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Assessing the Acceptability of Digital Financial Services and Associated Factors, Opportunities, and Challenges in Burundi's Health Sector

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Abstract

Background

Digital financial services (DFS) allow people to send and receive payments, and manage their finances. In Burundi, they are limited to individual money transfer agents and the purchase of phone credits.

Objective

To assess the acceptability of digital payments (DP) and identify the factors, opportunities and challenges associated with the use of DFS in Burundi's health system.

Methods

This is a cross-sectional, descriptive, and analytical study carried out in Burundi from March to November 2023. The study was conducted in 16 health districts and included 2,731 health care and services providers (HPs).

Results

The majority of HPs were young and working in the rural areas. Most of them (86.5%) had general knowledge of DP. The acceptance level of DP among the HPs was 62% compared with 74.8% among the community health workers (CHWs).Many of our study participants (88.1%) believed that DFS have a positive impact on vaccination campaigns and 74.9% thought they have an excellent effectiveness. The HPs who worked at the rural level were 1.26 times more likely to use DP during vaccination campaigns than those in the urban area. The CHWs and paramedical staff were respectively 3.94 and 1.48 times more likely, respectively, to use DP during vaccination campaigns than physicians.

Conclusion

This study sufficiently demonstrates that the use of DP in the Burundi's health sector overall, and during vaccination campaigns, can have a positive impact.

Introduction

Digital financial services (DFS) enable individuals and businesses to send and receive payments and manage their finances [1]. DFS have the potential to improve the speed and efficiency of healthcare payroll payments, the scale and effectiveness of healthcare services, the monitoring and management of healthcare programs [2] .

In Madagascar, a DFS program significantly simplified payments to family planning providers and reduced reimbursement delays[3]. In addition, rapid claim reimbursements increased providers' motivation to deliver quality services and expand their client base [4].

In Bangladesh, a program using electronic financial transactions to reimburse providers for delivering maternal and child health services resulted in annual savings of approximately USD 60,000 and annual time savings of approximately 41,333 working hours [3].

In low- and middle -income countries such as Burundi, even though DFS is already operational in many sectors, it has not yet been applied in the health sector [4].

Indeed, the Government of Burundi is developing a whole-of-government online approach that is largely limited to offering information as a service through informational websites. The use of digital platforms in the private sector remains very low and revolves mainly around digital payment (DP) solutions, with little success among micro, small and medium enterprises to date [5]. In Burundi, progress on citizen-centric and particularly-healthcare provider (HP)-centric -digital public service delivery and greater digital financial inclusion has been slow, limited by the lack of strong central leadership for digital transformation, a persistent urban-rural digital divide, and a lack of coherent donor strategies. DFS are largely limited to person-to-person transfers, deposits/withdrawals, and airtime purchases. There are opportunities to implement government-to-person payments and leverage development partner programs to mainstream DP solutions and promote digital transformation through a whole-of-government approach, establish comprehensive and operational digital transformation strategies and improve access in rural areas [5].

Recognizing the need to offer DFS to Burundi's health sector due to its potential impact, our study aims to assess the acceptability of DP and its associated factors, as well as identify the opportunities and challenges related to the use of DFS.

Methodology

a. Study framework

There are various existing models of technology adoption or innovation acceptability. Nielsen *et al.*[6] distinguish between practical acceptability, which focuses on the relationship between a technology's proposed functionalities and ease of use, and social acceptability, which includes users' impressions, attitudes, and social and normative constraints that lead to choosing or supporting the use of a given technology. Our study is based on the latter; in its first level of analysis, focuses on people's representations of a future or potential technology[7].

b. Type of study

We conducted a cross-sectional, descriptive, and analytical study on the health care and service providers (HPs) of Burundi between March and November 2023.

c. Study population

The population of our study consists of HPs located across the 16 health districts: 4 urban and 12 rural. These include doctors, paramedical staff (dentists, pharmacists, physiotherapists, health technicians, nurses, and nursing assistants), support staff (accountants, statisticians, computer scientists, surface technicians, drivers and security agents) as well as community health workers (CHWs). Any HP aged 18 to 65 working in the visited health institution, who agreed to sign the informed consent and complete the questionnaire, was included in the study. HPs who did not agree to sign the informed consent or who had already reached retirement age at the time of the study were excluded.

d. Sampling procedure

Since the study was national in scope, we chose to use Cochran's sample size calculation formula which is useful for large or unknown populations[8,9]. This formula combines the level of precision, confidence level and variability as follows: $n = Z^2 * p * q / e^2$, where n is sample size; Z is Z-score (Z = 1.96 for 95% confidence interval); p is proportion (p = 0.5); q equals 1-p; and e is level of precision (we used e = 2%).

In total, we collected from data on 2,731 HPs, distributed as follows: 196 doctors, 313 support staff (SP), 912 CHWs ,and 1,310 paramedics.

A total of 16 health districts were randomly selected: 4 located in urban areas and 12 located in rural areas. Data collection teams collected data, taking into account a 2 km distance between the institutions, and the HPs were randomly selected.

e. Data collection process

Quantitative data were collected from participants using a questionnaire **(**see **supplementary file)** developed for this study, then entered and compiled in Microsoft Excel. The questionnaire included items designed to collect information on the socio-professional characteristics of the HPs (age, sex, district location, and profession), as well as their knowledge, use, perception and acceptability of the DP by the HPs for the payment of their allowances during health campaigns in Burundi. Before data collection began, we pretested the questionnaire on one-tenth of the sample size (300 HPs). Thus, the dependent variable is the acceptability of digital payment by the HPs, measured by the following question: "Which payment method would you consider?". This variable was categorical with the modalities "Telephone", "Bank", "Cash" and these last two modalities were combined into a single modality which was called "Other methods of payment".

f. Data analysis

Data analysis was performed using SPSS software. Descriptive analysis was used to determine the frequencies for the different variables. Bivariate analysis allowed us to examine the association between the explanatory variables and the acceptability of the DP using cross-tabulations and the chi-square statistic. In multivariate analysis, binary logistic regression was employed to calculate the adjusted odds ratios (ORs) accompanied with the 95% confidence intervals.

Results

Our study included 2,731 HPs, 47.1% being female and 52.9% male. The HPs were generally young with 53.5% aged 40 years or younger (Table 1). Most of them were from rural areas (76.5%) and are mainly composed of paramedical staff (48.0%) and CHWs (33.4%).

Table 1
Socio-professional characteristics

Variables		Staff (n = 2731)	Percentage (%)
Age	≤ 39 years old	1461	53.5%
	40 - ≤ 65 years	1270	46.5%
Sex	Female	1285	47.1%
	Male	1446	52.9%
DS Location	Rural	2088	76.5%
	Urban	643	23.5%
Type of health institution	Provincial Health Office	22	0.8%
	Health center	1345	49.2%
	District Health Office	545	20.0%
	Hospital	673	24.6%
	Polyclinic	146	5.3%
Occupation	CHWs	912	33.4%
	Doctors	196	7.2%
	Support staff Paramedical staff	313	11.5%
		1310	48.0%

a. Knowledge, utilization, and perception of HPs regarding DFS.

Among the surveyed HPs, the majority (95.6%) reported having already made monetary transactions by telephone outside of health campaigns. Among the DP platforms used by the HPs of Burundi, Lumicash (53.2%) ranks first by large margin, followed by Bancobu E-noti (24.1%). Approximately twenty HPs (0.7%) stated that they had never used any electronic payment platform.

The majority (86.5%) of the surveyed HPs already had general knowledge of DP and 88.1% of them believed that DFS could have a positive impact on vaccination campaigns (Table 2).

Table 2
Knowledge, utilization ,and perception of HPs on DFS

Variables	Staff (N = 2731)	Percentage (%)
Used DP Yes	2612	95.6
No	119	4.4
Platforms used		
Bancobu E- noti	658	24.1
BCB	71	2.6
Ecocash	516	18.9
Lumicash	1453	53.2
Mpesa	5	0.2
Western Union	5	0.2
Others	3	0.1
None	19	0.7
Knowledge about DFS		
No	370	13.5
Yes	2361	86.5
Positive impact of DFS on the vaccination campaigns		
No	325	11.9
Yes	2406	88.1

Seventy-four point nine percent (74.9%) of HPs believed that DFS in the health sector could be highly effective if used (Fig. 1**).**

b. Acceptability of DPs

Among the HPs who had already participated in the vaccination campaigns, 62% agreed to receive their remuneration via the DP.

c. Bivariate analysis

Among the HPs who participated in vaccination campaigns, the acceptability was 65.7% among those at the urban level, while it was relatively low (49.7%) at the urban level, with a statistically significant difference ($P < 0.001$).

From a professional point of view, the acceptability of DP among CHWs is 74.8% while it is 43.2% among doctors with a statistically significant difference ($P < 0.001$) (Table 3).

Table 3
Acceptability of DP by HPs

Variable	Others, N = 771	Phone, N = 1,258	*P*-value
Age			**0.588**
≤29–39	406 (37.5%)	678 (62.5%)	
40-≤65	365 (38.6%)	580 (61.4%)	
Sex			**0.471**
F	370 (38.8%)	583 (61.2%)	
M	401 (37.3%)	675 (62.7%)	
District			**< 0.001**
Urban	238 (50.3%)	235 (49.7%)	
Rural	533 (34.3%)	1,023 (65.7%)	
Institution			**< 0.001**
Hospital	162 (32.5%)	337 (67.5%)	
Provincial Health Office	10 (71.4%)	4 (28.6%)	
Health Center	341 (29.7%)	806 (70.3%)	
Health district	181 (66.8%)	90 (33.2%)	
Private polyclinic	77 (78.6%)	21 (21.4%)	
Occupation			**< 0.001**
Doctors	67 (56.8%)	51 (43.2%)	
CHWs	218 (25.2%)	646 (74.8%)	
Support staff	115 (53.5%)	100 (46.5%)	
Paramedical staff	371 (44.6%)	461 (55.4%)	

d. Factors associated to the use of DP

HPs in rural areas were 1.26 times more likely to use DP during vaccination campaigns, compared to 1.35 times for those in health centers. CHWs and medical staff were 3.94 and 1.48 times more likely to use DP, respectively. HPs with a bank account and those with a mobile phone were 3.81 and 2.80 times more likely to use DP during vaccination campaigns, respectively (Table 4).

Table 4
Factors associated with DP use among HPs in Burundi

Features	OR	CI at 95%	P-Value
District			
Urban	1.00	—	
Rural	1.26	0.98, 1.62	**0.068**
Institution			
Hospital	1.00	—	
Provincial Health Office	0.17	0.04, 0.53	**0.004**
Health Center	1.35	1.04, 1.75	**0.022**
Health district	0.29	0.21, 0.41	**< 0.001**
Private polyclinic	0.18	0.10, 0.31	**< 0.001**
Occupation			
Doctor	1.00	—	
CHWs	3.94	2.51, 6.19	**< 0.001**
Support staff	0.72	0.44, 1.19	**0.203**
Paramedical staff	1.48	0.96, 2.29	**0.075**
Account			
No	1.00	—	
Yes	3.81	2:35, 6:22	**< 0.001**
Phone			
No	1.00	—	
Yes	2.81	1.64, 4.85	**< 0.001**
Positive impact of DFS			
No	1.00	—	
Yes	1.70	1.15, 2.54	**0.009**

Discussion

To our knowledge, this study is the first of its kind in Burundi to assess the acceptability of the DP and its associated factors as well as to identify opportunities and challenges related to the use of DFS in the

health sector. It included 2,731 HPs of whom 53.5% were young (≤ 40 years). This is consistent with existing statistics which show that the potentially active population in Burundi is estimated at 51.3% [9].

The vast majority of the HPs (76.5%) were working in rural areas. The participants were mainly composed of paramedical staff (48.0%) and CHWs (33.4%).This prevalence of rural-based HPs is significant, as access to commercial banks in these areas is often difficult. This finding aligns with a study of 31 low-income countries, which linked rural healthcare challenges including worker shortages and delayed salary payments to reduced effectiveness of health services and, in many cases, to corrupt practices such as soliciting illegal payments from patients[10].

Regarding healthcare workers' knowledge of DFS, 86.5% of them had a general understanding of DP. This finding is consistent with World Bank study results, which showed that two-thirds of adults worldwide were already aware of and using DP in 2022 [11]. This increased awareness is largely due to COVID-19 pandemic, which prompted governments to turn to DFS and accelerated transactions via DFS.

In terms of the use of DP by HPs, the usage rate was assessed at 95.6% outside of health campaigns. This aligns with the study conducted during the COVID-19 pandemic, showing that 57% of adults in developing economies were making or receiving DP[11]. Lumicash application of the Lumitel mobile phone network was preferred by 53.2% by HP to facilitate the DP process and is followed by Bancobu E- noti (24.1%). This preference for Lumicash is explained by market studies in Burundi which showed that Lumitel and Burundi Backbone System (BBS) are the only two network providers operating in the middle-kilometer market segment of Burundi. They are the entities that provide wholesale capacity and national transmission services to other mobile network operators [12]. As a result, the mobile operator Lumitel and its Lumicash application as well as the agents ensuring transactions are easily available and accessible throughout the national territory.

Regarding the perception of the DP among Burundi’s HPs, 88.1% believed that the DP can have a positive impact on vaccination campaigns. Our study aligns with research conducted in Sierra Leone during the Ebola crisis (2014–2016), where it is stated that the transition to the DP system for the essential HPs allowed the latter to receive their salaries in the shortest possible time, going from one month to one week .This situation eliminated staff strikes and saved the lives of countless patients [13].

The majority of HPs (74.9%) believed that DFS in the health sector could achieve excellent effectiveness when implemented. This is in perfect agreement with a study done in Liberia, which showed that the digital collection of teachers' salaries was highly effective :it reduced salary collection costs by 92% (from $25 to $2), primary due to the reduction or even the elimination of transport costs .As a result, the teachers spent more time to classroom [14].

In our study, the overall acceptance rate of DP among the HPs who participated in the vaccination campaigns was 62%. Our study is consistent with the survey conducted in Ivory Coast, which showed that 8 out of 10 polio vaccinators could accept and prefer DP and the convenience, shorter time to

receive funds and the safety of payment were among the reasons [15]. The results of the further analysis of our study showed that among HPs who participated in the vaccination campaigns at the rural level, the acceptability of DP was 65.7% while it is 49.7% at the urban level. HPs who worked at the rural level were 1.26 times more likely to use DP during vaccination campaigns. These results are similar to those of the study conducted in 31 low-income countries ,which demonstrated that in rural and remote areas, delayed payment and collection of salaries or allowances make it more difficult to provide effective and affordable health services [10]. Thus, the HPs are more favorable to the DP because it allows them to quickly collect and reduces the costs associated with the salary collection.

Additionally, the acceptability of the DP among the CHWs was 74.8% and they were 3.94 more likely to use the DP during vaccination campaigns. The explanation for this choice can be drawn from the studies conducted by Russo *et al.* as well as the World Bank which showed that reliable payment processes such as the DP improve employees' behavior, performance, working time and retention. It also allowed beneficiaries to receive relief benefits more quickly and securely, thereby providing them with the resources needed to cope with adverse shocks [16,17].

Limitations and strengths of this study

As our study is the first of its kind in Burundi, the lack of sufficient documentation to serve as a reference was a limiting factor. This, however, also constitutes at the same time the strength of this study: it will serve as a reference for future research. Additionally; it provides a well-documented database not only for the Government of Burundi during the implementation of DFS but also for its partners seeking to support the country in this area.

Methodological limitations were also observed in data collection since we randomly selected the health institutions. To address this, data collection teams were tasked with gathering data while accounting for a 2 km distance between the institutions. Since our study addresses the DP issue quantitatively, a qualitative study would strengthen the findings on the acceptability of DP within the Burundian health sector.

Conclusion

Given the high degree of acceptability of the DFS by HPs and especially CHWs, the results of this study strongly demonstrate that implementing the DP Burundi"s health sector, especially within vaccination campaigns, can have a positive and significant impact and thus, contribute to improving the quality of healthcare and services. This,in turn ,can contribute to improving the quality of healthcare and related services. For this reason, further research in Burundi is needed to explore the implementation of DFS within the country's health system.

Declarations

Ethics approval and consent to participate

The research protocol of this study was reviewed and approved by University Teaching Hospital of Kamenge and School of Medicine of University of Burundi Review Board (Approval Number: FM/CE 15/06/2023). We conducted this study in accordance with the Declaration of Helsinki .This study observed the Human Ethics and the participants signed an informed consent prior to participation.

Consent for publication

Not applicable

Availability of data and materials

The data and materials used in this study are available to the corresponding author and can be obtained upon request.

Funding Declaration

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Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Authors' Contributions Statement

J.N .and E.P. analyzed data, wrote the main manuscript; A.I. and J .N. collected data. N.E. supervised all activities related to this research work. All authors reviewed and approved the manuscript.

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Figures

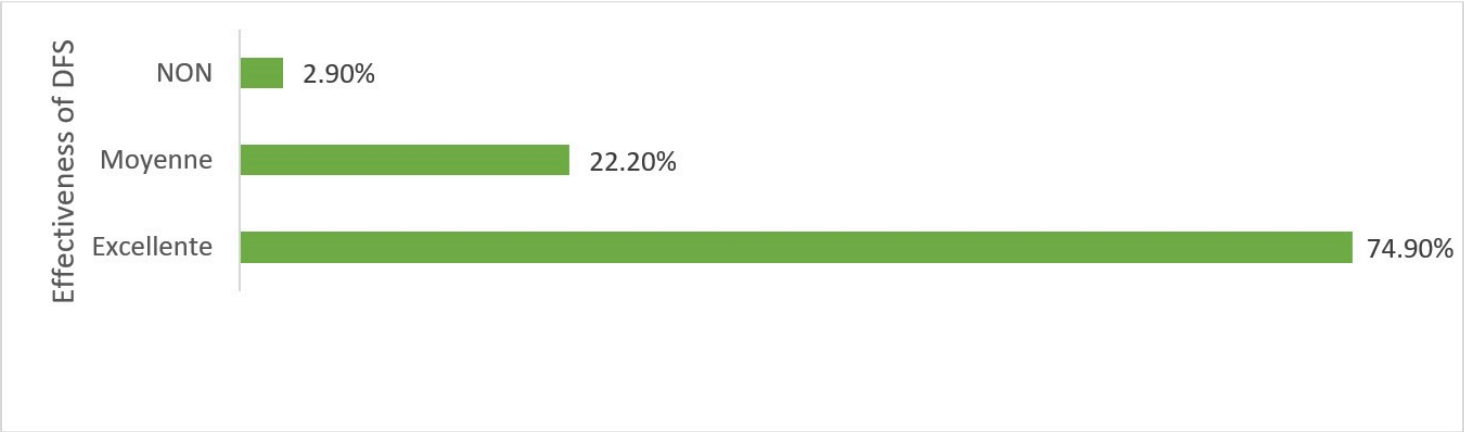


Figure 1

Effectiveness of DFS

Supplementary Files

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