zanel groceries, have penetrated the market and are offering e-grocery models to urban, township, and rural markets [5]. The transformation has been largely and indirectly enabled by the financial solutions provided by retail banks to enable rapid order processing for e-grocery payment and business operations.

Beyond an exposition of order processing, the financial inclusion packages have embedded the trust and privacy necessary to build a base of loyal customers. The most successful and profitable businesses have a base of loyal customers, and much of this loyalty is based on trust at the center of order processing and payment systems. As suggested by the relationship marketing and social exchange theory (SET), trust is the most precious asset any business has, and is the bedrock on which business is built [6]. In the new era of the Internet and the web, it has been noted that trust is more crucial than ever as it may determine the future of the Internet itself [6].

Whilst big grocery e-retailers have unlimited resources to support the last mile strategy, the small e-grocery retailers utilize competitors' stores (for order fulfillment), township and rural households (act as the point of order entry and strategic partners), independent contractors (pickers, drivers, foot soldiers), while their customers are predominantly digitally challenged townships and rural markets, such as social grant holders, Kota traders, crèches, bakeries, and societies, such as burial associations and stokvels [5].

E-grocery adoption continues to expand to the peripheries of South African cities and it has transformed the digitally challenged markets. The unique context of e-grocery retail, and the inherited apartheid township structure of South Africa that has no economic logic and that prohibits business activities heighten the interest of this study. The sense of financial inclusion and its role in e-grocery supply chain innovation cannot be understood, without first, understanding the systematic disparity of the context within which it operates. We attempt to do that in this paper.

The paper is organized as follows. First, we review the literature and position the paper's arguments in the supply chain finance literature in order to address issues of financial inclusion and the associated implications to the demand side of the supply chain. In the subsequent section, we present the methods part which is summarised using the case studies framework from Eisenhardt [7]. Then in section 4, we present some of the findings on financial models that have spurred e-grocery supply chain innovation in rural and township communities of South Africa. The discussion in section 5 addresses the supply side vis-a-vis demand side innovations enablers. The final section 6 discusses the conclusions, limitations, and direction for future research.

2. Review of the literature

The integration of various actors across different supply chains presents businesses with immense opportunities to build assets, acquire cheaper capital, and reduce fixed costs along the entire supply chain [8]. For consumers, it increases their purchasing power. In the literature, such benefits have been associated with SCF. Supply chain finance is primarily about the "inter-company optimization of financing as well as the integration of financing processes with customers, suppliers, and service providers in order to increase the value of all participating companies" [1]. The central idea behind SCF is the visibility of trade flows to allow financial institutions to intermediate these transactions (such as payables) and undertake risk on behalf of clients, especially at the downstream side of the supply chain [9]. The upstream side is often associated with working capital management, i.e., the management of receivables.

Supply chain finance is an important departure point for this paper. The International Finance Corporation [10] argued that the integration of traditional actors along the supply chain can "establish a pathway toward financial inclusion", especially for actors that have an unknown credit history or are considered unbankable. Silvestro and Lustrato [9] show that supply chains provide the right infrastructure and networks to introduce small businesses to the

formal banking system through partnerships with organizations that have on-the-ground experience. Obaid & Nozari [11] show that SCF provides chain stores with new innovative methods of financing their enterprises that are often unavailable through traditional financial institutions models. This according to Tsai & Kuan-Jung [12] could revolutionize financial inclusion of the underserved especially SMEs.

In the literature, financial inclusion has been defined as having access to and the use of formal financial services by consumers and firms [13]. The goal of financial inclusion is to increase access to financial services, including access to credit, for firms and individuals, and that has a significant impact on economic growth [12]. Digital financial inclusion has been proposed especially by big organizations to overcome the challenges of traditional financial inclusion models in the BoP markets. According to Sun [14], it involves the innovative use of technology to deliver financial solutions to those with a limited financial footprint. A good example of that is the emergence of FinTechs which provide digital innovative payment models such as cards, digital wallets, etc [2, 12]. Chen et al. [15] found that digital supply chain solutions increase market expansion, due to the availability of big data on consumer segments which can be used to enhance operational efficiency. Unfortunately, only a few, and especially large enterprises, have rapidly adopted programs that incorporate SCF into their business models [8]. The emergence of e-commerce platforms and modern retail markets has been enabled by technology to manage and integrate sales, inventory management, payment, financing, etc. [2]. This has reduced the challenges associated with the safety, soundness, and integrity of financial systems [16].

The 2018 world economic forum report [17] highlighted the different enablers and barriers of financial inclusion. Specifically, the report provided several contextual factors that can help explain the access to, as well as the acceptance of the different payment options. The supply-side factors included: reduced network costs due to scale, interoperability of networks, network risk, efficient distribution, and dependable infrastructure. The demand side factors include balanced person-to-merchant/ P2M flows, a robust Cash-in cash-out (CICO) footprint, and digitization of payments from different sources (business-to-person/B2P, government-to-person/G2P). These factors were used as a basis for interpreting our findings in the discussion section.

In sum, the literature shows that digital payments throughout the supply chain enable retail companies to generate data on the consumption and usage practices of small retailers and consumers for better decision-making. Small retailers on their part can make payments more easily to their distributors, reducing the insecurity and inconvenience associated with cash. Meanwhile, FMCG (fast-moving consumer goods) companies can have nearly real-time information on their inventory and improved visibility into demand, to ensure appropriate supply and increased sales for their customers. While technology can help to enhance compatibility and bridge the gap to the underserved, the reality is that many traditional retailers in emerging markets still have limited access to the technology channels that support digital financing.

3. Methodology

This study is a qualitative inquiry. We use the multi-case study approach to investigate how financial inclusion can ignite e-grocery supply chain innovation and adoption in a manner that defies known financial and market structures that are a legacy of apartheid. The research context is significant as it involves financial inclusion designs that bridge the digital divide between urban, townships, and rural areas, whilst creating new markets for small e-grocery retailers that have limited resources. The strength of the qualitative approach to exploring the complex reality within a given context has been discussed in depth by previous scholars [18, 19].

Semi-structured interviews were conducted with eight (8) chief executives (CEOs) and chief operating officers (COOs) that were purposively selected from thirteen (13) small and medium mobile e-grocery retailers in South Africa. The majority of the CEOs and COOs are involved in daily business decisions from strategy, and distribution models, to operative decisions on deliveries of groceries. These e-grocery retailers have been operating in township and rural areas for not more than three years, except for one business. All participating CEOs and COOs gave consent for the researchers to audio record their interviews. The interviews lasted between 38 minutes to 1 hour and 25 minutes. We used ATLAS.ti to conduct open and axial coding, and for its strength in analyzing transcripts, and then developed vignettes [20] to help in an iteration of the findings to and from the interviewees. The findings of this are presented in section 5. In Table 1, we describe the case study decision journey as guided by Eisenhardt [7].

Table 1. Case study process and implementation of research activities based on Eisenhardt [7]

Process step	Activities	Realization within the paper
1. Getting started	Definition of the research question	Sought to explore “how financial environments spur innovation in e-grocery supply chains?” and, “to what extent banking solutions affect the supply and demand of mobile e-grocery solutions for people in digitally excluded markets?”
2. Selecting cases	Identification of cases	All 13 known mobile application e-grocery retailers with township, rural and urban focus were contacted, but only eight responded. Also, referrals from the others in the network.
3. Crafting instruments and protocols	Multiple data collection methods	Skype, telephone, and Microsoft Teams interviews were held with mobile e-grocery retailers. Mobile applications were downloaded, and web and internal data sources were observed.
4. Entering the field	Integrative data collection and analysis	After the semi-structured interviews, the transcriptions were emailed back and forth to the participants for further input and clarification and to create vignettes. We also sent to mobile grocery e-retailers for their own interpretations.
5. Analyzing data	Within-case and cross-case analysis using divergent techniques	Used Atlas.ti for data analysis. We followed a three-phase approach that involved data reduction through open coding and selecting themes and patterns, then data display through thematic coding, and then created vignettes for more feedback.
6. Shaping research questions	Search evidence for "how" behind relationships	Conclusions after verification of analysis by eight participants, seven supply and demand enablers were identified and linked to mobile e-grocery flows and SCF.
7. Enfolding literature	Comparison with similar/conflicting literature	The findings show varied patterns and effects of contextual influences of financial inclusion in the adoption of e-business. In addition w-customers transactional trust and privacy concerns are discussed in contrast to the literature.
8. Reaching closure	Theoretical saturation, when possible	Observed and reported on the unintended consequences of financial inclusion in new markets, SCF and digitally excluded markets at the BoP.

4. Findings

The findings provide interesting insights into the hybrid payment models that support e-grocery mobile commerce in the urban, township and rural contexts in South Africa. The dominant payment models identified in the empirical data include, but are not limited to, speed points, electronic fund transfers (EFTs), bank deposits, stokvel models, credit offerings, PayPal and cash in transit, are enabled by different contextual factors in the demand and supply side of the financial inclusion models as those in Blake and Propson [17].

Across the case studies of small and medium mobile e-grocery retailers in South Africa, we report on the findings using seven (7) vignettes from which we draw the findings using the supply chain contextual factors derived from Blake and Propson [17]. According to Törrönen [20], vignettes in qualitative research are “discursive constructions that evoke and materialize the phenomenon under study, placing it in concrete contexts and allowing the researcher to explore participants’ views, feelings, experiences, interpretative resources”. The sub-section below explores the findings of this study from each of the payment models that support e-grocery mobile commerce in South Africa using seven vignettes.

4.1. On Speed points

In vignette #1, the grocery retailers reported two types of speed point payment mechanisms. The one functions more as a substitute for an auto teller machine (ATM). This type of speed point machine is usually held by a speed point host or the spaza shop’s owner and offers customers the flexibility of being able to withdraw cash and pay for e-groceries. In the context of cash withdrawal, township and rural customers who are usually far from ATMs can swipe their bank cards, and once the speed point machine validates the availability of funds, the spaza shop owner or speed point host can issue money on behalf of the bank to the customer. If the purpose is to pay for e-groceries, the host of the speed point machine retains the money and passes it to the small e-grocery retailer.

“There are several platforms that have been introduced to us, such as the ABSA speed point machine. The speed point allows customers to make payments by swiping their cards as if it is an ATM, but it does not have cash inside. The host of the speed point (Spaza shop) issues cash to the customer following a successful swipe

of the bank card, validated by the receipt confirming the availability of funds. The host (Spaza shop owner) submits the receipts and reclaim the money issued from the bank. So, literally you can go and swipe your card, it gives you a slip and you give the slip to the guy of the spaza shop and he gives you cash. So, things like that are very interesting techniques to handle our payments. Somebody can buy groceries from us, swipe the card, put down the receipt as a voucher but effectively that amount is for us to collect”.

The second type of speed point machine is used by the small grocery retailers themselves upon delivery of groceries. However, the speed point carried by the small grocery retailer is not without challenges. One small firm reported that they experienced payment failure at the point of delivery. Fortunately, their customers were able to consider alternative EFT payment options. The hybrid payment options show that the flexible payment options significantly expand the small firms’ customer base, and simultaneously increase the gains for retail banks. At most, it enables small firms to react quickly to sudden challenges.

“The second payment method is through our speed point. We are trying now to avoid cash payments as much as possible for safety reasons. We only deliver after the payment has been made. I have previously experienced a situation where payment could not go through at the point of delivery, but the issue was not on our customer’s side, but rather our speed point provider. In that situation, we requested the customer to do an electronic transfer to our bank account”.

4.2. On Electronic funds transfers (EFTs)

The case of Vignette #2 presented the importance and popularity of EFTs for those in middle-class townships and rural customers who often place orders whilst at work. The small e-grocery retailers accept proof of electronic fund transactions that are facilitated by customers’ banks to the e-grocery business account, without having to bear in-house payment systems. Looked at differently, the retail banks’ EFT systems enable speedy and smooth business transactions for small e-grocery retailers, save them time, and builds trust, while reducing the cost of implementing an in-house computerized electronic funds transfer system.

“We accept EFT for situations where maybe a customer would like to use our service but still at work and their helper is home to collect the rest of the goods, then they send an EFT. Once the EFT reflects, we do the shopping and deliver to the helper.”

4.3. On the Stokvel payment model

In the case of Vignette #3, one small firm experimented with a piggyback stokvel society model for their e-grocery payment option. A stokvel is an informal friendly society model which has been widely used by many people in townships and rural areas as a weekly/monthly or yearly common pool of an agreed fixed amount of savings, money lending, and credit rotation. While a stokvel aims to help people achieve specific individual goals, it has never been a retail banking option. The stokvel model has now been embraced and integrated by retail banks such as Nedbank. However, the model was operated outside the purview of bank packages and could not be sustained due to the inherent risks of liability.

“I mean a couple of weeks ago we were using a ‘stokvel’s collection/payment model. So, telling customers that if you belong to a Stokvel you can pay/give your money to the treasurer and the treasurer holds the money, but once we deliver groceries to you, the treasurer releases the money to us. The customer is then able to ask the treasurer to deposit the money. The model takes away the cash risk from us, but all we have done is technically just moved the risk. The model is dangerous because what if the treasurer says I lost your money? What do you say? What do you do? Who is liable? Is he liable to us or is he liable to stokvel member? It is complicated, hence, we retracted to the thousand-rand limits deposits to the ATMs for now, until someone comes up with digital currency in South Africa. If we were in Kenya, this would not be a problem because they have M-pesa but here in South Africa cash is a challenge.”

Whilst the small firm’s stokvel experiment was not a success, it illustrated the small firm’s ability to accommodate those market segments that are often disadvantaged by exclusion from existing formal financial structures. Thereby,

they pioneered some of the payment inclusion options that foster the equality of people within a specific township and rural context, whilst complementing the e-business/ e-grocery mobile applications model. At best, the experiment paved the way to create an approach that bridges the digital divide, whilst creating pathways for those marginalized groups to gain access to and participate in those markets that are deemed urban experiments, so they can equally enjoy the convenience and benefits of e-business and e-grocery.

4.4. On Bank deposits

In the case of Vignette #4, we explored bank deposits as another payment method commonly used in South Africa. One small firm opted for bank deposit as a payment model for their e-grocery mobile commerce. In this context, customers order groceries, make the payment and send the grocery retailers proof of payment. The rationale provided by the small firms is that a bank deposit is an old method of payment popular to many South Africans, hence, the need to accommodate something familiar to them.

“South African people are very not used to the idea of shopping online. So, we have opened a bank deposit option and EFT. Basically, the customer select that they want to do a bank deposit, or they want to do an EFT and once they send us the proof of payment we go fetch their orders.”

4.5. On the PayPal option

Vignette #5 reported on the PayPal option as an alternative method to have been considered, but not well utilized by small and medium mobile e-grocery retailers. Two small firms are familiar with PayPal which is commonly used across the world. However, it was deemed unsuitable for the small e-grocery retailers in SA, due to the time it takes for payments to be cleared and the steep commission fee. The findings reveal how a popular internationally renowned payment method can be suitable for one context, but not for the other (i.e. large business vs small firm or developed vs developing nations).

“We have also considered other alternatives, for example, PayPal, but the payment takes about 48 hours to clear for 3.4% fee. In e-groceries, our margins are not big at all, and if you take 30% of the margin and you must wait for 48 hours for the money to clear, it becomes complex. Firstly, chances are you could have delivered the goods and you don't even know that the money it's cleared”.

4.6. On Credit offerings

Vignette #6 reported on the last payment option, i.e. credit offering to e-grocery customers. Again, this is another payment option reflective of the township and rural income disparities, expenditure patterns, and low credit card penetration context. Most township and rural market segments do not have a second and third-stream income, and they mainly rely on one source of income such as pensions, social grants, or monthly salaries. As such, their consumption patterns usually center around a certain date, therefore, credit is one inclusive method that allows them to shop any day, and to pay later when they get paid. Offering credit to customers was deemed to have accelerated entry and e-grocery adoption by the target market, especially to B2B customers such as those that use groceries as daily inputs for their businesses. For example, spaza shops, funeral societies, bakeries, chisanyama restaurants, khota bread traders (sipahlo), crèches, office parks, and caterers.

“Initially we started by giving credit to customers, but now moved to cash on delivery. We lost a lot of customers, at least 50% of our customers stopped ordering because we did not offer credit anymore. Credit works, but the problem is we do not have the capital or the cash flow to be able to give out that much credit. So, what happened is that we reached our max and this happened in July 2018, and then we were forced to go back to cash on delivery. We had so much cash out there and customers were placing orders, but we did not have cash to go and get the stock. We were having to call customers to say when are you going to make your payment, or tell them your payment is late, especially the B2B customers that use groceries daily, e.g. crèche, bakery, etc. The biggest issue with lot of these businesses is that they do not know how to manage cash flow. So, they pay you back but its two weeks or a month late. If we do get access to more cash, offering credit is something that we will do. But, we will do it differently, instead of just giving credit to anyone, we

aim to start at low level, help them understand how you manage this credit and then literally reward people who use it well and penalize people who do not use it well. If we give you three hundred Rands on credit, let us see how you use it and if we are convinced that this person understands the pattern of paying back at a certain frequency then we will start to increase it. But for the ones that are struggling, then we will take it away”.

While the challenges related to cash flow made it difficult for small e-grocery retailers to sustain credit offerings, the main concern was not customers being dishonest or the inability to collect the money owed, but rather the late payments that created a cash flow bullwhip effect for small e-grocery retailers and their B2B customers. Whilst the credit option has been discontinued, its merits in creating inclusion and faster penetration to the e-grocery market are acknowledged. The small firms intend to revisit the payment option in the future, but with a complement of cash flow management training to educate their B2B e-grocery target market, benefits which will be appropriated by both the customer and the small e-grocery retailers. B2B e-grocery customers benefit in terms of free training, rewards of increased credit, and efficiency in their businesses, hence, small grocery e-retailers will appropriate on-time payment benefits from their target market. Thus, this is a win-win strategy that can be crucial for successful e-grocery operations and that could see most townships and rural areas participate more in the digital markets.

4.7. On Cash in transit

The last Vignette #7 was related to Vignette #6. Even though no theft problems were reported by those small firms that carried cash in transit, they encountered some challenges, such as customers not having enough cash to pay for orders, and a customer forgetting the scheduled delivery. One small e-grocery retailer managed the situation by consolidating products that matched the customer’s cash on hand.

“Lately we had a guy who ordered groceries worth seven hundred bucks and upon delivery, he had only R270. What we do is to calculate what makes up R270 and give to him”.

Others reported incidents where the customer had spent the money on something, leaving them with the inevitable position of returns: *“Another big issue is that customers change their minds, sometimes when we deliver, the customer says I don’t have the money, I spent it this morning”.*

“We have experienced challenges with cash in transit, but not theft gratefully, just accounting issues. For example, a couple of months back, the driver bought petrol on the road and paid for tollgate. But forgot that they paid R10.00 at the tollgate and lost the receipt when we were consolidating accounts at the end of the day. I think we started to fix it, the first thing we said is that any expense that you have on the road should be paid by the given bank cards. Whatever the driver wants to buy, and its business related, they just use the card. We told them that whatever money you collected do not touch because we need to get that on the system and have it recorded”.

Looked at differently, the small e-grocery retailers demonstrate a comprehensive understanding of their target market's needs, and challenges, which is reflected by their choice of payment options.

5. Discussion

In general, retail banks and other financial intermediaries appear to be indirectly creating a conducive environment that alleviates some of the technological e-grocery payment skepticism such as privacy, security, and trust in payment methods. As the seven vignettes showed, small firms have adopted multiple payment options that cater to the needs of their market segment, such as the case of digitally challenged people in townships and rural areas. However, most of the payment options shown in **Fig.1** emerge from the retail banks’ packages.

The findings show that small and medium e-grocery firms are dependent on supply-side actors, such as retail banks and other financial intermediaries, to create an ecosystem for firms/merchants to rapidly interface with their customers more efficiently than traditional models (see Vignettes #6 and #7). Yet because of the challenges of lack of interoperability and unreliable network infrastructure, some of the SCF models have not been well developed to scale as shown by **Fig.1**. For the supply side actors, this is an economic cost to the entire ecosystem [17].

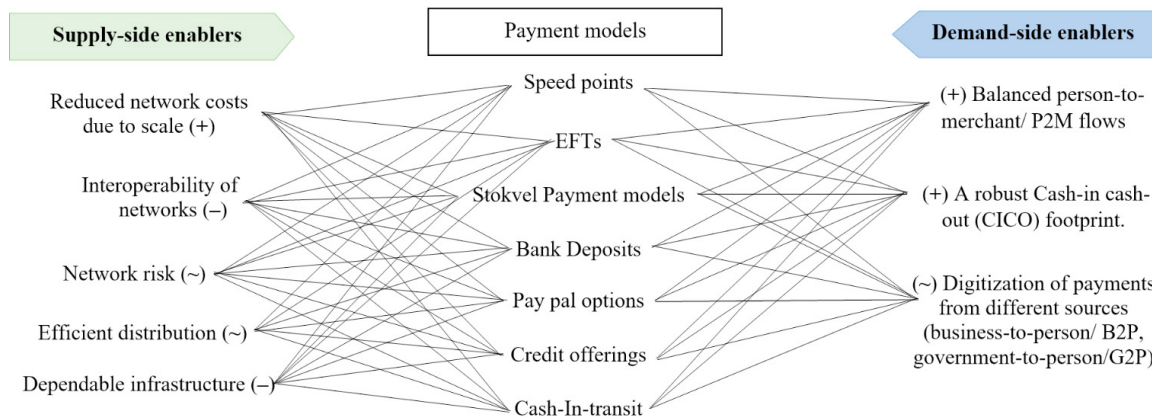


Fig. 1. E-grocery supply chain flows framework; where (+), (-) and (~) represent supported by the data, unsupported by data and fairly supported by data respectively.

The other finding is the significance of demand-side transactions (not actors), such as transactions between consumers and traders, consumer payments to businesses (bill payments), and governments (taxes and fees). These according to Blake and Propson [17], increase the scale of the CICO footprint, as well as enhance supply chain financing innovations. **Fig.1** shows the key supply and demand side enablers from all the payment models (refer to Vignettes #1 to #7) that make digital finance an attractive option for the everyday activities of small businesses that sell their goods to the common man in the street. This is precisely the aim of financial inclusion [13].

The findings further suggest the importance of retail banking’s flexible payment options for small e-grocery adoption. That is, the more retail banks design financial inclusive packages, the easier it becomes for small firms to leverage mobile commerce and e-grocery markets. The latter highlights the critical role of financial inclusion and how the network of the financial industry shapes small entrepreneurs and helps generate new markets. Furthermore, the various payment options provide not only strategies to overcome the software related to payment barriers but also canvass how small firms consider their options in terms of the demographic, income, education, and socio-economic status of the township and rural context. For example, the stokvel, bank deposit, speed point machine, and cash-on-delivery payment options, are some of the different ways of ensuring the inclusion of marginalized market segments in digital markets, whilst bridging the digital divide. At best, they highlight models contrary to the popular PayPal option, but reflective of cultural (i.e. stokvel community pool), and environmental differences (township and rural context, which when incorporated by small firms, lowers the technological software for payment challenge. Put simply, even though banks’ payment options have not been designed with e-grocery adoption in mind, the options provide a platform for small firms and the digitally challenged market to decrease payment and digital divide challenges.

6. Conclusion

This study augments how the supply-side services, such as retail banks and other financial intermediaries’ payment packages, spurred e-grocery supply chain innovations in an apartheid historical context that had no economic logic and prohibited business activities. Drawing on the interaction of context and financial inclusions, the paper refers to how eight small e-grocery retailers create an ecosystem for firms/merchants to rapidly interface with their digitally excluded customers more efficiently than traditional models. The findings show, on the one hand, how the supply-side (financial inclusion models) can indirectly, have positive effects on demand-side innovation, digital inclusion, and new e-grocery supply chain markets. On the other hand, it reveals how demand-side conditions in digitally challenged markets (such as a context with no economic logic and prohibited economic activities) can positively shape supply-side financial models as a supply chain financing mechanism. Thus, our study shows a symbiotic positive relationship between financial inclusion models and e-grocery supply chain innovations. It further highlights the strategies used by financially excluded small businesses to access economic opportunities, mitigate privacy and trust concerns of digital markets and integrate their low-income customer segments.

The findings are crucial for policymakers in developing economies and for financial market investors in developed nations. It also offers interesting managerial insights for financial intermediaries and small e-grocery businesses. From the financial intermediaries' perspective, it shows how financial inclusion given specific enablers indirectly fosters e-grocery supply chain innovations, which in turn, can fuel the growth of business banking accounts necessary for the sustainability of financial intermediaries and supply chain finance. In terms of small e-grocery retailers, it reveals options for leveraging supply-side financial models to enter new markets and manage privacy concerns and conditions of previously disadvantaged business markets. In particular, participation in digital supply chain markets by small businesses and low-income customer segments is influenced positively by diverse payment models of financial intermediaries. Future studies can explore the transferability of the findings to other contexts and the extent of economic value back into supply chain finance, which is a limitation that offers substantial opportunities for further research.

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