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Digital Credit Revolution on Customer over Indebtedness: An Accelerator?

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Abstract

The sharp increase in the numbers of digital credit providers in Kenya as well as the increased number of people blacklisted at the Credit reference Bureaus (CRBs), greatly informed the need to carry out this study to determine whether there was any relationship between digital credit revolution currently being witnessed and the customer over-indebtedness. The advancement of technology, new innovations in money transfer, as well as the entrepreneurial drive may be factors attributed to the increase of digital credit uptake in Kenya. Financial inclusion has significantly improved since the introduction of M-Pesa mobile financial services into the country by Safaricom Limited in 2007. The innovation in smart phone technology among other innovations improved financial inclusion and introduced digital credit revolution in the country. However, the availability of easily accessible loans through mobile phone, has encouraged people to borrow more than they could afford leading to over-indebtedness. This study used survey research design to collect quantitative data from the study respondents. Stratified sampling was used to obtain a target sample size of 384 respondents who are digital loan users in the informal sector in the Nairobi City County. Binary Logistic Model was used for the analysis of the answers in the structured interview. Pearson correlation coefficient (r) was used to determine the correlation between the two variables. From the findings, the null hypothesis that there was no significant effect of digital credit revolution on customer over-indebtedness was rejected meaning that the huge influx of digital credit providers had indeed significantly increased customer over-indebtedness.

Keywords: Digital Credit Revolution, Customer Over-Indebtedness, Accelerator, Data Protection, Credit Scoring, Fintechs

Introduction

Digital credit access and use has expanded rapidly in Kenya yet there is limited evidence on who is using it, how it is being used and the risks involved. The advancement of technology has democratized digital credit application making it instant, automated, and easily accessed remotely within a short time for both low and middle income earners (FSD, 2018). Digital credit is accessible to a bigger population in the informal economy compared to traditional financial system that excluded the rural poor, illiterate and people with disabilities (Totolo, 2018). Digital credit has facilitated financial inclusion for the unbanked and the under banked. It has solved perennial problems among them; the many documents that was needed by the banks before one is given a loan, requirements of collateral that may not be available to the poor, slow

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response to credit requests, inadequate product design, a lot of inconveniences of traveling to the branch and the risk of carrying cash (FSD, 2017).

The remarkable rise of digitally delivered micro-credit is as a result of transformation within financial services sector that was fuelled by the mobile money revolution that started in 2007 (Micro Save, 2019). Since the launch of the first digital loan product, M-Shwari, by Safaricom and NCBA Bank in 2012, the country has experienced a significant increase in the size of the digital credit market, both in terms of providers and the total amounts of loans. For instance, in 2018, M-Shwari platform alone disbursed Kshs 230 billion (Totolo, 2018). Between 2016 and 2018, it is estimated that 86 % of the loans advanced to Kenyan borrowers were in digital form (Micro Save, 2019).

However, the financial inclusion has also come with lots of risks to both the consumer and the provider. Customers are suffering from psychological stress, treats and harassments, shame of being listed on the Credit Reference Bureau (CRB), and sometimes insults and loosing of one's belongings to the lenders (Totolo, 2018). With the increase in access to digital credit products and the proliferation of digital lenders in the financial service sector, over indebtedness of consumers has also increased attracting the attention of many Kenyan and the banking sector regulators (Izaguirre et al., 2018).

The threat of over-indebtedness cannot be underestimated, as recent reports have shown that the percentage of non-performing loans is relatively three times higher for digital loans i.e., 16% compared to conventional loans which is at 5% (Wamalwa et al., 2019). In 2018 the number of digital non-performing loans increased to Kshs 923,560 from Kshs 667,720 in 2017 (Micro Save, 2019). In the same study, Micro Save (2019) shows that the youth between 18-26 years are mostly the defaulters of these loans, accounting to 36% of all non-performing digital loans. More recently, according to a 2022 report by Safaricom, over 1.7 million people in Kenya are using Fuliza service (an overdraft facility by M-pesa). Similarly, there has been a huge increase witnessed in Hustler Fund, a new loan facility by government to the masses at very low interest rates, where the Ministry of Cooperatives reported that Kenyans had borrowed over Kshs 21 billion in the first 3 months of 2023.

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Research Objectives

This study was guided by the following objectives:

(i) To establish the extent of digital credit revolution in Kenya.

(ii) To establish the extent of customer over-indebtedness in Kenya.

(iii) To establish the effect of digital credit revolution on customer over-indebtedness.

Historical Development of Digital Credit

As internet use expanded in early 2000's, the internet economy emerged and continued to grow. The expansion of ICT and digitally oriented enterprises as essential actors in the internet economy became widespread. This led to improved internet connectivity in developing countries, and the expansion in the range of digital firms, products and services (OECD, 2014). Through retail electronic payment systems, virtual savings, technological platforms and inclusive finance, digitization has had an impact on the economic growth by allowing the unbanked and the under banked persons to access banking services through their phones (UNCTAD, 2017).

The market for digital credit in Kenya has grown quickly since the launch of M-Shwari in 2012, a mobile banking service that provides access to a savings account and digital credit. The three biggest banks in Kenya i.e., Kenya Commercial Bank, Equity Bank, and Cooperative Bank quickly followed suit. An increasing number of fintechs and non-bank organizations, now provide digital credit. Different credit scoring and credit delivery mechanisms have been created by online credit providers (Totolo, 2018).

M-Shwari appears to have gained competitive advantage due to being the first such product in the market. As of December 2018, it had double the unique borrowers of its nearest rival, KCB M-Pesa. Both services are provided through Safaricom's M-Pesa platform, which reaches a much larger network of clients than any particular bank or fintech. Safaricom is Kenya's largest telecommunications company. Nevertheless, there are several other options available to clients nowadays (Ndung'u & Signe, 2020). Since 2016, Kenya's three largest banks i.e., Kenya Commercial Bank, Equity Bank and Co-operative Bank, have introduced their own digital credit solutions, either in conjunction with Safaricom (e.g., KCB), through the creation of a separate virtual mobile network operator e.g., Equitel from Equity Bank or through the creation of a stand-alone mobile application, M-Coop Cash. Additionally, there are many fintechs in the market. Although the

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largest players have been highlighted, there are hundreds of other small fintech players. Numerous unregulated players have entered the market during the past two years (Ndung'u & Signe, 2020).

Fintechs are leading in the development of new technology that is revolutionizing the way customers' access and use financial services. Financial players including banks and telecommunication companies have transformed their strategies by mirroring consumer behaviour. As a result, there has been a roll out of bank led digital financial products by the leading banks in Kenya. The next phase of digitization has been the proliferation of digital lenders offering loans through mobile phone, mainly apps. Overall, it is estimated that there are over 100 mobile loan providers in Kenya offering consumer and small business loans, and this is set to grow as consumers continue to adopt faster, more convenient, and increasingly efficient ways of borrowing (Francis, Blumenstock & Robinison 2017). Many of these mobile loan apps have been created mainly due to increasing credit demand and the huge mobile phone penetration in Kenya as shown by the CAK Annual Report of 2017. While it is convenient for the customer, mobile lending is a highly risky business to the banks and other financial providers due to high default rates associated with it (AFI, 2017).

In 2021, with many businesses and individuals recovering from the devastating effects of Covid 19, there were huge demand for loans and mobile lending was at its peak in Kenya. It is at that point that Kenya through parliament enacted into law the Digital Credit Providers (DCP) regulations. These regulations outline that all digital loan providers in the country must apply for operating licence from the Central Bank of Kenya before running its operations. As of the date of publishing this paper in 2023, a few providers had been licensed and not a single digital loan provider had been stopped from transacting its lending business. This regulation though does not affect the regulated banks, microfinance banks and regulated SACCOs who are the biggest digital lenders in the country. Further research on the effect of these regulations on the digital credit revolution that was being witnessed will need to be carried out since it is outside the scope of this paper.

Customer Over-indebtedness

According to FSD (2018), 35% of digital credit users have ever borrowed from more than one digital provider. As much as Digital credit revolution has increased the financial inclusion, it has also come with risks to both the consumer and the provider. Customers are suffering from over-indebtedness, psychological stress of debt, treats and harassments, shame of being listed on Credit Reference Bureau (CRB), and sometimes insults and loosing of one's belongings to the lenders (Totolo, 2018).

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According to phone polls conducted in Kenya and Tanzania by Ebong and Babu (2020), digital credit has drawn the attention of many in the field of financial inclusion as a tool to assist small, frequently unorganized businesses, to manage their daily cash flow demands or as a way for households to access emergency liquidity for things like medical emergencies. Approximately 50% of digital borrowers in Kenya have paid back their loans late at some point (Izaguirre, Kaffenberger & Mazer, 2018). 12% of the respondents confirmed to have defaulted on the loans. These are significant numbers in any market, but they are particularly worrisome in one that caters to underprivileged and unserved consumers. Digital loans are most frequently used to pay for consumption, such as standard household needs (approximately 36% in both countries), airtime (15% in Kenya, 37% in Tanzania), and personal or home products (10% in Kenya, 22% in Tanzania). These are not the business or emergency demands that many borrowers had anticipated that they will use the loans on; rather, they are discretionary consumption activities (Ebong & Babu, 2020).

Some digital credit consumers have been faced with late repayment and loan defaulting due to lack of transparency in the repayment period and the amount of interest charged (Kaffenberger, et al., 2018). Mobile banking and mobile wallet are experiencing high rate of growth especially in Kenya which is good for both financial institutions and their clients but this calls for better-integrated ways to enhance these opportunities. With the ease of access to these loans, those customers who would otherwise have struggled to get collateral for borrowing loans, can now access instant mobile loans from their phones with no collateral required.

A study conducted on household indebtedness by D'Alessio & Lezzi (2010) notes that financial indebtedness is a result of poor financial decisions, lack of transparency on the terms and conditions and borrowers' inability to manage one's finances. Digital transformation also comes with challenges which may include changing technologies and change in customer expectation towards the products and services provided to them (Dasho, et al., 2016). Digital credit is characterized by automated loan decisions which are enhanced by the online application and processing of the loan through mobile phones; small loan, short term and more expensive as compared to normal loans; and customer relations, repayment and loan collections which are managed remotely (Hwang & Tellez 2016). This transformation has come with threats to customers including the high risk-based pricing, lack of transparency, poor information disclosure on the interest rates, charges and other hidden fees, misuse of borrowers' personal data and customers borrowing more than they can afford to pay back (Njoroge, 2017).

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Methodology

The research employed the survey research design to establish the relationship between digital credit revolution and customer over-indebtedness. The main determinants of the two variables were elaborately developed through literature review, which were then operationalized and structured into a questionnaire. The scope of the study was within the informal economy in Nairobi City County. The respondents who were informal sector operators, were sampled across the population through stratified sampling within the nine divisions of the area of study.

Data was collected using an Online Google Form questionnaires targeting respondents across the nine divisions in Nairobi City County. The data was collected from 19th August 2021 to 30th October 2021. A total of 389 questionnaires were therefore complete and suitable for analysis, this was slightly above the target of 384. The response rate was therefore 101.3% which was adequate for undertaking inferences about the population.

Descriptive and inferential statistics were used in the analysis of the study variables. Pearson correlation coefficient (r) was used to determine the correlation between the two variables while Binary Logistic Model was used for the analysis of the results in the structured interview. The findings, conclusions and recommendations concerning the findings of the study were made in regard to the effect of digital credit revolution on customer over-indebtedness.

Findings and Results Discussions

From the responses given, the study established that 59.2% of the respondents had borrowed mobile loans within the last 30 days, 26.7% had borrowed a mobile loan in a period of 30-60 days ago and 14.1% of the respondents had borrowed a mobile loan over 90 days ago.

All the respondents in the study knew at least one mobile/digital loan provider. Those who knew one loan provider was coded as 1 were 34 in total indicating 8.7 %. The respondents who knew two mobile loan providers coded as 2, were 58, indicating 14.9%. Those who knew more than three mobile loan providers were coded as 3 – they were 297 in number which represented 76.3 % of all respondents. This indicates that majority of people are aware of many existing digital/ mobile loan providers.

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Table 1: Digital Credit Statistics

		Do you have a bank account?	Did you have any secured bank/MFI/Sacco loan before you started using the digital/mobile loans?	Do you currently have a secured bank/MFI/Sacco (0n-digital) loan?
Percent	Yes	75.1%	46.5%	21.3%
	No	24.9%	53.5%	78.7%
Median		.00	1.00	.00
Mode		0	1	0
Std. Deviation		.866	.499	.410

The respondents were also asked questions as indicated in Table 1 above and the findings indicated that there were 75.1% respondents who had bank accounts while those who didn't, comprised of only 24.9%. It showed that majority of respondents have at least a bank account. The standard deviation between those with bank accounts and those without was as high as 0.866. However, there were more respondents without secured bank/MFI/Sacco loan at 53.5% than those without. It therefore meant that although more respondents had existing bank accounts, obtaining secured bank loans was not easy due to collateral requirements among other conditions. Similarly, there were fewer respondents with existing secured bank loans at 21.3% than those without (78.7%). It was an indication that although secured bank/MFI/Sacco loans had less interest charges, they were less accessible to respondents due to the collateral or loan securities required by those institutions.

Study Findings on Customer Over-Indebtedness

The number of loans a respondent is currently servicing, the number of loans currently at default, the increased number of digital loans taken by respondent, late repayments of loans, flimsy excuses for late repayments of loans, as well as borrowing of loans to repay other loans were hypothesized as factors that enhanced over-indebtedness. All these factors were used to determine whether a certain respondent was over-indebted or not. The scores for each variable were added together. Respondents who had a score of 14 and above from a possible total score of 18 was indicated as over-indebted, while a respondent who had a total score of less than 14 was said not to be over-indebted. The table below indicates that 193 respondents were not over-indebted while 196 respondents were over-indebted. There were therefore more respondents who were over-indebted than those who were not over-indebted (50.4% vs 49.6%).

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Table 2: Customer Over-Indebtedness Frequency Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Over-indebted	193	49.6%	49.6%	49.6%
	Over-indebted	196	50.4%	50.4%	100.0%
	Total	389	100.0%	100.0%	

The respondents were asked whether they had any mobile/digital loans that they were servicing, or which were outstanding. 76.8% of the respondents agreed that they were currently servicing or had an existing digital loan, while only 23.2% of the respondents disagreed. The respondents listed the digital loans that they were servicing, where those without any loan were assigned a score of 0, those that listed only one digital loan, a score of 1, two digital loans, a score of 2 and 3 or more loans were assigned a score of 3.

Table 3: Number of Digital Loans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	91	23.4	23.4	23.4
	1	124	31.9	31.9	55.3
	2	95	24.4	24.4	79.7
	3	79	20.3	20.3	100.0
	Total	389	100.0	100.0	

Table 3 indicates that there were only 91 (23.4%) respondents who were not servicing a digital mobile loan currently. 124 of the respondents (31.9%) were servicing one digital loan, 24.4% (79 respondents) were servicing 2 digital loans while 20.3% (79 respondents) were servicing either three or more digital loans.

Respondents were also asked whether they have ever defaulted on paying back the mobile loans. 35.7% of the respondents (139) indicated that they had never defaulted on repaying mobile loans, while majority of the respondents 64.3% (250 respondents) had at one time defaulted in repaying their mobile loans. The respondents who had defaulted were asked to provide reasons for defaulting such mobile loans and the reasons were rated accordingly. 60.9% of the respondents provided flimsy excuses on why they were in default, while only 5% of the respondents could be said to have genuine reasons for defaulting.

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Table 4: Frequency of Digital Credit Defaulters

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Genuine Reason)	13	5.0	5.0	5.0
	2 (Acceptable Reason)	88	34.1	34.1	39.1
	3 (Flimsy Excuses)	157	60.9	60.9	100.0
	Total	258	100.0	100.0	

Majority of the respondents (65.6%) indicated that the coming of digital/mobile loans increased their borrowing of loans. On the question whether the respondent always repaid their digital loans on time, majority of the respondents (65.6%) indicated that they did not repay their digital loans on time, while only 34.4% of the respondents agreed that they repaid their digital loans on time, despite the fact that 72.2% of the respondents knew the consequences of not repaying the loans on time. However, only 37% of the respondents agreed that they were aware that they had ever been blacklisted in CRB while 63% of the respondent indicated that to the best of their knowledge, they have never been blacklisted on CRB. The respondents also cited reasons why they borrow mobile loans, 34.2% of the respondents provided one reason, where most of these respondents cited lack of funds due to loss of jobs or poor business environment. 39.1% of the respondents cited two reasons which were mainly lack of funds, loss of jobs, emergency and poor business environment. 26.5% of the respondents had three or more reasons why they borrowed mobile loans as shown it the table below. This category of respondents apart from the reasons cited in the other categories also had reasons such as ease of getting loans, delayed income, pressure from peers, family needs, business troubles among other reasons.

From the findings it is very clear that majority of the respondents are aware of the consequences of defaulting the loans yet they still proceed to default the loans anyway. Researcher postulates that there needs to be better mechanisms of managing debt rather than using the regulation. The reasons why people borrow themselves into over-indebtedness needs to be addressed in a more sustainable way.

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Table 5: Reasons for Taking Digital Loans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	.3	.3	.3
	1	133	34.2	34.2	34.4
	2	152	39.1	39.1	73.5
	3	103	26.5	26.5	100.0
	Total	389	100.0	100.0	

Correlation Analysis of the Variables

In order to determine the correlation between digital credit revolution and customer over-indebtedness, each factor that comprises digital credit revolution was checked on its correlation with customer over-indebtedness. The factor of customer over-indebtedness had been determined by either yes or no (1 or 0) that indicated whether a respondent was over-indebted or not. The table below indicates the correlation of each factor of digital credit revolution on customer over-indebtedness.

Table 6: Correlations Table

	Customer Over-Indebtedness	When was the last time you borrowed a mobile loan?	Do you have a bank account ?	Did you have any secured bank/MFI/Sacco loan before you started using the digital loans?	Do you currently have a secured bank/MFI/Sacco loan?
Customer Over-Indebtedness	1				
When was the last time you borrowed a mobile loan?	.240**	1			
Do you have a bank account?	-.319**	.048	1		
Did you have any secured bank/MFI/Sacco loan before you started using the digital/mobile loans?	.291**	-.140**	-.594**	1	
Do you currently have a secured bank/MFI/Sacco loan?	-.086	-.465**	-.228**	.398**	1

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The correlation between customer over-indebtedness and the last time a respondent borrowed a mobile loan was positive and significant at 0.01 level. The Pearson's Correlation (r) was 0.240 that indicated that respondents who had taken a longer period of time before they borrowed a digital loan were less likely to be over-indebted, while those who had taken a digital loan in the recent past, were more likely to be over-indebted. The more recent a loan has been taken, the higher the propensity of borrowing again.

The correlation between customer over-indebtedness and whether a respondent had a bank account was also significant but negative with r = -0.319. This indicates that respondents who had bank accounts were less over-indebted, while respondents who did not have bank accounts indicated were more likely to be over-indebted. This is because those respondents who had bank accounts had more channels of accessing loans and more often those with bank accounts were more financially included.

Respondents had also been asked whether they had existing secured/bank loan before undertaking digital/mobile loans. Those who answered in the affirmative were more likely to be over-indebted as the correlation between the two variables was significant and positive at r = 0.291. This showed they were serial borrowers even before the digital loans came into being.

Hypotheses Testing

This study was based on the null hypothesis that there is no significant effect between digital credit revolution on customer over-indebtedness in the informal economy in Nairobi City County Kenya. Binary Logistic Regression model was used in the study to test this hypothesis. The study identified different factors that when combined together they would classify a person as either over-indebted or not over-indebted. The dependent variable was therefore binary in nature where 49.6% of the respondents were not over-indebted and 50.4% of the respondents were over-indebted.

Binary regression was used to test the hypothesis where the Logit model took the form:

$\text{Logit}(Pi) = \beta_0 + \beta_i X_i$.

The factors that were used to determine digital credit revolution included: the last time respondent borrowed a mobile loan (X_1), knowledge of mobile loan providers (X_2), presence of bank account (X_3) and presence of other secured loan(s) before using digital loans (X_4) and currently have a secured bank/MFI/Sacco loan (X_4)

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The Omnibus tests of model coefficients was used to determine the strength of the model as indicated in the table below; that indicate that the model had a significance P<0.05 and therefore the model was significant in predicting customer over-indebtedness through the factors of digital credit revolution.

Table 7: Omnibus Tests of Model Coefficients

		Chi-square	Df	Sig.
Step 1	Step	90.568	5	.000
	Block	90.568	5	.000
	Model	90.568	5	.000

The explained variation in the dependent variable was explained by Nagelkerke R^2 method which is a modification of Cox & Snell $R^{2,}$ and which indicated a value of 0.277. This indicates that the model could explain changes in customer over-indebtedness to the extent of 27.7%. The rest can be explained by other variables outside of this study.

Table 8: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R^2
1	448.678[a]	.208	.277
a. Estimation terminated at iteration number 4 - parameter estimates changed by less than .001			

The classification table 9 below shows the observed cases from the predicted cases by the model. It therefore provides the accuracy of the model which indicates that it has an overall accuracy of 69.9%. The main diagonal of the table indicates the cases that were correctly classified by the model while the other diagonal indicates the cases that were wrongly classified by the model. There were an observed 193 cases of respondents who were not over-indebted, of which 124 of them were correctly classified as not over-indebted while only 69 cases were predicted as being over-indebted. The accuracy rate was therefore 64.2%. On the other hand, there were a total of 196 respondents who were over-indebted, out of which 148 were correctly classified as over-indebted and indicating accuracy rate of 75.5% as indicated in table 9 below.

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Table 9: Classification Table

Classification Table[a]					
Observed			Predicted		
			Customer Over-Indebtedness		Percentage Correct
			No	Yes	
Step 1	Customer Over-Indebtedness	No	124	69	64.2
		Yes	48	148	75.5
	Overall Percentage				69.9
a. The cut value is .500					

In order to determine the significance of each factor, Wald test was undertaken, and the results indicated below. The significance of each factor was less than 0.05 and therefore the null hypothesis is rejected. Rejecting the null hypothesis means we accept the alternative hypothesis that there is significant effect of digital credit revolution on customer over-indebtedness.

Table 10: Table of Test Results using Binary Logit Model

Digital Credit Revolution								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
The last time borrowed a mobile loan	0.75	0.186	16.2	1	0.000	2.117	1.469	3.05
No. of mobile/digital loan providers	0.543	0.197	7.58	1	0.006	1.721	1.169	2.534
Presence of bank account	-1.09	0.334	10.667	1	0.001	0.336	0.175	0.647
Had a secured bank/ Sacco loan before digital/mobile loans	1.021	0.299	11.634	1	0.001	2.777	1.544	4.994
Currently have a secured bank/MFI/Sacco loan	-0.652	0.335	3.796	1	0.048	0.521	0.27	1.004
Constant	-3.432	0.755	20.643	1	0	0.032		
a Variable(s) entered on step 1: Factors of Digital Credit Revolution								

The findings are as indicated in table 10 above. The first factor represents the period taken by a borrower before borrowing the next digital loans. Those who had taken less than 30 days were assigned a value of 3 while those who had taken longer had been assigned less values of 2 and 1. The B-coefficient value is positive indicating that as the value increases (less time before the last loan) then there was higher over-indebtedness. This is consistent with the findings by FSD in 2018 that found that Kenyans in the informal

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sector took loans more frequently and often for trivial reasons, and this could be the reason why in less than 30 days majority of the respondents had already taken new loans.

The second factor shows the number of digital lenders that were known by the respondents. The more the digital lenders known to the respondent, then the more the level of over-indebtedness. This means that the borrower had more options of accessing loans hence more chances of over-indebtedness.

The presence of bank accounts could signify that the lender does not rely on mobile and digital loans as they are likely to get loans from the bank. The negative relationship was significant indicating that the less the people had bank accounts, the more they were indebted. The researcher postulates that bank accounts widen financial inclusion and often banks teach people to be more financially disciplined.

The presence of other secured loans from banks/ MFIs or SACCOs were also tested and it showed positive relationship to over-indebtedness, indicating that the more one had other loans, the more they were likely to be over-indebted. This is due increased loan burden which often goes beyond the customer's ability to repay.

The findings also showed that the respondents who had initially started borrowing secured bank/ MFI or Sacco loan before the advent of digital/mobile loans, had positive significant correlation to over-indebtedness. These portents a behaviour of serial borrowing and digital loans just served to worsen that situation.

All the findings are consistent to the earlier conclusions by Musau et al. (2018) that indicated that late loan repayments in Kenya had been made worse by increased presence of digital lenders. On the other hand, the study by Schicks (2011) indicated contrary findings. He postulates that even though many digital lenders had tried to curb non-payments through debt shaming and embarrassment to the borrower, surprisingly the mistreatment served little to deter or lower cases of over-borrowing.

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Table 11: Summary of Results from the Tests of Study Hypotheses

	Null Hypothesis	**Results**	**Interpretation**
H_1	There is no significant effect of digital credit revolution on customer over-indebtedness	Omnibus Test Model is significant ($p<0.05$)	The null hypothesis is rejected
H_a	There is no significant effect of 'the last time one borrowed a loan' on over-indebtedness.	Negative correlation and Wald Test is significant ($p<0.05$).	Null hypothesis rejected and therefore the longer the period from the last time a borrower borrowed loan, the lower the chance of being over-indebted.
H_b	There is no significant effect of 'knowing many mobile loan providers' on customer over-indebtedness.	Positive correlation and Wald Test is significant ($p<0.05$).	Null hypothesis is rejected which implies there is significant and positive effect of knowing many mobile loan providers on customer over-indebtedness.
H_c	There is no significant effect of 'having a bank account' on customer over-indebtedness.	Negative correlation and Wald test is significant ($p<0.05$).	The null hypothesis is rejected which implies that there is a significant negative effect of having a bank account on customer over-indebtedness.
H_d	There is no significant effect of 'had a secured bank/ Sacco loan before digital/mobile loans' on customer over-indebtedness	Positive correlation and Wald test is significant ($p<0.05$)	The null hypothesis is rejected which implies that those who initially had secured loans before digital/mobile loans were more likely to experience customer over-indebtedness.
He	There is no significant effect of 'currently have a secured bank/MFI/Sacco loan' on customer over-indebtedness	Positive correlation and Wald test is significant ($p<0.05$)	The null hypothesis is rejected implying that having other existing secured loans led to customer over-indebtedness.

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Conclusions and Recommendations

The study findings show that there was significant effect of digital credit revolution on customer over indebtedness. It indicated that the sudden increase in digital loans providers accelerated the digital credit revolution currently witnessed which in turn facilitated over-indebtedness.

The increase in channels for accessing these loans, gave the borrowers easy access which if not controlled would lead to over borrowing. Digital credit revolution was the independent variable in the study and was comprised of; the number of digital lenders, level of activity among borrowers, frequency of access to digital loans, and the comparison on the mainstream loans versus digital/mobile loans.

The main finding is that there was a significant correlation between customer over-indebtedness and when the last time a respondent borrowed a mobile loan was. The positive correlation indicated that the borrowers who had recently (within the last 30 days) borrowed mobile loans, had higher chances of being over-indebted. The findings are consistent to the earlier conclusions by Musau et al. (2018), which indicated that late loan repayments in Kenya had been made worse by increased presence of digital lenders.

Respondents who had a bank account had lower chances of being over-indebted meaning that they did not engage more on mobile/digital loans as people without bank accounts. The Pearson's Correlation was negative and significant (r=-0.319).

People who had borrowed from other secured loan providers e.g., banks, microfinance institutions and SACCOs were also likely to be over-indebted than those without - the correlation between this factor and over-indebtedness was positive and significant. This means the more the loan obligations, the higher the chances of getting over-indebted.

The findings also showed that the respondents who had initially started borrowing secured bank/ MFI or Sacco loan before the availability of digital/mobile loans, had positive significant correlation to over-indebtedness. This shows that those particular respondents were either with a high demand for loans or they were just serial borrowers.

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From the study, it is evident that the more the respondent understood the digital loans landscape and could name more lenders, the more likely they were to get over-indebted. Majority of the respondents are well aware of avenues of excessing these loans. This showed that these respondents had more loan providers within their reach increasing the chances of taking loans. Musau et al. (2018) indicated that late loan repayments in Kenya had been made worse by increased presence of digital lenders and therefore conforms to the findings of this study.

Findings shows that so long as the digital and mobile loans continue to be readily available, the majority of borrowers within the informal sector will continue to borrow without being bothered with their inability to repay these loans. Majority of these borrowers are not bothered by being listed on credit reference bureaus. Therefore, to curb over-indebtedness, more needs to be done by regulators and lenders to ensure only the customers who are not over-indebted can access these loans. More civic education needs to go into the informal sector to help these operators make prudent financial decisions.

Though there have been enhanced efforts to improve borrowers' data privacy by the recently formed office of the Data Commissioner in Kenya and the new Digital Lending regulations (Central Bank of Kenya (Amendment) Act, 2021), the study showed that the borrowers in the informal sector cared less on data privacy nor the predatory interest rates that were punitive. This then calls for review in policy to help these borrowers at the bottom of the pyramid who might not be able to stand on their own despite the new regulations favoring them. This study recommends a keener re-look into regulations and its enforceability. This is because a significant number of people in the informal sector would borrow loans, not necessarily because they need to attend to an emergency or to undertake a certain investment that would guarantee them returns, but rather take up loans because of its availability.

The government especially those in charge of trade, commerce and industry also needs to do more in offering capacity building and training programs to the borrowers on healthy borrowing habits. These training programs would ensure that the informal sector understands what kind of loans to undertake and the advantages of paying loans in time on a person's credit worthiness. This would entirely reduce the risk of default on digital lenders and therefore make it reasonable to charge lower interest rates for digital loans. The researcher also recommends inclusion of financial literacy courses in schools in an effort to raise a generation that would be making prudent financial decisions. Even with launch of Hustler Fund in 2022,

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the fund managers and the policy makers need to move with speed to address the capacity building and the training aspect. If this is not addressed at this stage, the borrowers within the informal economy will end up borrowing these loans just because of its availability as it's been seen in this study. That is the only way such a fund would be sustainable in the long run.

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