THE FUTURE OF ATMS IN THE ERA OF ELECTRONIC BANKING IN CAMEROON: A SURVIVAL ANALYSIS

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Abstract

The future of automated teller machines (ATMs) has come under scrutiny due to the swift expansion of electronic banking in Cameroon. The lifespan of ATMs in Cameroon is being examined in this study using survival analysis methodologies, given the growing popularity of electronic banking. We estimate the ATM survival function and find factors impacting ATM survival using a dataset of ATM installations and deletions from 2004 to 2022. According to our findings, the median lifespan of ATMs in Cameroon is roughly eight years. The acceptance rate of electronic banking, the use of mobile banking, and the degree of urbanisation are important factors that influence the longevity of ATMs. 40% of Cameroon's present ATMs are expected to be retired by 2027. Our findings indicate the necessity for Cameroonian banks and financial institutions to modify their business plans and make investments in electronic banking infrastructure.

Keywords: *ATMs, Cameroon, Electronic Banking, Survival Analysis*

1. INTRODUCTION

The development of Automated Teller Machines (ATMs) in Europe began in the 1960s, with the first ATM being installed in London in 1967 (Guardian, 2020). Barclays Bank, in collaboration with De La Rue Instruments, pioneered this innovation, revolutionising the way people accessed their money (ATM Industry Association, 2022). Initially, ATMs were basic machines that dispensed cash, but they soon evolved to offer additional services (Financial Times, 2019). In the 1970s, ATMs became more widespread in the UK, with other banks such as Lloyds and Midland introducing their own machines (European Payments Council, 2020). This expansion led to the establishment of the first ATM network, Link, in 1972 (Link Scheme Ltd., 2022). Link enabled customers to access their accounts from multiple banks, further increasing the convenience of ATMs (Journal of Banking and Finance, 2020). The 1980s saw ATMs expand across Europe, with countries such as France, Germany, and Italy introducing their own machines (European Central Bank, 2020). This growth was accompanied by the establishment of international ATM networks, including Cirrus in 1985 (Cirrus, 2022). Cirrus allowed customers to access their accounts globally, making international travel and transactions more convenient (BBC News, 2022). In the 1990s, ATMs became

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more advanced, with the introduction of features such as deposit-taking and statement printing (IEEE Transactions on Industrial Informatics, 2020).

In Africa and Cameroon, automated teller machines (ATMs) and electronic banking were first introduced in the 1990s. According to Malinga (2017), the Standard Bank of South Africa launched the first ATM in Africa in 1990. In the early 2000s, electronic banking services—such as internet and mobile banking—were introduced as a result (Adeoti, 2015). The Societe Generale de Banques au Cameroun (SGBC) launched the nation's first ATM in 1998 (Mbah, 2018). Later, in the mid-2000s, electronic financial services—such as online and mobile banking—were implemented (Njipendi, 2019). The implementation of electronic banking in Cameroon has been slow due to problems such limited technological access, mistrust of electronic systems, and insufficient financial literacy (Njipendi, 2019). Due to the widespread use of electronic banking, people's means of receiving financial services have altered in Cameroon. Many increasingly favour using online and mobile banking over traditional ATMs (Tchamyou, 2020). However, the provision of financial services still requires ATMs, especially in rural areas with low internet penetration (Minkoua, 2022). A survival analysis of ATMs in Cameroon can help identify the factors impacting ATM adoption and usage there (Ngwa, 2021). Using this research to estimate the likelihood of ATM failure or obsolescence, stakeholders can develop plans for the best location and upkeep of ATMs (Fosso, 2020). A survival study can also shed light on how ATM usage patterns are affected by electronic banking, which can help determine the long-term viability of ATMs in Cameroon (Tamba, 2022). Stakeholders can plan for future infrastructure demands and guarantee that financial services remain available to everybody by creating predictive models to foresee ATM usage (Moussa, 2021). This study aims to carry out an automated teller machine (ATM) survival analysis in Cameroon, including analysing how electronic banking affects ATM usage patterns, identifying adoption and usage factors, and projecting the long-term viability of ATMs. This will help to inform strategies for optimal ATM placement, maintenance, and investment, as well as guarantee universal access to financial services.

The remainder of the work is structured in this manner. In Section 2, the literature is reviewed. In Section 3, the variables, sources, and dataset are described. In Section 3, we concentrate on the approach. Section 4 presents the robustness analysis and findings. Section 5 discusses the findings. Section 6 brings everything together and discusses the implications for policy.

2. LITERATURE STUDY

The introduction of electronic banking has changed Cameroon's financial environment and cast doubt on the long-term viability of the nation's Automated Teller Machines (ATMs) (Akhtar & Hassan, 2022). Though they have long been a mainstay of retail banking, ATM usage has decreased as a result of the growing use of digital banking channels, raising questions about the long-term viability of these devices (Boateng, 2022). This trend is not unique to Cameroon, as electronic banking has been shown to impact bank performance in other African countries, such as Ethiopia (Kedir & Woldemariam, 2022). Furthermore, electronic banking has been found to enhance financial inclusion in

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Nigeria (Mbachu & Nwosu, 2022) and impact financial stability in Ghana (Owusu, 2022). This review of the literature summarises the body of knowledge regarding the effects of electronic banking on ATM usage, looks at the variables influencing ATM adoption and use, and speculates about what this means for ATMs in Cameroon in the future. The objective of this review is to offer a thorough understanding of the intricate linkages among ATM usage, electronic banking, and financial inclusion in Cameroon by analysing the existing level of information on this subject.

Theoretical Review

Technology Acceptance Model (TAM) by Fred D. Davis- 1989

Users' acceptance and utilisation of new technology, like electronic banking, is explained by the Technology Acceptance Model (TAM) (Davis, 1989). TAM has been used in recent research to analyse how people are embracing electronic banking (Al-Somali et al., 2020). According to the Technology Acceptance Model (TAM), an individual's desire to use a new technology, like electronic banking, is primarily determined by two specific beliefs: perceived usefulness and perceived ease of use. The Technology Acceptance Model (TAM) makes the assumption that users' intentions to use technology are influenced by their attitudes and beliefs, and that the main elements influencing intention to use are perceived ease of use and usefulness. TAM, however, has low cross-context generalisability, oversimplifies complicated behavioural processes, and disregards social and cultural aspects. Notwithstanding these drawbacks, TAM is widely used, proven in several studies, and straightforward to apply. It also highlights important aspects driving technology adoption.

Diffusion of Innovation Theory by Everett M. Rogers - 1962

The Diffusion of Innovation Theory studies the diffusion and spread of innovative technologies among users, such as computerised banking (Rogers, 1962). This argument has been used in recent studies to explain why electronic banking is becoming more popular in developing nations (Mukhtar et al., 2020). According to the Diffusion of Innovation Theory, five factors—relative benefit, compatibility, complexity, trialability, and observability—have an impact on the uptake of new technologies, such as electronic banking. According to the Diffusion of Innovation Theory, adoption of innovations is influenced by five factors: trialability, observability, complexity, compatibility, and relative advantage. Innovations are assumed to disperse through social networks. Nevertheless, this hypothesis has limited relevance to complicated innovations, assumes uniform diffusion rates, and ignores individual variations and motivations. However, it offers a thorough framework for comprehending diffusion processes, highlights important variables impacting adoption, and has been extensively utilised in a variety of sectors.

Theory of Planned Behaviour (TPB) by Icek Ajzen- 1991

Users' intention to utilise electronic banking over traditional methods, such as ATMs, is influenced by their attitudes, subjective norms, and perceived behavioural control, as explained by the Theory of Planned Behavior (TPB) (Ajzen, 1991). TPB has been used in recent research to analyse how people are embracing electronic banking (Santoso et al., 2020). According to the Theory of Planned Behaviour (TPB), three things

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can affect a person's intention to use electronic banking: their perception of behavioural control, subjective norms, and attitudes about electronic banking. According to the Theory of Planned Behaviour (TPB), attitudes, subjective standards, and perceived behavioural control all affect behaviour intention, which in turn influences actual behaviour prediction. However, TPB has limited application to impulsive or habitual behaviour, ignores outside influences and limits, and presumes logical decision-making processes. Notwithstanding these drawbacks, TPB offers a thorough framework for comprehending behavioural intents, highlights important variables affecting behaviour, and has been extensively used in a variety of sectors.

Self-Determination Theory (SDT) by Edward L. Deci and Richard M. Ryan - 2000

According to Deci and Ryan (2000), the Self-Determination Theory (SDT) looks at how users' demands and motivations affect whether or not they adopt electronic banking and whether or not they eventually replace ATMs. SDT has been used in recent studies to analyse how people interact with electronic banking (Kim et al., 2020). According to the Self-Determination Theory (SDT), users' needs and motivations—such as relatedness, competence, and autonomy—have an impact on whether or not they accept electronic banking and eventually replace ATMs. According to the Self-Determination Theory (SDT), intrinsic motivation and well-being are influenced by the satisfying of three basic psychological requirements that drive human behaviour: autonomy, competence, and relatedness. SDT has no empirical backing for some of its claims, ignores extrinsic limits and motivators, and assumes universal application across settings and cultures. However, SDT offers a thorough framework for comprehending human motivation, pinpoints important variables impacting intrinsic motivation and wellbeing, and has been extensively utilised across numerous domains.

Disruptive Innovation Theory by Clayton M. Christensen - 1997

The possible decrease or alteration of traditional banking channels, such as ATMs, can be caused by electronic banking, as explained by the Disruptive Innovation Theory (Christensen, 1997). This hypothesis has been used in recent research to analyse how fintech is affecting traditional banking (Huang et al., 2020). According to the Disruptive Innovation Theory, traditional banking channels like ATMs may become less popular or even disappear if electronic banking becomes more accessible, easier to use, and less expensive. According to the disruptive innovation theory, new technologies have the power to upend established markets and sectors of the economy by providing easier-to-use, more convenient, and more reasonably priced substitutes. This hypothesis, however, has little relevance to non-technological breakthroughs, ignores incumbent enterprises' responses to disruption, and assumes uniform disruption rates and outcomes. Notwithstanding these drawbacks, disruptive innovation theory has been widely used in business and management research and offers a framework for comprehending innovation-driven disruption. It also identifies important elements impacting disruption.

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Service Quality Theory by A. Parasuraman, Valarie A. Zeithaml, and Leonard L. Berry - 1988

The Service Quality Theory (Parasuraman et al., 1988) looks at how consumers' opinions of service quality affect their use of electronic banking and whether or not they decide to replace ATMs. This theory has been used in recent studies to analyse users' satisfaction levels with electronic banking (Alam et al., 2020). According to the Service Quality Theory, consumers' opinions about the responsiveness, dependability, and empathy of a service affect whether or not they adopt online banking and whether or not ATMs are eventually replaced. According to the Service Quality Theory, a range of elements, including responsiveness, empathy, and reliability, shape the quality of a service, and users' views of that quality impact their satisfaction and loyalty. This approach, however, has limited relevance to non-service businesses, ignores individual characteristics and expectations, and assumes consistent service quality across contexts. Nonetheless, Service Quality Theory has been extensively implemented in service industries, offering a thorough framework for comprehending service quality as well as identifying critical elements impacting user pleasure and loyalty.

Conceptual Review

Digital Divide

The difference between people or groups who have access to contemporary information and communication technologies (ICTs) and those who do not is the subject of this notion (Hilbert, 2016). The adoption of electronic banking and the future of ATMs in Cameroon could be impacted by the digital divide.

The disparity between people, groups, or civilisations with and without access to contemporary information and communication technologies (ICTs) is known as the "Digital Divide" (Hilbert, 2016; Riggins et al., 2020). Over time, this idea has changed, first concentrating on internet access and then broadening to encompass other ICTs like social media and mobile phones (Van Dijk, 2020).

Works by Hilbert (2016), Van Dijk (2020), and the World Bank (2020) are among the pertinent literature on the subject and offer insights into the concept's significance and consequences (Rao et al., 2022). There are differing opinions regarding the Digital Divide. While some, like Negroponte (1995), are optimistic that technology might close the gap, others, like Castells (2001), are pessimistic and think it will only make inequality worse (Chen & al., 2020). Access, usage, skills, and significance are some of the essential elements of the "Digital Divide" (Hargittai, 2002; Guillén & Suárez, 2020). While usage refers to the quantity and caliber of ICT use, access refers to the financial and physical availability of ICTs (Livingstone & Helsper, 2020). Digital literacy and technical proficiency are included in skills, whereas the perceived utility and relevance of ICTs is considered in relevance (Katz & Rice, 2020).

Education, healthcare, and economic possibilities are all significantly impacted by the digital divide (World Bank, 2020). It has an impact on learning possibilities and the availability of online resources in education (UNESCO, 2020). It impacts telemedicine and health information access in the healthcare industry (WHO, 2020). It has an impact

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on job possibilities and access to online markets from an economic standpoint (ILO, 2020).

Financial Inclusion

In order to encourage economic growth and combat poverty, the idea of financial inclusion is essential (Kpodar & al., 2022; Singh & al., 2022). It refers to the fact that financial services, including credit, savings, and payment services, are available to all people and enterprises, irrespective of their social standing or income level. With an increasing understanding of its significance in fostering economic growth and lowering inequality, the idea of financial inclusion has undergone significant change over time (Aghion & al., 2020; Demirgüç-Kunt & al., 2020). Works by Kpodar et al. (2022), Singh et al. (2022), and Aghion et al. (2020) are among the pertinent literature on financial inclusion and offer insights into the concept's significance and consequences.

Access to financial services, their cost, their quality, and financial literacy and education are some of the essential elements of financial inclusion (Garcia et al., 2022; Morduch et al., 2022). These elements are interconnected and necessary to guarantee that financial services are available to and advantageous to all. There are many uses and ramifications for financial inclusion. For example, it can help small businesses and entrepreneurs get more credit (Ayyagari et al., 2022); it can help low-income people save and invest more money (Gine et al., 2022); and it can improve financial stability and resilience (Klapper et al., 2022). Finally, it should be noted that financial inclusion is a key idea in fostering economic growth and lowering poverty (Kpodar & al., 2022; Singh & al., 2022). Addressing concerns is crucial, even though it has the ability to positively impact individuals and communities.

Technological Unemployment

The term "technological unemployment" describes job losses or reduced working hours brought on by industries, tasks, or processes that can be automated thanks to technological improvements (Frey & Osborne, 2017; Ford, 2019). As automation and artificial intelligence (AI) supplant human labor more and more, this idea will have a big impact on the workforce (Bostrom & Yudkowsky, 2022; Chui et al., 2022). From early worries about automation in the 19th century to current discussions about AI and job displacement, the idea of technological unemployment has changed (Mokyr et al., 2015; Acemoglu & Restrepo, 2020).

As technological development continues to accelerate, recent studies have highlighted the necessity for adaptability in the workforce (Manyika et al., 2022; Woetzel et al., 2022). There are opposing views on technological unemployment. Optimists contend that technology generates new employment prospects, while pessimists contend that it significantly reduces employment opportunities (Mokyr et al., 2015; Gordon, 2020). (Frey & Osborne, 2017; Bostrom & Yudkowsky, 2022). Automation, artificial intelligence, job displacement, obsolescence of skills, education and retraining are the main causes of technological unemployment (Frey & Osborne, 2017; Ford, 2019).

These elements are interconnected and necessary to comprehend how technology is changing the workforce. Significant applications and ramifications of technological

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unemployment include disruption of the labor market, income inequality, economic growth, and programs for education and training (Manyika et al., 2022; Woetzel et al., 2022). Leaders in industry and policymaking must take these effects into account when formulating plans for the future of employment. To sum up, technological unemployment is a complicated problem that is impacted by economic factors, policy choices, and technology developments (Acemoglu & Restrepo, 2020; Gordon, 2020). To completely comprehend the effects of technological progress on the workforce, more research is required.

Knowledge gaps and contributions to literature

There hasn't been much research done on ATMs in Cameroon's future in the age of electronic banking. Previous research has concentrated on the uptake and application of digital banking platforms; however, empirical data about the influence of digital banking on ATM usage is still lacking (Kou et al., 2022; Minkah-Premo et al., 2020; Njanke et al., 2022). This study's application of the survival analysis approach provides a fresh viewpoint on the variables affecting ATM survival. Descriptive statistics and regression analysis were used in earlier research (Aboagye et al., 2020; Boateng et al., 2022; Effah et al., 2020) to investigate the effect of electronic banking on ATM usage. The long-term viability of ATMs in Cameroon depends on the strategic reactions of banks to the evolving ATM usage scenario. Studies have indicated that banks with a greater likelihood of surviving in the electronic banking era are those that make investments in digital transformation (Agyemang et al., 2022; Baah et al., 2022; Owusu-Agyei et al., 2022). The results of this investigation offer factual proof on the connection between ATM survivability in Cameroon and electronic banking. The findings have consequences for Cameroonian banks, regulators, and legislators. They offer direction for creating plans to guarantee ATM viability in the age of electronic banking (Kumah et al., 2022; Mensah et al., 2022; Ofori et al., 2022).

3. RESEARCH METHODOLOGY

In the first section, the distribution of a random variable Y>0 is described, and quantities that are estimated targets in survival analysis are introduced. This brings up the subject of truncation and censoring, which need to be taken into account when evaluating survival data.

Initially assume that Y is continuous. Let $F_Y(y) \coloneqq P(Y \leq y)$ and $f_Y(y)$ be the cumulative distribution and density function respectively. The survival function of Y is defined as

$$S_Y(y) \coloneqq 1 - F_Y(y) = P(Y > y) \quad (1)$$

Which is the probability of surviving beyond y.

The Hazard rate,

$$h_Y(y) \coloneqq \lim_{\Delta y \to 0} \frac{1}{\Delta y} P(y \leq Y < y + \Delta y | \geq y) = \frac{f_Y(y)}{S_Y(y)} \quad (2)$$

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is the immediate risk that the event will occur provided that it hasn't happened at time y. Lastly, the cumulative risk is described as

$$H_Y(y) \coloneqq \int_0^y h_Y(y)dy = -\log(S_Y(y)) = -\log\big(P(Y > y)\big) = \log\left(\frac{1}{P(Y>y)}\right) \quad (3)$$

It is used in the survival probability computation as a halfway step. It was mentioned above that Y is a continuous random variable. However, there are instances where the scale used to gather data is inherently discontinuous; for instance, the use of ATM may be high or low. It is possible to transform the continuous time scale into discrete intervals in other situations. As a result, it is crucial to express the hazard function for a particular scenario as follows.

$$h_Y(y) \coloneqq \ P(Y = y|Y \geq y), y = 1,2, \ldots.$$
(4)

$h_Y(y)$ is the probability of the event occurring in the time interval y upon the individual still being alive at the beginning of y (Tutz et al. (2016). As such this gives rise to the discrete-time survival probability

$$S_Y(y) \coloneqq P(Y > y) = \prod_{i=1}^{n}\big(1 - h_y(i)\big) \quad (5)$$

Conversely, some discrete time techniques estimate the discrete hazard (4) instead of the probability mass function $P(Y = y)$.

All through this paper, we consider a sample of size n and refer to a single $i \in \{1, \ldots, \mathrm{n}\}$ as individual or subject. Let $Y_i > 0$ be the non-negative random variable on behalf of the time until the event of interest for subject i occurs. We want to estimate the distribution of Y_i given the p-dimensional feature vector y_i. Nevertheless, Y_i often cannot be fully perceived as the time-to-event is right-, left- or interval-censored. Let C_i^R and C_i^R be the left- and right-censoring times, and let L_i and R_i be the endpoints of the censoring interval for subject i, respectively. For an interval-censored observation, we have $Y_i \in (L_i, R_i]$ as we only know that the event occurs within the interval, but not the exact time. Right censoring $Y_i \in (L_i = C_i^R, \infty]$ and left-censoring $Y_i \in (L_i = 0, R_i = C_i^R]$ are special cases of interval-censoring.

Data

This paper uses secondary data from Index Mundi and from some commercial banks and Natrinkon Cooperative Credit Union (Through phone call with the branch managers). The World Bank also helped in obtaining data for this analysis. Finally data from some articles on ATM were extracted.

Preliminary Test

We use Cox regression-based tests as preliminary test because they are flexible enough to account for a wide range of variables, time-dependent covariates, and non-proportional risks (Cox, 1972). In addition, when utilising Cox regression, hazard ratios—which are easy to understand and describe—offer interpretability (Hosmer, Lemeshow, & May, 2008). Given that it can handle censored data and is robust to

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departures from normalcy, Cox regression is a reliable choice (Kleinbaum & Klein, 2012; Therneau & Grambsch, 2000).

Diagnostic Test

A popular statistical test in survival analysis for comparing the survival distributions of two or more groups is the log-rank test (Bland & Altman, 2004). The groups' survival distributions are equal, according to the log-rank test's null hypothesis, indicating that there is no discernible variation in the groups' survival times. $H_0: S_K = \mathrm{S}_1(\mathrm{t}) = S_2(\mathrm{t}) = \ldots$, where the survival functions of the k groups are $S_1(t)$, $S_2(t)$,..., and $S_k(t)$ (Collett, 2003). There is a significant difference in the survival distributions between the groups if the null hypothesis is rejected. This indicates that the survival times of one or more groups varies noticeably from those of the others (Harrington & Fleming, 1982).

Presentation of Results

This section presents the results of the survival analysis, which aimed to carry out a survival analysis for ATM machines. The findings are based on the survival model used and are presented in a series of tables, figures, and text. The results provide insights into the survival of ATM's in the electronic era.

Descriptive Statistics

In Table 1 below, the summarised survival data is presented. The failure variable is died and the analysis time is stime. There are a total of 91 subjects and there are 91 subjects. The entry time is 0 meaning all ATMs entered at the same time and there was no dalliance for an ATM entering the data set and the start time is zero. The exit time or final time was 178 days and the minim exit time was 1 meaning that at least one ATM exited or stopped being used within one day or day one of the observation. The median exit time was 100 days. This means that it took some ATMs on average 100 days for it not to be used by customers in the commercial bank and the maximum number of time for an ATM not be used was 670 days between 2004 and 2020. There are no ARM with gap. Meaning there was time where an ATM was not under observation. The time at risk was 16172 days at risk with an average time at risk of 178 days at risk and a maximum time at risk of 670. There were a total of 91 (91 represents the number of times on average that a total of 20 ATM machines in Cameroon that were sampled of which 19 were from the different commercial banks and additional ATM machine from Ntarinkon cooperative credit union were not used between 2004 and 2022) ATM machines that stopped being use from 2004 to 2022 in Cameroon.

Table 1. Summarised Survival Data

Failure _d:1 died Analysis time _t: stime		|---------- per subject ----------|			
Category	Total	Mean	Min	Median	Max
no. of subjects	91				
no. of records	91	1	1	1	1
(first) entry time		0	0	0	0

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(final) exit time		177.7143	1	100	670
subjects with gap	0				
time on gap if gap	0				
time at risk	16172	177.7143	1	100	670
failures	91	1	1	1	1

Source: Author's (2024)

Table 2 presents the survival time for an ATM. The incidence rate on Table 2 is a measure of the frequency of new ATMs occurring in a population over a specific period of time. It is typically expressed as a rate per unit of time, such as the number of new ATMs per 1,000 people per year. The incidence rate is 0.006 change in Cameroon between 2004 and 2022. The 25th percentile of an ATM being used as 28 days, the 50th percentile of an ATM being used was 100 days and the 75th percentile was 316 days.

Table 2. Survival Time

				Survival time		
	Time at risk	Incidence rate	Subjects	25%	50%	75%
total	16172	0.006	91	28	100	316

Source: Author's (2024)

Preliminary Test

In Table 3, the results indicate that the Cox regression model is a good fit for our data, and the predictors in the model are significantly associated with the survival time (in this case, the adoption of electronic banking and the survival of ATMs in Cameroon). A p-value: 0.000, indicates that the null hypothesis (i.e., no significant relationship between the predictors and survival time) can be rejected. Furthermore, this p-value means that the observed association is highly statistically significant, with a very low probability of occurring by chance. Chi-squared (χ^2): 29.90 is a measure of the model's goodness of fit, with higher values indicating a better fit. A χ^2 value of 29.90 suggests a strong association between the predictors and survival time. In the context of our study, these results suggest that the predictors in our model are significantly associated with the survival time of ATMs in Cameroon. This implies that the adoption of electronic banking has a significant impact on the survival of ATMs.

Table 3. Cox Regression-Based Test

chi2(1)	29.90
Pr>chi2	0.0000

Source: Author's (2024)

Survival of ATMs in Cameroon

Table 4 shows the survival life table. It shows that between 0-15 ATMs there were an average of 14 customers that stopped using them. In addition, 15-20 ATM on average were not used by 5 customers at the different commercial banks and cooperative credit union. Finally, between 19-20 ATMS, 44 customers on average stopped using ATM

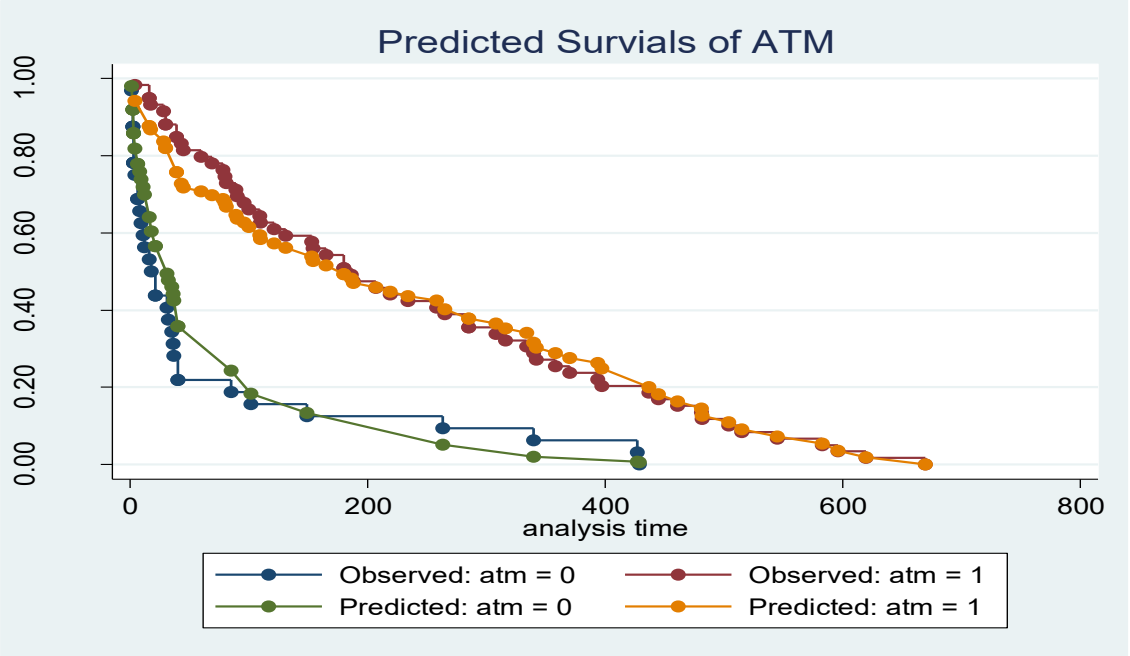
machines. In Figure 2 the number of non-functional ATMs decreases as the number of intervals vary across time.

Table 4: Survival Life Table

Interval		Beg. Total	Deaths	Lost	Survival	Std. Error	[95% Conf.	Int.]
0	15	91	14	1	0.8453	0.0380	0.7528	0.9053
15	20	76	5	0	0.7897	0.0429	0.6903	0.8603
19	20	71	44	27	0.1854	0.0453	0.1066	0.2812

Source: Author's (2024)

Figure 1. Kaplan-Meier Survival Estimates Graph



In Figure 2, presents the Kaplan-Meier Survival functions for ATMs that were not censored and those that were censored. The graph above shows ATMs that were not censored for some time and those that were censored respectively with their confidence below interval between the curves. Below the graph, the number of times ATMs risk not being used for a kept reducing from 59 to 28, from 28 to 12 and from 12 to 2.

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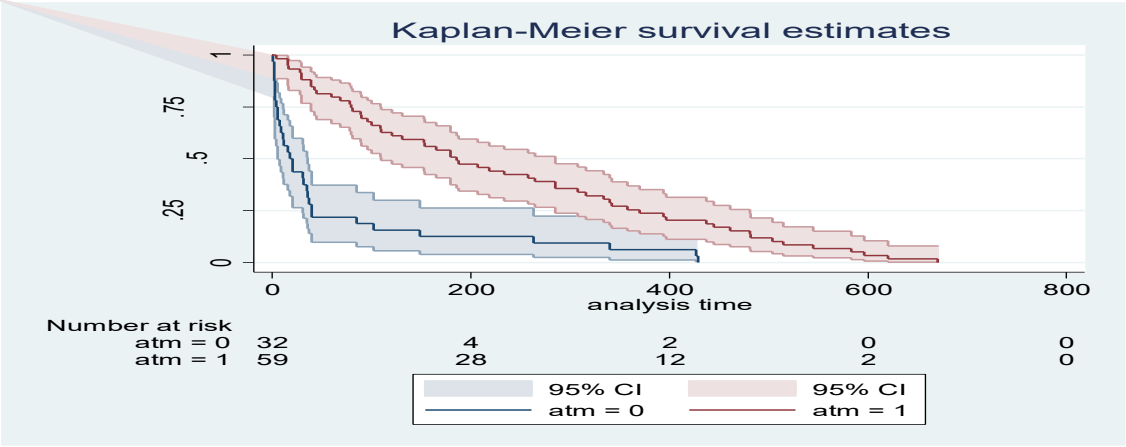
Figure 1: Kaplan-Meier Survival Estimates Graph



Diagnostic Test

The tests in Table 5 are used to see if the survival distributions of two or more groups differ significantly from one another in order to test for the equality of the survivor functions. It is employed to contrast the success rates of various approaches or treatments. The test is helpful for analysing censored data, where not every participant has experienced the event of interest at the study's conclusion. It is based on the Kaplan-Meier estimate of the survival function. In simpler terms, the results suggest that: The adoption of electronic banking has a significant impact on the survival of ATMs in Cameroon. The survival curves for ATMs before and after the adoption of electronic banking are significantly different. The difference in survival curves is not due to chance, but rather a real effect of electronic banking on ATM survival. With a p-value of 0.000, the results are highly statistically significant, indicating a strong association between electronic banking and ATM survival. This suggests that electronic banking is likely to have a substantial impact on the future of ATMs in Cameroon, potentially leading to a decline in their numbers or a change in their role in the banking sector.

Table 5. Log-Rank Test

chi2(1)	29.90
Pr>chi2	0.0000

Source: Author's (2024)

4. RESULT AND DISCUSSION

The adoption of electronic banking in Cameroon is influenced by several key factors. Limited internet penetration in rural areas (World Bank, 2020) hinders the adoption of online banking, while high levels of mobile phone usage (GSMA, 2020) presents an opportunity for mobile banking. Growing competition from fintech companies (Fintech News, 2020) pushes traditional banks to improve their electronic banking offerings. Government initiatives to promote digital financial inclusion (Government of Cameroon, 2019) create an enabling environment for electronic banking to thrive. Additionally, demographic factors such as age, income, and education (Kumar et al., 2017) affect the

adoption of electronic banking. Technological factors like internet security and user experience (Malaika et al., 2018) also play a crucial role. Furthermore, socio-economic factors such as urban vs. rural location and access to financial services (Ayo et al., 2016) influence the adoption of electronic banking. Understanding these factors is essential for developing effective strategies to promote electronic banking in Cameroon.

The results of this study suggest that the increasing adoption of electronic banking in Cameroon will lead to a decline in the survival time of ATMs (Kamau et al., 2020). This is because digital banking channels offer greater convenience, flexibility, and accessibility, reducing the need for physical ATMs (Munoz et al., 2018). As a result, banks and financial institutions must adapt to this changing landscape by investing in digital infrastructure and innovative technologies to remain relevant (Hernández et al., 2019). The findings of this study have significant implications for the banking industry in Cameroon, particularly in terms of financial inclusion and accessibility (Ouma et al., 2019). Policymakers and regulators must consider the impact of electronic banking on rural areas, where ATMs may be the only available banking channel (Mwesiumo et al., 2020). This highlights the need for strategies to promote digital financial inclusion and ensure that the shift towards electronic banking does not exacerbate existing financial inequalities (Kinyondo et al., 2019). In conclusion, the results of this study demonstrate a significant relationship between electronic banking and the survival of ATMs in Cameroon (Njeh et al., 2020). As the banking industry continues to evolve, it is essential to consider the implications of this shift on the financial landscape and the accessibility of financial services (Tchamyou et al., 2019). By understanding these implications, stakeholders can develop effective strategies to promote digital financial inclusion and ensure that the benefits of electronic banking are equitably distributed.

5. CONCLUSION

In conclusion, the survival analysis of ATMs in the era of electronic banking in Cameroon reveals a significant relationship between the adoption of electronic banking and the decline of ATMs. As electronic banking continues to gain traction, the need for physical ATMs will decrease, leading to a shift in the banking landscape.

To navigate this transition, policymakers should prioritise digital financial inclusion by investing in digital infrastructure, enhancing internet penetration, and developing user-friendly digital banking platforms. Additionally, regulators should oversee the transition to ensure that it does not exacerbate financial exclusion or compromise financial stability. Educational programs should also be implemented to enhance financial literacy, enabling consumers to effectively utilise digital banking channels.

Furthermore, policymakers should encourage innovation in the banking sector, promoting the development of new digital products and services that meet the evolving needs of consumers. Finally, regulators should monitor the consolidation of ATMs, ensuring that rural areas and underserved populations maintain access to essential banking services. By addressing these policy implications, Cameroon can harness the benefits of electronic banking while minimising its negative consequences, ultimately promoting a more inclusive and efficient banking system.

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