Scenarios for Scale and Sister Programs
Digital Payments for Vaccine Campaigns

Benjamin Mazzotta, Ashirul Amin,
Jorge Hernandez

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00 Executive summary

Findings **in brief**

The unit cost of digital payments is 20% higher than that of cash payments for vaccine campaigns, unless fraud control and prompt payments are taken into account. Considering these factors too, the cost of digital payments is 67% lower than cash.

The most important benefit of digital payments is prompt payments to frontline workers. Additional benefits include enhanced visibility and reporting into disbursement, granular data to confirm payments, and fraud control.

Finance and administrative staff are strongly supportive of digital payment methods. They are proud to work with payments systems that provide rapid and reliable accounting for disposition of funds.

Payees are enthusiastic supporters of digital payments, whether through banks or mobile money. More than 80 percent of frontline staff reported preferring to receive their payments into an account, rather than in cash.

The likely direction of bias in this study is to understate the benefits of digital payments. Our figures for the value of fraud control and prompt payments probably understate the extent of these issues.

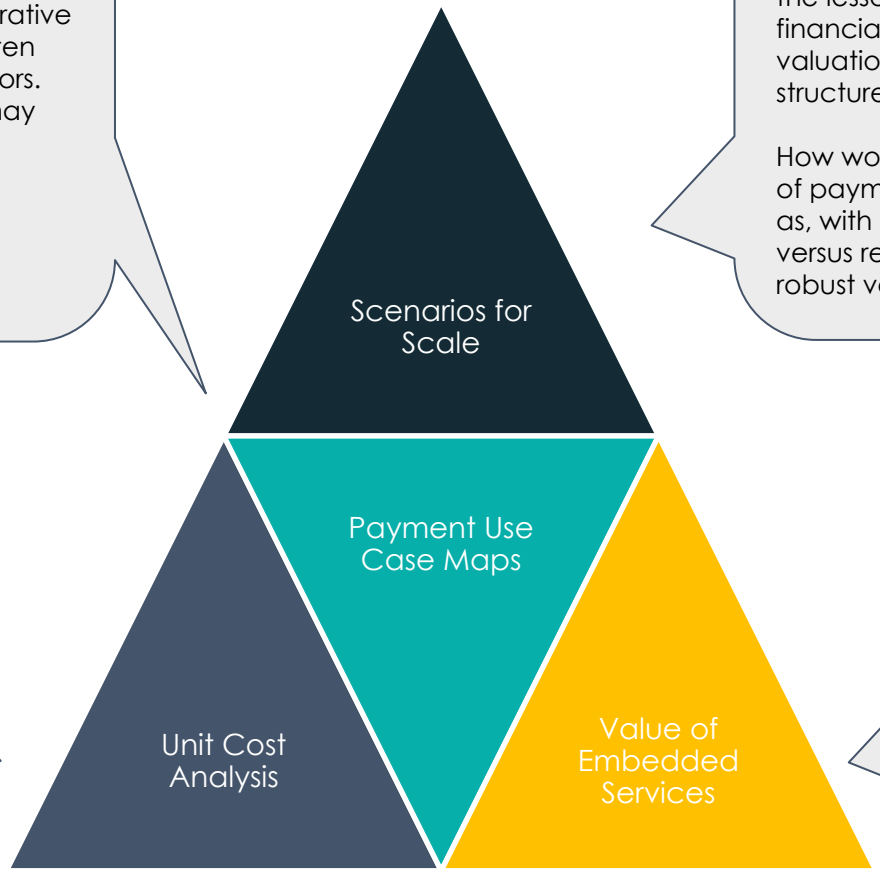
Components of the analysis

1. The first component of research mapped out all workflows related to payments for vaccine campaigns. Payments to healthcare workers typically involve multiple administrative layers of the ministry of health. Funders often include a consortium of international donors. Cash operations and payment services may be conducted by the health ministry, by donors, or outsourced.

The use case maps illustrate the specific workflows that relate to every payment process on behalf of the campaign.

2. This financial model is the result of original research that blended interviews with finance and administrative staff with analysis of primary budget materials. It estimates the cost of all staff time and materials related to the payments for frontline healthcare workers in five recent supplemental immunization activities (SIAs) that included measles.

This Excel file allows users to compare unit costs from various campaigns side-by-side and with sensitivity analyses.



4. This final report synthesizes the prior analyses into a comprehensive view. It applies the lessons from stakeholder mapping, financial analysis, transaction costs, and valuation of embedded services to a structured set of policy hypotheticals.

How would digital payments change the cost of payments under specific scenarios? Such as, with larger versus smaller campaigns; new versus returning workers; and countries with robust versus scant cash-out infrastructure.

3. Digital payments embed certain services along with the payment that are effectively inseparable from the payment itself. The proper comparison between digital and cash payments is not, "What is the relative cost of digital payments versus cash as it is today?" Instead, we should ask, "What is the relative cost of digital payments versus **similarly prompt and verifiable** cash payments?"

This report values promptness and verifiability using original and secondary research.

01 Research overview

Research **Questions**

The arguments for digital payments in general are strong: they tend to be "**fast, accurate and secure**," while cash is "slow, inaccurate and open to graft and theft" (Better Than Cash Alliance, "BTCA"). Despite these encouraging arguments, a significant share of the world remains outside the digital economy, relying on **cash to receive income**, save "under the mattress" and pay for services – including healthcare services.

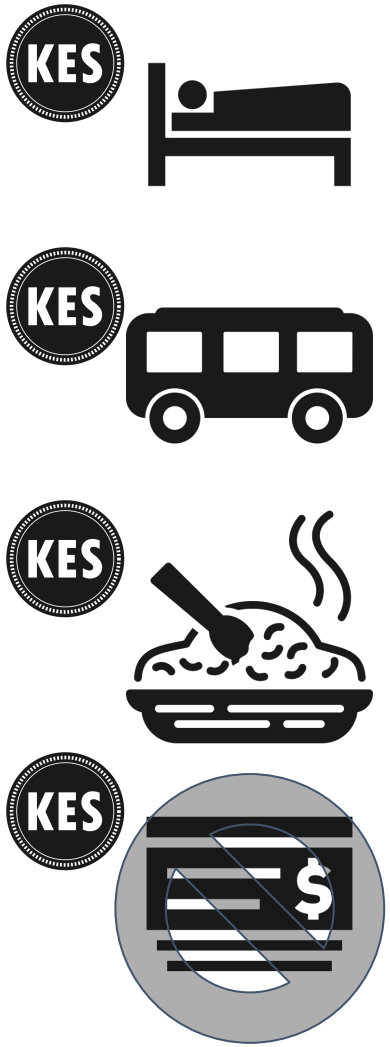
Prompt, regular, and accurate payments promise big improvements in health campaigns, such as vaccines, that rely on a large workforce of last-mile health workers. **Digital payments** facilitate recruitment and continued motivation. Programs stand to save substantial amounts associated with cash due to **errors, fraud, accounting controls, and security**. The **timeliness and accuracy** of payments for a vaccine campaign are critical determinants of the morale of the vaccine workforce. Controlling errors, delays, and fraud holds the potential to improve the **efficacy of a campaign** and, by extension, deliver on the mission.

However, it is not always clear that the benefits of digital payments completely outweigh the costs of doing business in cash. Sometimes, cash may trump digital when it comes to last-mile delivery in certain areas. At other times, digital interventions may require **significant upfront or continued investment** in technology that remains obscure or inaccessible.

Before we can develop hypotheses about whether digital payments are cost effective, we need to understand the specific workflows involved in preparing digital payments. These workflows will create the basis for subsequent cost-benefit analysis.

- Who disburses payments to healthcare workers for vaccine campaigns today? How are those payments delivered?
- How are payments to healthcare workers planned and authorized?
- How are healthcare workers registered by payer organizations?
- How do healthcare workers receive their payments? Where and when do workers receive cash? If they are paid into accounts, what accounts are used to receive the payments? And do they prefer to hold balances in accounts or to withdraw cash?
- What processes are required after disbursement? Consider inquiries and customer service; return of excess funds; accounting for use of funds; and updates to payment credentials over time.

Stylized facts: payments for healthcare workers in a measles catch-up campaign



Payments are largely in the form of allowances for accommodations, travel, and meals during the training and field work phases of the campaign.

Most staff are seconded to the campaign by their employers, such as the ministry of health for nurses and clinical officers.

While in some countries **incentive payments** are common for staff, the campaign does not pay the salaries of most frontline workers.

Stylized facts: Teams of four work for a period of ten days, receiving allowances beyond their normal monthly salary. Each team has a quota for vaccinations to administer during the period of the campaign, which reflect local populations and geography. Teams include both clinical and non-clinical personnel.

Partnership. A consortium of partners is required to plan, underwrite, and implement the campaign. Specific responsibilities are held by WHO, UNICEF, GAVI, UNOPS, and the Government / Ministry of Health.

Type of campaign. Fixed-post immunizations are typical of catch-up campaigns for measles and rubella. The type of vaccine and demographics of the target population determine whether distribution follows a fixed-post or other system, such as door-to-door.

Portrait Of Thoughtful Nurse Outside In Ppe Looking Away From Camera by Noun Project from NounProject.com

Geographic scope and methodology

Country	Regions	Organizations	Campaign type	Target population and coverage
Burkina Faso	No local participation in interviews.	National Ministry of Health (1) and Regional MInistry of Health (3).	Measles and rubella catch-up campaign	1.2 million children, ages 9-59 months, with the goal of 95 percent coverage.
Ethiopia	Addis Ababa, Oromia Region, Somali Region	City and sub-city within Addis Ababa; zone and woreda offices in Oromia and Somali.	Measles and rubella catch-up campaign	14.5 million children ages: 9-59 months
Kenya	Nairobi, Bungoma, Garissa, and Kajiado	County offices (3) Subcounty offices (3) Health posts (4), UNICEF and UNOPS finance staff.	Measles and rubella catch-up campaign	Ages 9-59 months, 22 counties, 4 million individuals, 95 percent coverage
Nigeria	Bauchi	National Ministry of Health, State Ministry of Health, WHO, and UNICEF.	Multi-purpose (Measles, meningitis, and yellow fever)	Measles, 9-59 months; Meningitis, 7-10y; Yellow fever, 9m - 44y. Target population of 30 million.

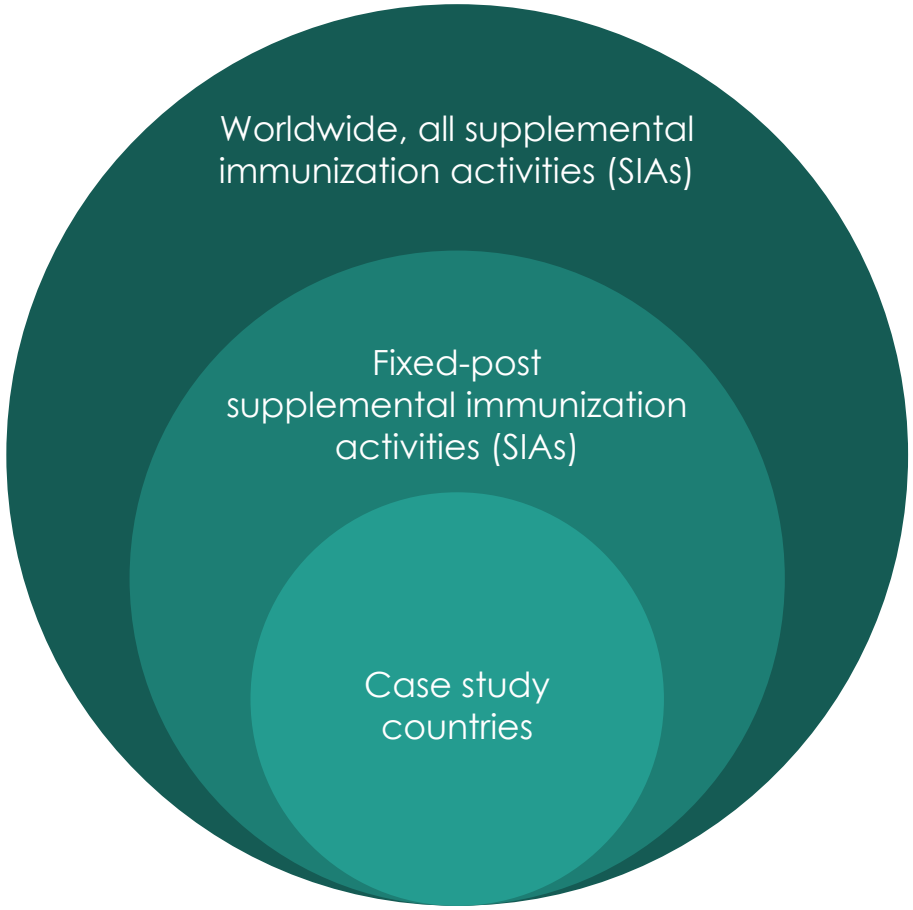
BFA selected four countries with similar, fixed-post immunization campaigns conducted within the past five years. Where possible, we selected measles campaigns.

We recruited contacts at the health ministry through BMGF senior program officers, and requested permission to conduct interviews with local offices and partners at UNICEF, UNOPS, and WHO through that network.

This study relies on in-depth interviews, with a duration of roughly 45 minutes. The interview covered respondents' workflows for immunization campaigns and related payments. We requested copies of financial records, paperwork, and budgets that are produced in the normal course of business. Follow-up interviews as needed for clarification.

Interviews were completed remotely by Zoom and WhatsApp, using English, French, and local languages.

Vaccine campaigns during the COVID pandemic



The COVID-19 pandemic caused pervasive delays in supplemental immunization activities (SIAs). In 2020, 532 campaigns were planned for 26 different interventions representing 13 diseases and 105 countries. Many of these planned campaigns were postponed, canceled, or suspended.

- **In the African region,** 55% of overall campaigns were delayed. Delays increased as the pandemic intensified. As of May 2020, delays affected 61% of measles campaigns were delayed, while by December, the rate of delays reached 78%.

Several of our case studies were carried out during the pandemic despite this trend. Ethiopia, one of Africa's most populous countries, is also reliant on SIAs, as they are considered one of the most cost-effective interventions for public health.

- **Ethiopia** had substantial measles outbreaks in 2014-2016. Hence, the Ethiopian government decided against pausing the measles vaccination campaign in light of Covid, and by July 2020, vaccinated 15 million children nationwide.

Source: Health Campaign Effectiveness Coalition (2021). The State of Health Delivery Campaigns.

02 Use case map: **Kenya**

Campaign description (KE)

In 2021, Kenya fielded a catch-up campaign for measles and rubella to restore the target immunization rate of 95 percent among children under age 5. This catch-up campaign lasted ten days, 25 June - 5 July 2021 and occurred in 22 of Kenya's 47 counties with the lowest rates of coverage among the target population. The target population, ages 9-59 months, included some 4 million individuals.

The campaign was a joint effort between the Ministry of Health (Government of Kenya); bilateral donors, notably the CDC (U.S.); and international organizations, including United Nations Children's Fund (UNICEF) and the World Health Organization (WHO). More than 16,000 workers were dispatched to 5,000 vaccination sites, such as health clinics, preschools, marketplaces, churches, and other designated locations, with awareness campaigns and a mass text message campaign to promote uptake.

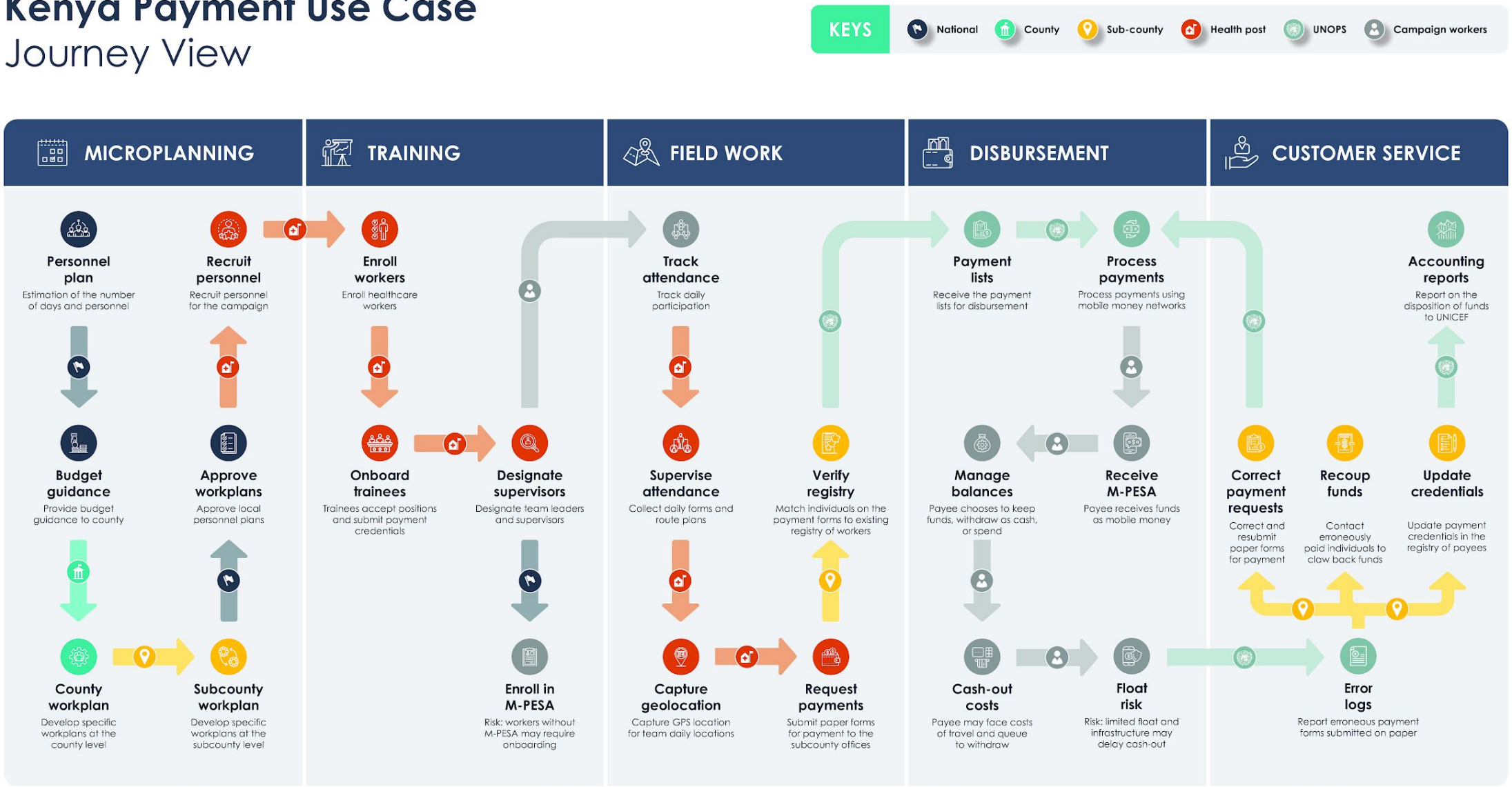
Gavi, also known as the Vaccine Alliance, was the main funder of the campaign, with supporting funds provided by the Centers for Disease Control and Prevention (CDC) (Government of the United States). Funding from these donors is passed through UNICEF, who in turn utilize the United Nations Office for Project Services (UNOPS) for financial operations.

The Ministry of Health planned the vaccine campaign and budget at the national level, allocating funds and assigning personnel to the county offices. The payments to healthcare workers that are the focus of this study fall under total operational costs, which the CDC funded at a total of USD1.8 million.

Timeline. The preparatory phase of the campaign includes training, microplanning, printing, and community engagement. The training phase occurs sequentially with nationally developed training materials, which are then used to train teams for counties, sub-counties, and health posts. The microplanning team calculates the population for each health post and the required logistics for vaccines and cold storage.

Healthcare workers are not involved in the printing of materials for the campaign. However, the campaign may need to cover the cost of travel and attendance for community leaders at in-person events, television, and radio campaigns. The campaign proper includes ten days of work, of which seven are the scheduled immunization campaign and three are "mopping up" any gaps or excess demand that could not be served on the scheduled seven days.

Kenya Payment Use Case
Journey View



03 Lessons from the **financial model**

Applying the financial model

We applied the learnings from our earlier research on this project to a small number of scenarios in order to understand the dynamics of the costs of payments.

1. Components of the cost of payments in the measles catch-up campaign in Kenya, 2021
2. Changing how many workers require new registration or changes to their payment details
3. Accounting for the true value of embedded services in digital payments

These analyses are based on in-depth financial models of the campaigns in Kenya (2021), which paid workers in mobile money; in Kenya (2016), paid in cash; and in Nigeria (2021), paid by bank transfer.

These case studies differ very much in their geography, target population size, and financial infrastructure. Differences between the campaigns may result from any number of factors and not their payment methods alone.

Components of the cost of payments

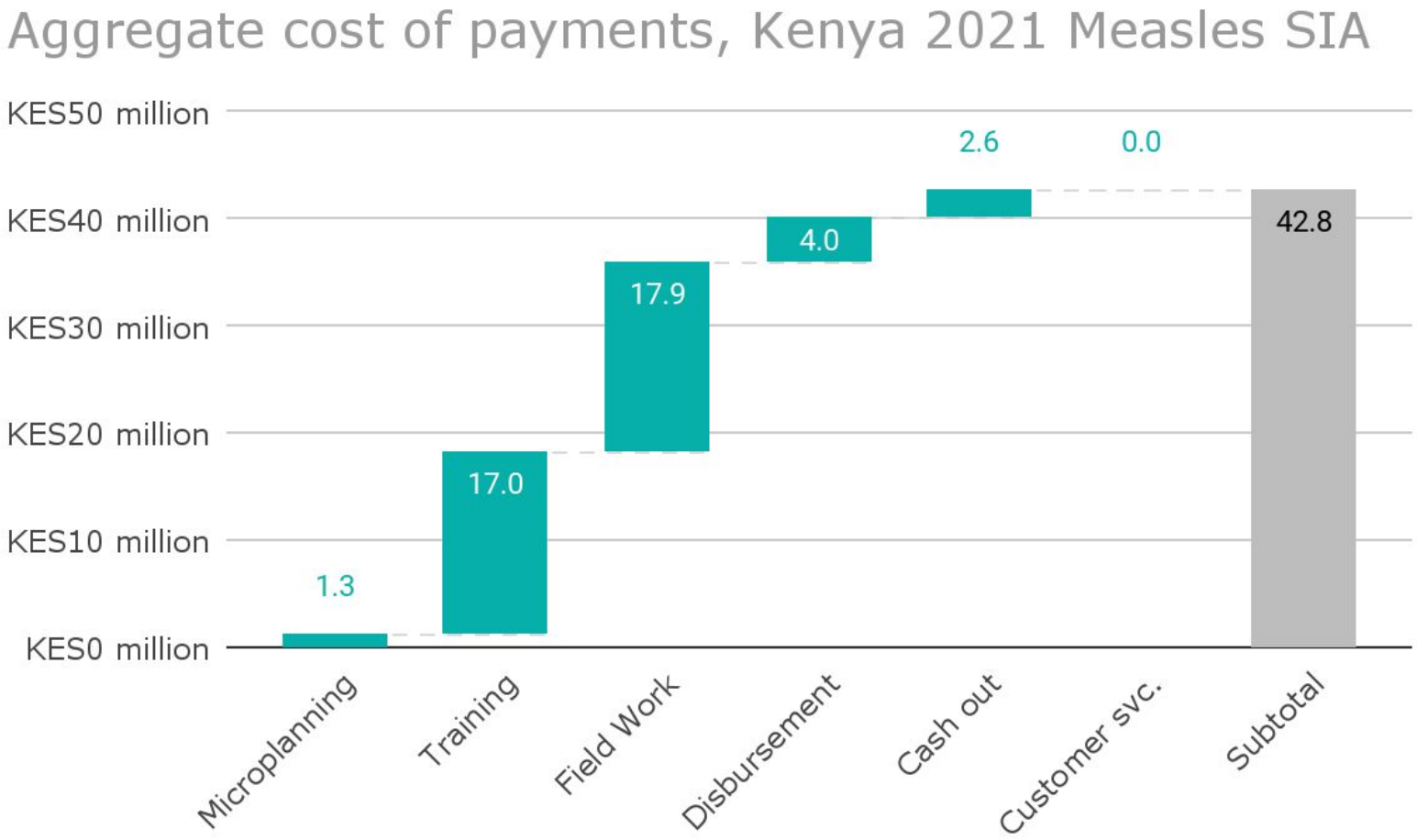
Analysis of the financial model of the measles campaign in Kenya, 2021

The total cost of administering payments to frontline healthcare workers was KES42.8 million, for the national measles campaign in 2021.

In the aggregate, these transaction costs associated with payments were valued at 12.5% of the notional value of the payments themselves. Frontline healthcare workers were paid KES342 million in total, or eight times greater than the cost of issuing the payments.

Within the transaction costs, 80% of the cost of administering payments comes from direct oversight of workers during "training" and "field work."

Of the remaining categories, the direct costs of disbursement were the largest component (4%) of the cost of payments.



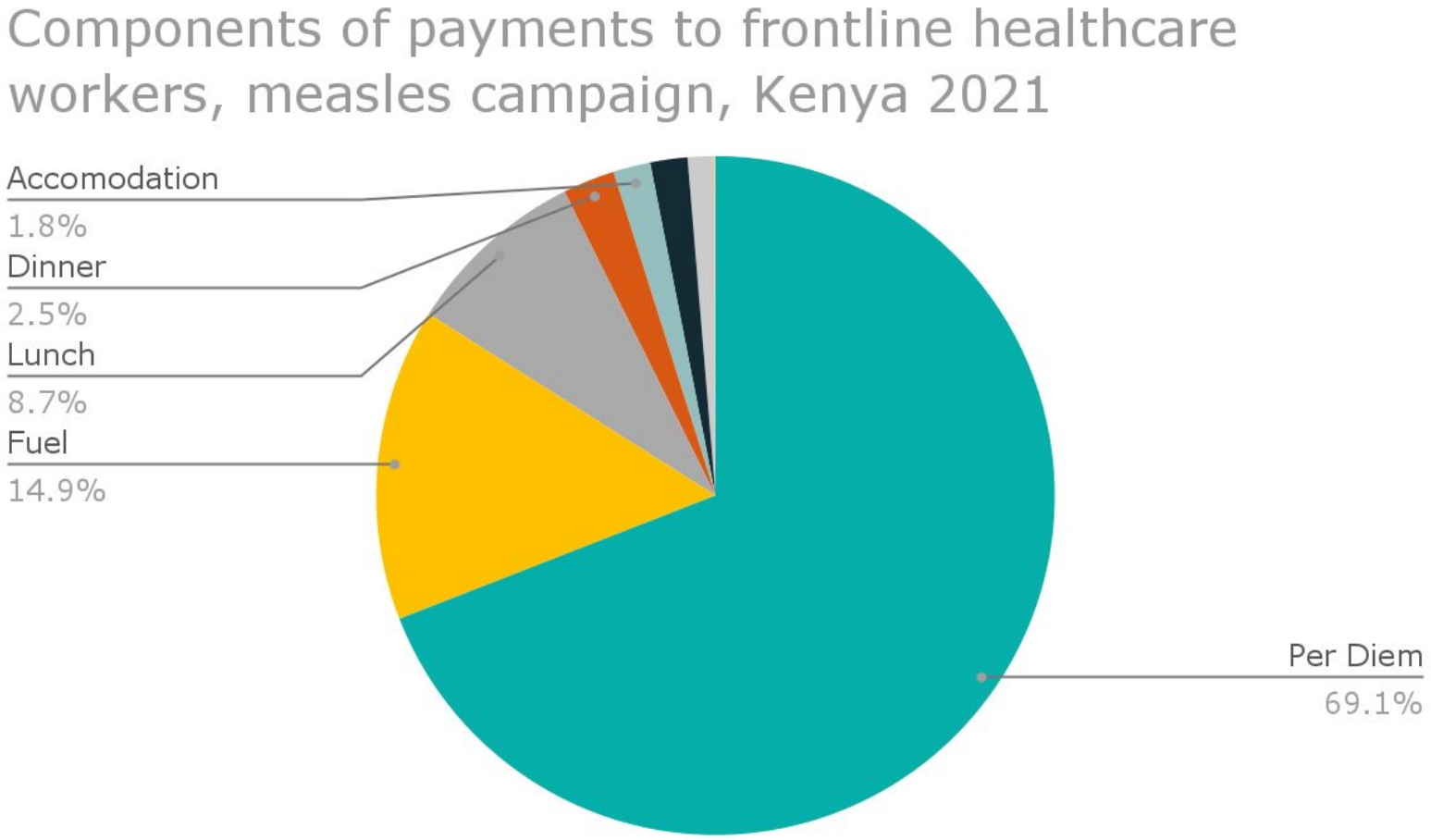
Components of allowances to frontline workers

Analysis of the financial model of the measles campaign in Kenya, 2021

Our analysis considers all of the allowances due to frontline healthcare workers in Kenya.

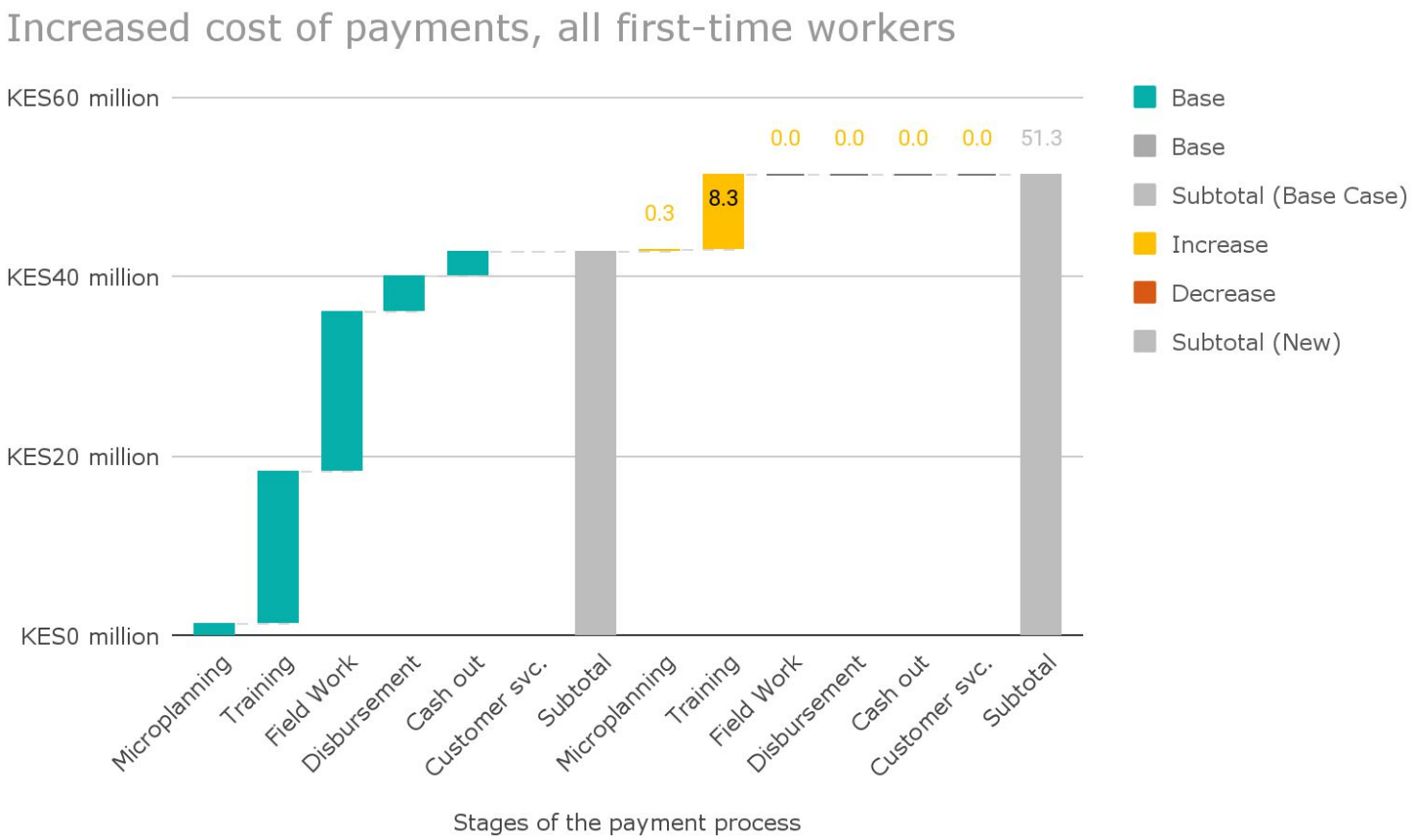
The components of the payments (not pictured) are per diem, fuel, meals, transportation, and airtime. Of these, per diem and fuel are the largest two categories, comprising 84% together.

Cost Heads	Total	Pct
Per Diem	KES 236,305,200	69.08%
Fuel	KES 50,973,750	14.90%
Lunch	KES 29,671,075	8.67%
Dinner	KES 8,486,000	2.48%
Accomodation	KES 6,075,600	1.78%
Transport	KES 6,060,600	1.77%
Night Out	KES 4,348,400	1.27%
Airtime	KES 156,500	0.05%
Total	KES 342,077,125	



First-time enrollment increases the cost of administering payments

A scenario based on new assumptions for the measles campaign in Kenya, 2021



The cost of payments would have been KES8.5 million higher (20%) if all workers in the 2021 campaign had required new registration for payment.

Enrolling workers in the payments system occurred during the training phase of the campaign.

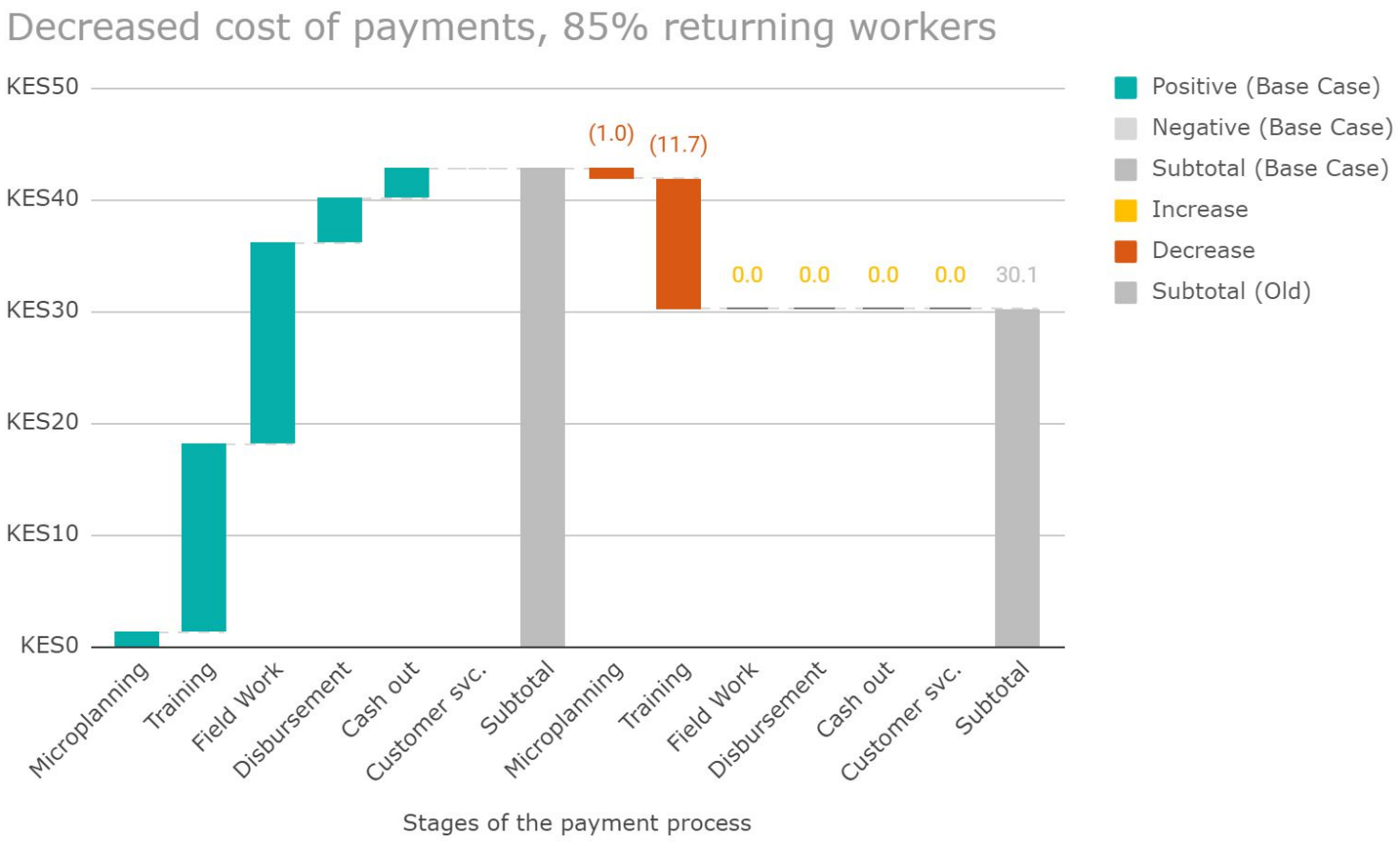
This scenario integrates a number of assumptions about registrations:

- New staff increased from 80% to 100%
- Staff requiring new M-PESA accounts increased from 33% to 75%
- Changes to staff phone numbers increased from 5% to 10%

Logically, it would be impossible to have all these assumptions at the same time — no returning staff and 10% of returning staff with new numbers. We took that liberty because the proportion of new hires in the 2021 measles campaign was already high, at 80%.

Reusable databases for payment credentials decreases the cost of administering payments

A scenario based on new assumptions for the measles campaign in Kenya, 2021



Reusing the database of payment credentials can decrease the cost of payments by KES12.7 million (30%).

The largest decrease in the cost of payments occurs during the training phase of the campaign. At this phase, workers are recruited for specific roles. Reducing paperwork offers significant cost reductions.

This scenario integrates a number of assumptions:

- New workers reduced from 80% to 15%
- Staff requiring new M-PESA accounts reduced from 33% to 20%
- No changes to the base case assumptions about the churn rate in mobile phones (5%) or the error rate in payments (10%)

These assumptions reflect a best-case scenario for each parameter. Minor logical inconsistencies — 15% new employees, but 20% requiring new M-PESA accounts — do not harm the overall inference.

Smaller campaigns benefit more from reducing the overhead of planning and training

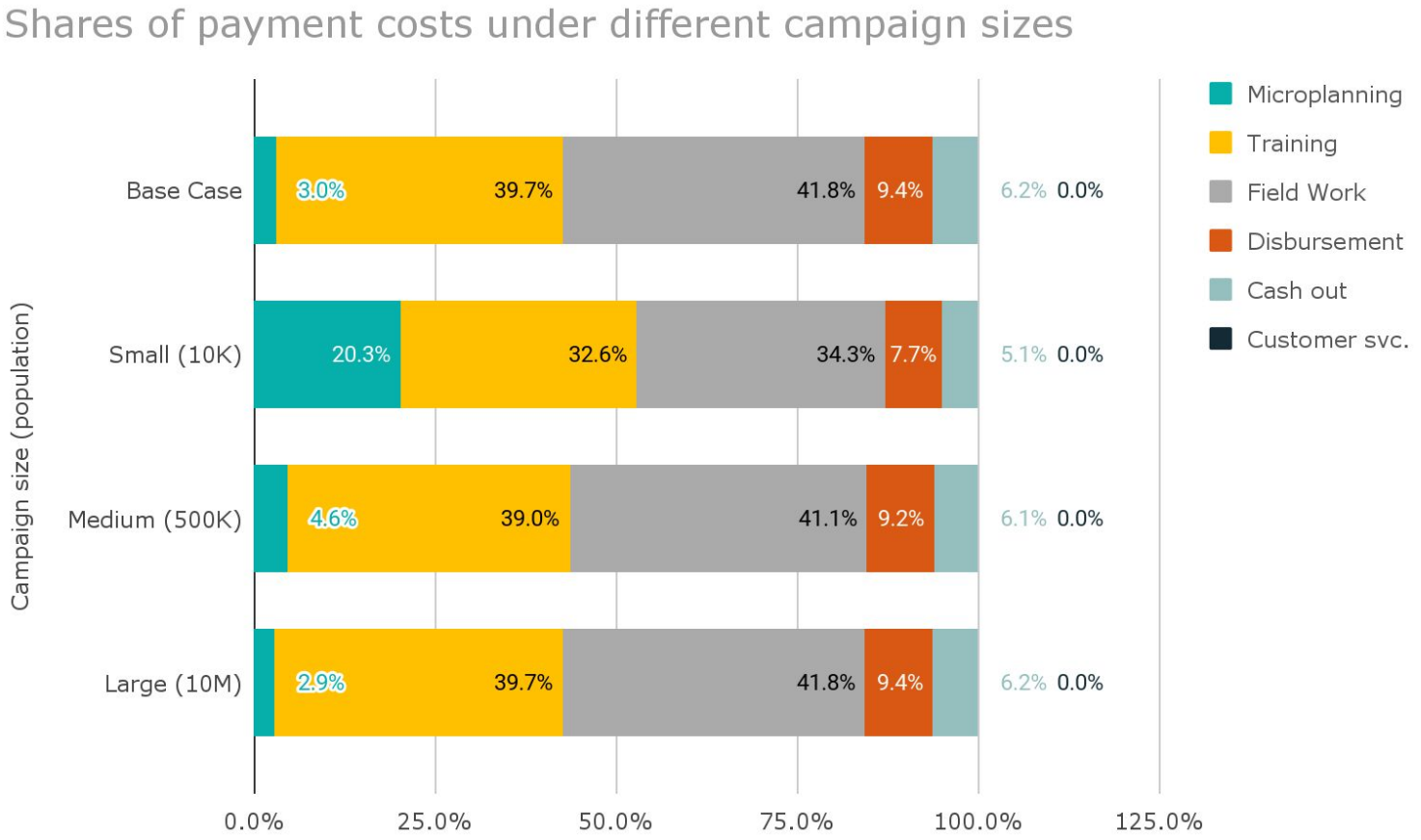
Three scenarios based on the measles campaign in Kenya, 2021

The smaller the campaign, the greater is the share of costs created in the planning phase of the campaign.

In the planning phase, the proportion of payment-related costs rises from 3% to 20% when we decrease the target population size from 7 million to 10 thousand.

On the previous slide, we saw that re-using payment credentials can reduce costs principally at the training and planning phases.

Small campaigns intensify the value of re-using a database of payment credentials for workers. That is, the gains from re-using payment credentials can achieve a greater reduction in the *unit cost of a payment* when we apply them to smaller immunization campaigns.



Accounting the costs of digital payments from three case studies

A comparative analysis of campaigns in Kenya (2021, 2016) and Nigeria (2021)

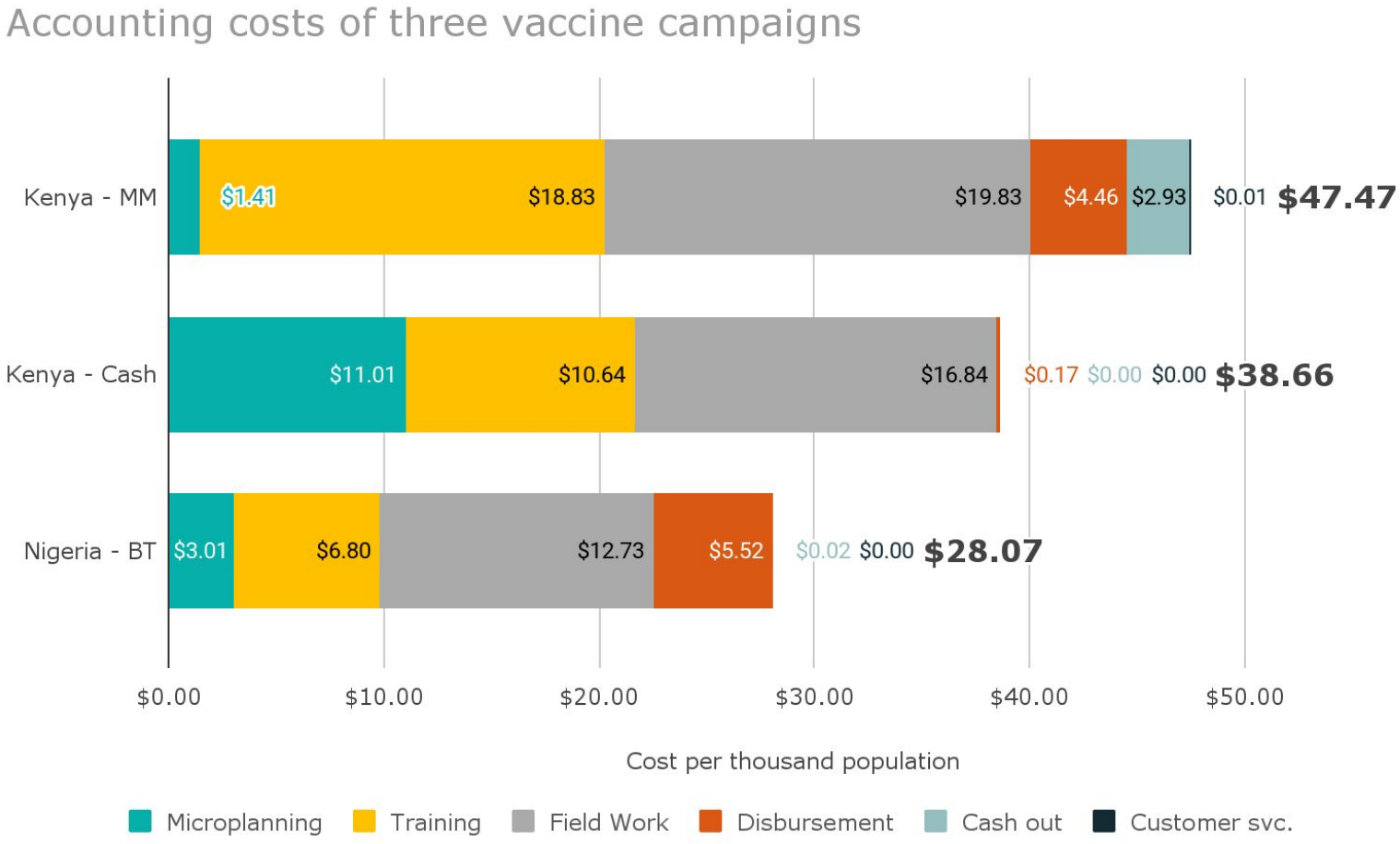
The cost of disbursement was lowest for cash, among the three campaigns studied. The greatest efficiency of cash vis-à-vis other payment methods was achieved in the distribution phase of the campaign.

In a cash distribution, we recognized the cost of withdrawing cash from the bank and staff time to transport the cash to the point of distribution.

The figures at right do not estimate the value of cash lost, whether through accident, fraud, or theft.

Thus, we recommend extreme caution in interpreting the graph at right.

The cost of fraud in cash distribution has been estimated as anywhere from 5% to 30% of the notional value of payments in high-risk environments.



Phases of payments process with mobile money, cash, and digital

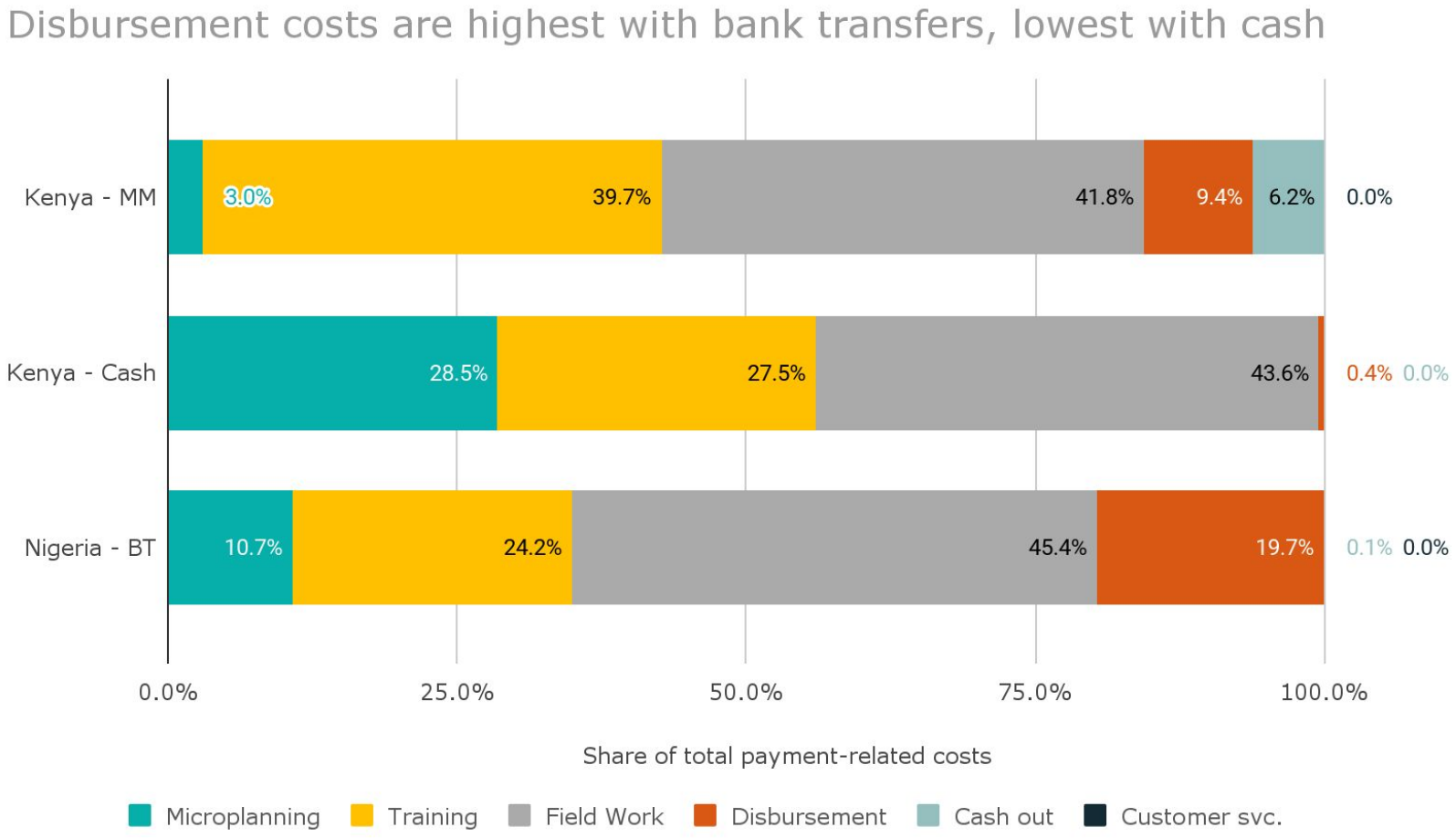
A comparative analysis of campaigns in Kenya (2021, 2016) and Nigeria (2021)

Comparing the share of cost on a percentage basis is more informative than on an absolute basis. That is, the greatest difference between the cash campaign and the other campaigns is the near-total elimination of disbursement costs.

This finding is at odds with interview evidence from finance professionals, who described cash logistics as costly.

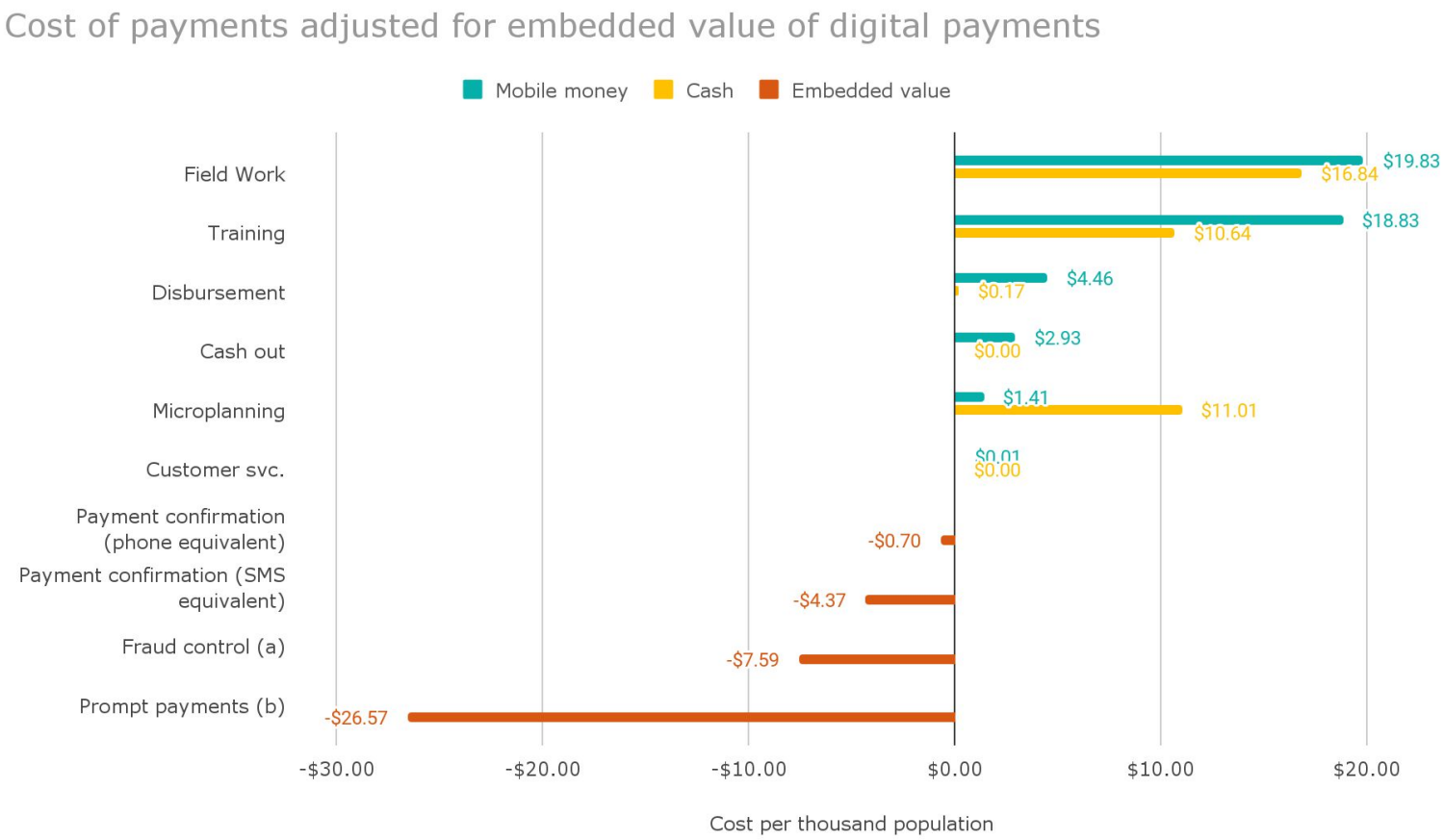
Other differences, as well as the payment methods used, are very likely responsible for the observed differences between the campaigns.

The Kenya "cash" campaign (2016) was also the largest, targeting more than 26 million individuals, as compared with 7.5 and 3.6 million in the Kenya "mobile money" (2021) and Nigeria "bank transfer" (2021).



Adjusting for the **value of embedded services**

A comparative analysis of two campaigns in Kenya (2021, 2016)



When we consider the value of digital services side-by-side with the costs of digital payments, the differences are striking. The value of the embedded services are more than enough to offset the cost of payments in full.

Cash's apparent cost advantage vis-à-vis mobile money in Kenya was roughly $9 per 1,000 population, or $38 for cash versus $47 for mobile money.

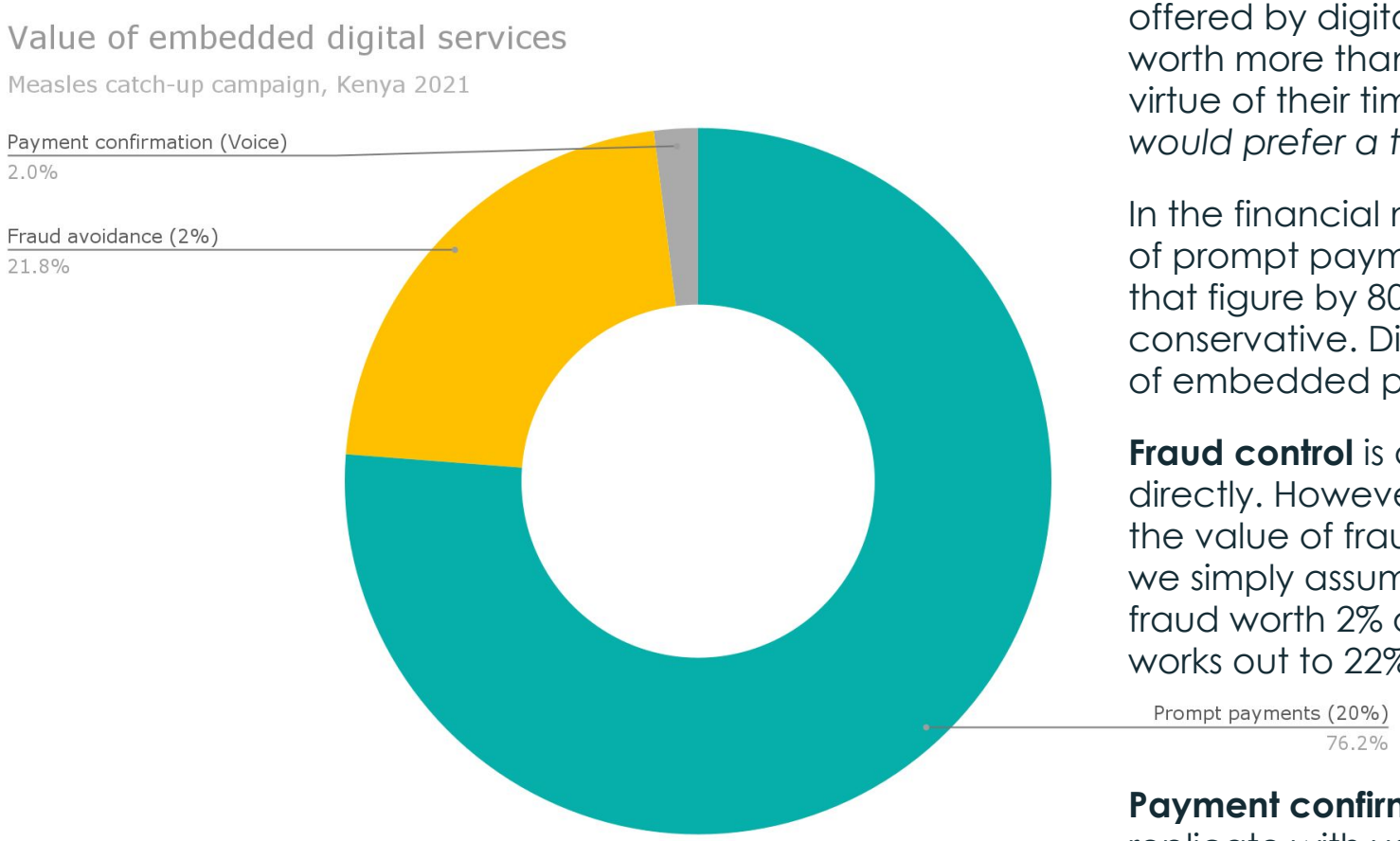
Yet, digital payments embed the following services as well.

- payment confirmations
- fraud control
- prompt payments

The aggregate value of these services is worth as much as 75% of the cost of a mobile money payment, or $35 per thousand population.

Adjusting for the **value of embedded services**

Analysis of the financial model of the measles campaign in Kenya, 2021



Prompt payments are by far the most valuable service offered by digital payments. When prompt, payments are worth more than 35% more to the typical recipient by virtue of their timeliness. *That is, over half of recipients would prefer a timely payment to one that is 35% larger.*

In the financial model, we calculate the additional value of prompt payment to the recipient, and then discount that figure by 80% solely to keep the estimate conservative. Discounted in this manner, 75% of the value of embedded payments derives from timeliness.

Fraud control is a benefit that this study did not estimate directly. However, it seems wrong to leave a "zero" for the value of fraud control. As a placeholder for this value, we simply assumed that replacing cash could control fraud worth 2% of the notional value of payments. This works out to 22% of the value of embedded services.

Payment confirmations are not particularly expensive to replicate with voice calls. The cost is $0.70 per thousand population covered, or 2% of the value of digital services.

Netting out the costs and benefits of digital

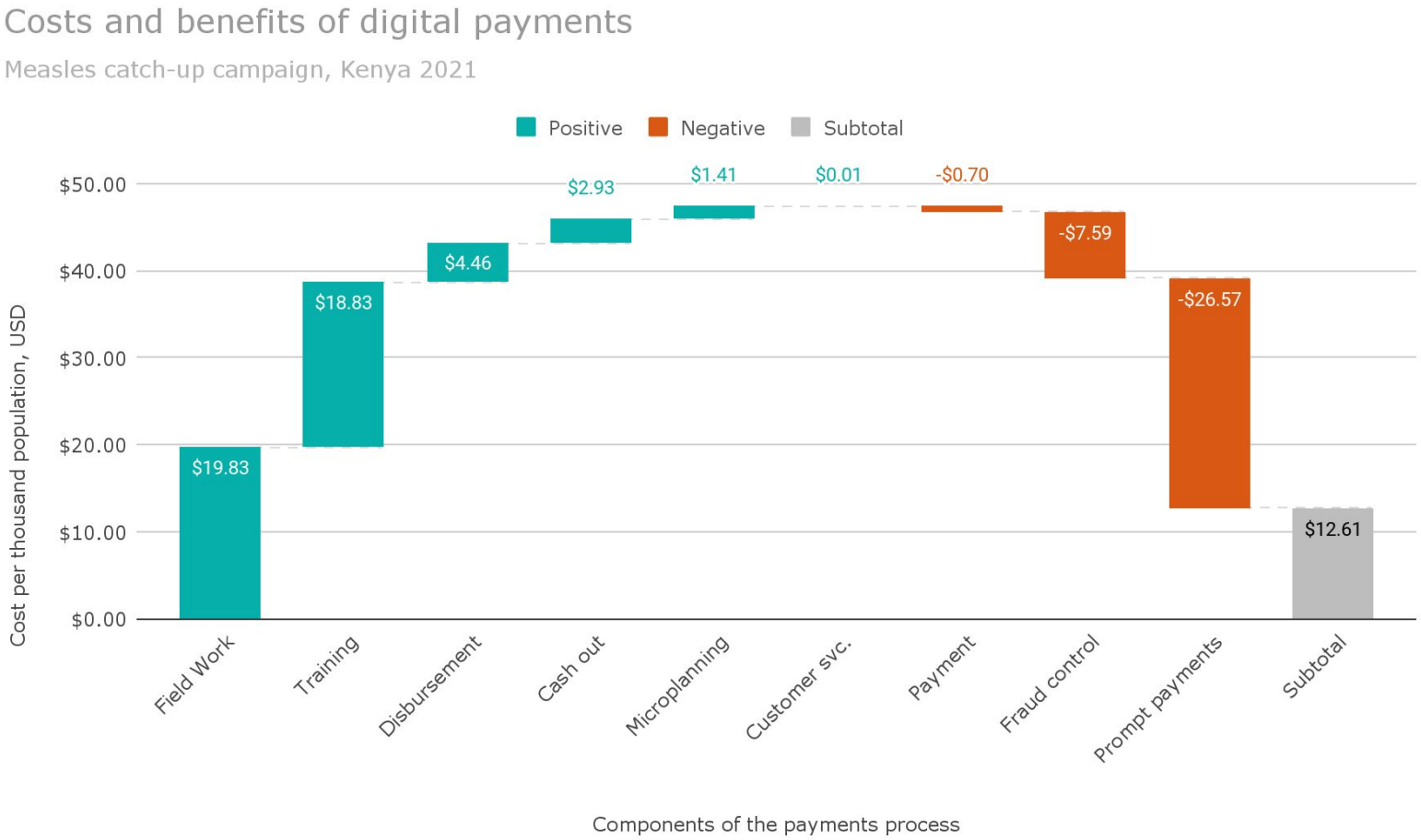
Analysis of the financial model of the measles campaign in Kenya, 2021

The aggregate value of the benefits of embedded digital services is sufficient to offset 74% of the cost of administering payments.

The largest component of this value is the **promptness of the payment** itself. Here, we have discounted that value by 80% relative to what research shows is the true value.

Fraud control is the second largest service embedded in digital payments.

Payment confirmations, while extremely important for accounting and customer service, are not particularly expensive to replicate by telephoning recipients of payments.



Summary of the **drivers of payment costs**

Features of campaigns	Risks / downside	Improvement / upside	Examples
Target population (larger)	Increases cash in transit and tariffs (as % of unit cost).	Decreases planning and one-time enrollment costs (as % of unit cost). Decreases unit cost of payments.	Measles campaigns target large geographic regions and cover broad populations.
New and temporary workers (more)	Increases one-time enrollment costs (as % of unit cost). Increases unit cost of payments.	Decreases cash in transit and tariffs (as % of unit cost).	Polio vaccine campaigns employ unskilled workers to administer oral vaccines on a door-to-door basis.
Rural vaccination sites (more)	Increases cost of cash in transit (cash). Higher CICO costs and risk of network outages (digital payments).	Digital payments offer bigger improvement over cash payments in timeliness and cost to payee.	Countries with limited digital infrastructure, cash-out access, and mobile network coverage will face greater obstacles.
Cost of vaccines and materials (more)	No impact on the unit cost of payments. Payments are a smaller share of the campaign budget.	No decrease in the unit cost of payments. Payments are a smaller share of the campaign budget.	COVID-19 vaccine requires costly cold storage and spoils quickly.
Security risks and fiduciary risks (higher)	Greater unaccounted costs of cash leakage and cash loss.	Digital payments reduce (1) risks to cash in transit and (2) cash balances held by frontline workers.	Finance and administration personnel characterized some countries as "high risk" countries.
Re-usable databases of healthcare workers	Requires interagency cooperation for re-use of databases. Requires an office or entity to host and maintain the database.	Decreases the cost of enrolling workers, disbursing payments, and troubleshooting errors.	Efforts are underway in Burkina Faso to build a database of payees that could be leveraged for SIAs.

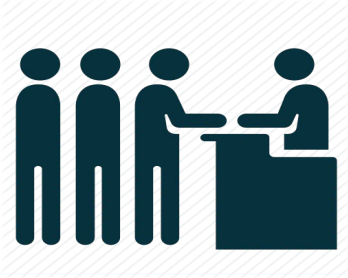
04 Drivers of adoption: **cash in, cash out (CICO)**

Case 1: Cash Payments

Cash total due for payments is dispatched from UNOPS bank account via CIT services which include:

- Bulk cash collection
- Bulk cash payments
- Cash counting

- Cash is dispatched via cash-in-transit (CIT) to far-flung areas normally reachable within a day
- Can take a few hours to several hours to collect, deliver, and pay out cash to health workers
- Dispatch must be completed within banking hours (8am - 5pm) for security reasons.



- Workers are paid the dues via cash on location
- Queue time depends on number of workers and processing time for each payment
- Processing time may depend on the availability of required documents e.g. KYC proof

Drivers

- Lack of digital payments distribution in the location where payments are being made, therefore cash payments make more sense
- Distance and remoteness of the area where digital services are being offered
- Number of registered mobile money users may be too low hence cash payments

- Yet, UNOPS cites multiple problems with cash delivery.
  - Higher cost of cash delivery to far-flung payment locations.
  - Staffing burden of cash distribution and risk if robbery whilst cash is in transit.
  - Staff bear the accountability risk for cash in transit.
  - Poor verification of recipients. No independent confirmation of the recipient's identity, making it impossible to separate the disbursement and control functions.

After receiving cash, the health workers may:

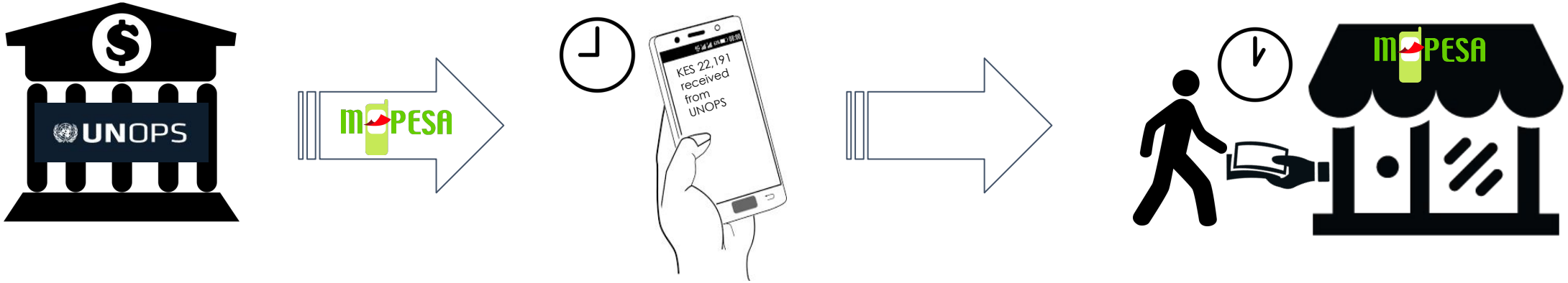
- deposit the cash at M-PESA outlet or bank

- buy food using cash whilst on campaign

- buy grocery or personal items

- pay for services like transport, entertainment, hospital etc

Case 2: M-PESA payment and immediate cash-out



- UNOPS makes a deposit to the bank for total amount they want to pay out in bulk for the health workers
- Bulk payment is initiated by via M-PESA B2C system operated by UNOPS
- Charges at KES 22.40 per transaction for all values over KES 1,000 paid to M-PESA by UNOPS
- Depending on the amount, the cash out cost for a single transaction can be added to the total e.g. if KES 22,000 is being disbursed, then the cost will be KES 213.40 (22.40 + 191)

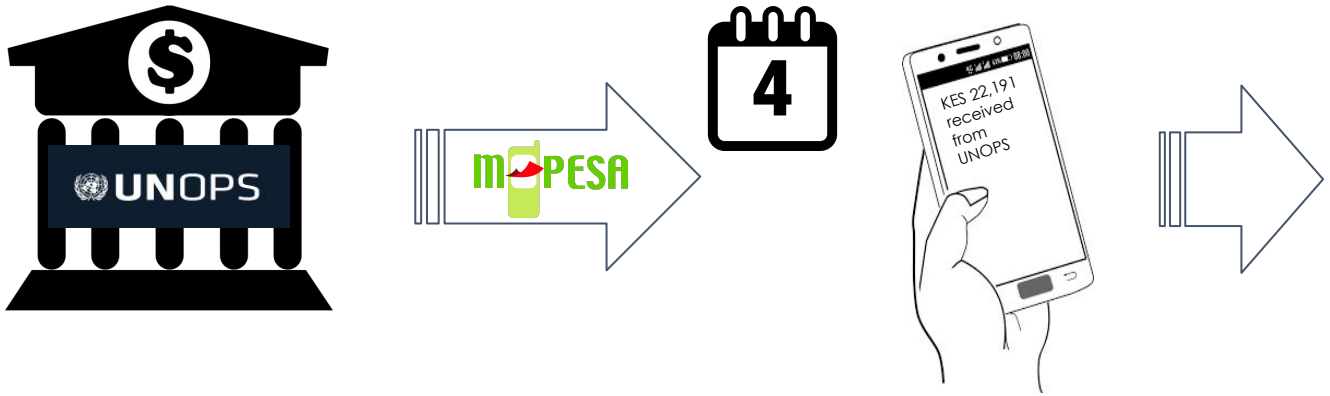
The health worker will receive KES 22,191 which includes the total amount plus cash out cost

The recipient can now cash out the exact amount without losing to the cost of cashing out.

Drivers

- Lack of digital payments distribution in the location where payments are being made, therefore one cash out makes more sense as the recipient will now have the freedom to spend in cash which is more acceptable
- Long distance and remoteness of the vaccination centre: In such cases, using M-PESA makes little financial sense to the recipient health worker due to cost and other inconveniences e.g. lack of electricity to charge phone, no network coverage, too costly and time consuming to travel to the nearest agent (can take 1 hour to 1 day, costing between KES 50 and 1,000
- Multiple cash out may also be expensive if considering time and cost of travel and cash out charges
- When there are no cash-out points or low liquidity, people tend to:
    - Send money to another party (mostly relative) in a different location e.g. health worker in remote area sends money to their spouse back at home in an urban area
    - Remote payments
    - Remote cash out
    - Store value in wallet till later
    - Buy airtime

Case 3: M-PESA payment and multiple cash-out

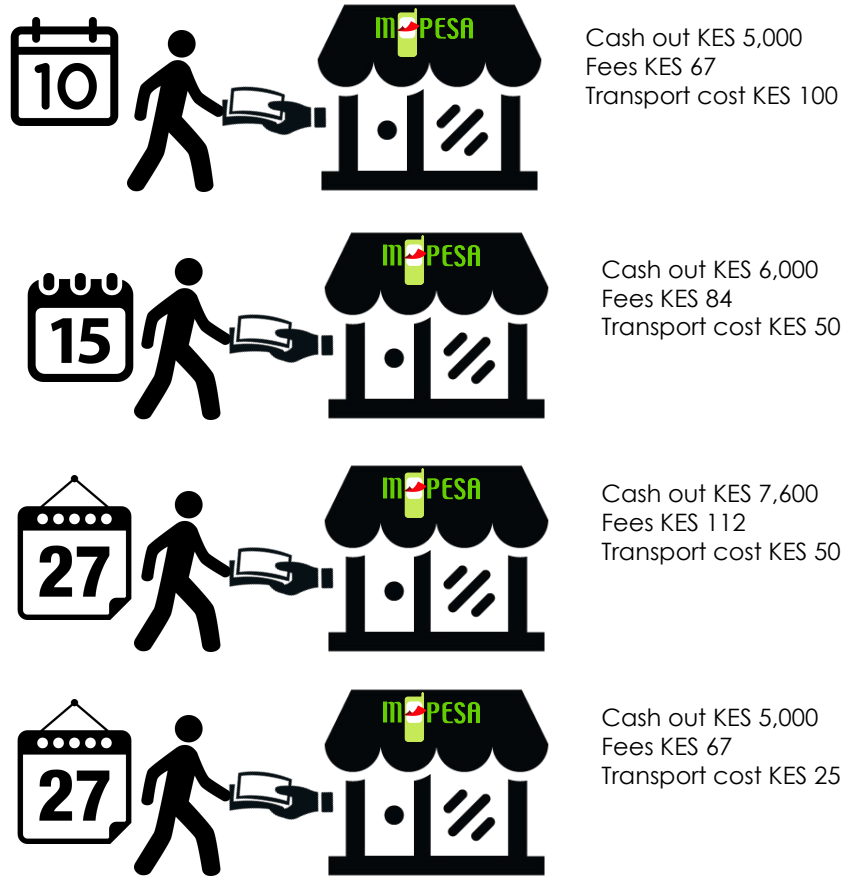


UNOPS transfers funds from a project account into a specific account for a designated group of health workers. Finance personnel then disburse funds into M-PESA via a payment gateway.

UNOPS incurs charges KES 22.40 per transaction for all values over KES 1,000 on M-PESA.

How much will a recipient incur in cash-out costs? That depends on user behaviors. We illustrate how different behaviors and points of access to cash can affect fees and transportation costs.

The health worker will receive KES 22,191 which includes the total amount plus cash out cost



Total cash out	KES 22,000
Total fees	KES 330
*Total transport cost	KES 225
**Total additional out of pocket costs	KES 364

Drivers

- Where the cost of cash out supersedes the risk of losing cash, recipients may opt to use mobile money to store value for later usage for the security it offers.
- It would be good for UNOPS to consider including the cost of multiple cash out, assuming an average number of cash outs, and adding that cost to the paid amount. The cost of travel can also be considered especially for far-flung areas with poor agent distribution as well as poor and costly transportation
- Including these costs does not change the B2C transaction cost, but cushions customers against possible loses if they did multiple cash out transactions

*Assumes M-PESA agents are a distance away at the time the cash out is needed
**Additional cost of KES 139 from multiple cash out + total transport

Exhibit: M-PESA Tariffs, 2021

M-PESA TARIFF EFFECTIVE 1ST JANUARY 2021

TRANSACTION RANGE (KSHS)		TRANSACTION TYPE AND CUSTOMER CHARGES (KSHS)			
MIN	MAX	TRANSFER TO M-PESA USERS, POCHI LA BIASHARA AND BUSINESS TILL TO CUSTOMER	TRANSFER TO OTHER REGISTERED MOBILE MONEY US-ERS	TRANSFER TO UNREGISTERED USERS	WITHDRAWAL FROM M-PESA AGENT
1	49	Free	Free	N/A	N/A
50	100	Free	Free	N/A	10
101	500	6	6	45	27
501	1,000	12	12	49	28
1,001	1,500	22	22	59	28
1,501	2,500	32	32	74	28
2,501	3,500	51	51	112	50
3,501	5,000	55	55	135	67
5,001	7,500	75	75	166	84
7,501	10,000	87	87	205	112
10,001	15,000	97	97	265	162
15,001	20,000	102	102	288	180
20,001	35,000	105	105	309	191
35,001	50,000	105	105	N/A	270
50,001	150,000	105	105	N/A	300

MAXIMUM AMOUNT CUSTOMER CAN TRANSACT DAILY	MAXIMUM AMOUNT CUSTOMER CAN HOLD IN M-PESA
300,000	300,000

ATM WITHDRAWAL		
TRANSACTION RANGE (KSHS)		CUSTOMER CHARGE (KSHS)
MIN	MAX	
200	2,500	34
2,501	5,000	67
5,001	10,000	112
10,001	20,000	197

OTHER TRANSACTIONS	KSHS
ALL DEPOSITS	FREE
M-PESA REGISTRATION	FREE
BUYING AIRTIME THROUGH M-PESA	FREE
M-PESA BALANCE ENQUIRY	FREE
CHANGE M-PESA PIN	FREE

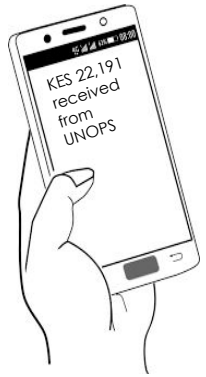
- Download mySafaricom App and transact on M-PESA
- Dial *334# to access all M-PESA services

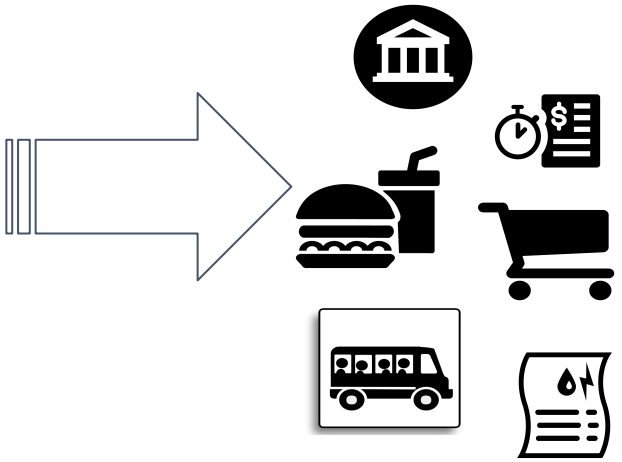
Drivers to single cash out:

- **Non Uniform Cost**: Cash out cost for lower value transactions range between 1.20% and 20%, with lower value transaction costing higher in terms of percentage of the transaction.
- **Complex structure**: For some transaction bands, the change in cost of transaction is almost double when moving to the next band e.g. it costs KES 22 more to send KES 2,500 than to send KES 2,501 which may be confusing to customers
- Cost **discourages split cash out** transactions: cashing out KES 1,000 fifteen times would cost KES 405 compared to one cash out of KES 15,000 (costs KES 162)

Source: M-PESA Tariffs

Case 4: M-PESA payment and digital spend cycle





- UNOPS makes a deposit to the bank for total amount they want to pay out in bulk for the health workers
- Bulk payment is initiated by via M-PESA B2C system operated by UNOPS
- Charges at KES 22.40 per transaction for all values over KES 1,000, paid directly to M-PESA
- The payers can determine the average cost of transactions based on assumptions of possible customer behaviours once they receive money. Some scenarios are included here

The health worker will receive KES 22,191 which includes the total amount plus cash out cost

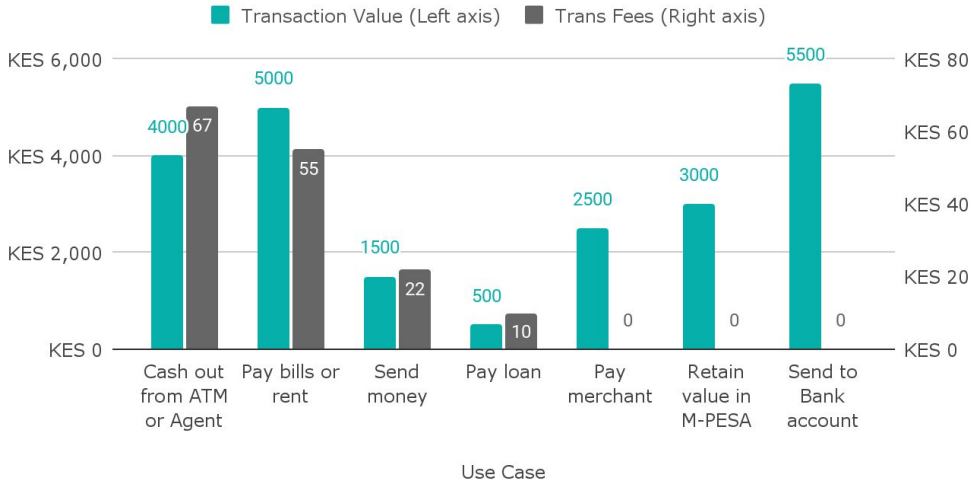
Example of how the money in the wallet could be used:

- Buy airtime
- Pay utility bills
- Pay merchant
- Send money
- Pay loan
- Store value in M-PESA
- Cash out: ATM/Agent
- Send to Bank account

Drivers

- Users are more likely to use mobile money where services that accept mobile money payment are available
- Other requirements to support the usage i.e. agent network, banks, good electricity supply and mobile network, which would mostly be present in urban areas.
- Heavy users of the full digital cycle would most likely be also tech savvy, youthful, busy and having multiple transactions to do monthly, so preferring remote transactions
- There are more gains for cash out fees, which are priced higher to encourage more usage within the ecosystem to send money, make payments and store value for later use. This assures downstream revenue, even if it is deferred.

Example: Transaction Value and Fees



Initial distribution of health workers in the 2021 campaign

As a first step to illustrate the cost implications for recipients, we assumed that 20% of health workers who participated in the campaign were paid in cash and that 80% who received payments via M-PESA, 30% corresponded to Case 2, 30% to Case 3 and a final 20%, to case 4.

	Case 1: Cash payments	Case 2: M-PESA, immediate cash-out	Case 3: M-PESA, multiple cash-out	Case 4: M-PESA, fully digital spend cycle
Distribution of Health Workers	20%	30%	30%	20%
Number of Health Workers	4,141	6,212	6,212	4,141

Although we do not know the exact data point, we can infer that the distribution of 20%-Cash / 80%-MM may be close to the actual deployment as consulted with different stakeholders during the study.

Setting up geographical nuances to approach the different costs scenarios for the recipients

Additionally, to portray the implications of cash and digital payments across different types of territories we classified the participating counties set to take part in the 2021 Vaccination Campaign into two categories

- **Territory type 1:** Territories where is highly likely that vaccination centers are close-by and cash-out points are concentrated
- **Territory type 2:** Territories in remote areas with lack of digital payments distribution.

The main criteria for this categorization were the level and development of economic activity and the population concentration in each participating sub-counties. Below is the campaign's characterization of some of the most significant descriptive variables.

	Territory type 1: Remote territories that lack digital payments distribution	**Territory type 2:** Vaccination centers are close-by and cash-out points are concentrated
Number of Counties	10	13
Percent of health workers	51%	49%
Number of health workers	10,566	10,139
Number of sub-counties	59	99
Percent of people vaccinated	41%	59%

Other assumptions to describe the variables driving costs to the recipients

	Territory type 1: Remote territories that lack digital payments distribution	**Territory type 2:** Vaccination centers are close-by and cash-out points are concentrated
Average allowance amount to health workers	KES 9,542	
Amount spent by payees in food and transport	KES 2,970	KES 2,475
Commuting expenses	KES 700	KES 350
Cash payments drivers		
Percent of payees that deposit cash at M-Pesa	30.00%	50.00%
Percent of total amount received that is deposited at M-PESA	50.00%	100.00%
Risk of losing cash	10.00%	
MM payments drivers		
Percent of payees that cash-out	25.00%	20.00%
Percent of the received amount that is cash-out	100.00%	25.94%
Number of cash-out transaction	1 for immediate cash-out (Case 2). 3 for multiple cash-out (Case 3)	

The average allowance amount is the BFA estimate for the 2021 campaign. See: Vaccines Payment Model - All: KE ::: MM - UnitCostBuildup Step1!N681

According to the same criteria for categorizing the territories, we are assuming that the health worker in type 1 territories must face higher essential costs such as food and transportation than workers in type 2 territories. This analysis does not include "non-habitual" expenses such as health and entertainment.

We assume that the probability that recipients deposit their cash payment in M-PESA is higher (about twice as much) for more developed territories in payment distribution.

Specifying the probability of occurrence of a money loss event is not an easy task to its dependence on many variables. For example, the likelihood of robberies, workers not receiving the correct change, or even losing their wallet.
This variable impacts the average cash amount that workers have in hand based on the combinations of "Cases" and "Type of Territories" proposed in this analysis. Therefore, it affects both workers who receive payment in cash and keep it and those who receive their payment digitally but decide to eventually cash-out.

The resulting costs to the recipients

Cost to the recipient	Case 1: Cash payments	Case 2: M-PESA, immediate cash-out	Case 3: M-PESA, multiple cash-out	Case 4: M-PESA, fully digital spend cycle
Cost to get the cash payment				
Transportation cost to the pay out facility:	KES 529			
Cost to cash-out:				
Transportation costs	NA	KES 529	KES 1,586	
Cash out costs	NA	KES 71	KES 84	
Cost to use of cash:				
Cost to lose cash	KES 73	KES 518	KES 7	
Cost to use of MM:				
Transportation cost to deposit the cash at M-PESA outlet or bank	KES 193			
Transactional costs on MM platform	KES 176	KES 217	KES 443	KES 443
Total cost to the recipient	**KES 971**	**KES 1,335**	**KES 2,120**	**KES 443**

Mobile payments seem the most convenient option to make vaccination campaign payments more efficient for the deploying organizations and -orders of magnitude to health workers.

Cash is still a good option for campaigns where there is no advanced development of mobile money networks and in areas where having cash does not imply a significant risk for workers to lose it. The transportation cost for workers who receive their payment to the place of payment is half the total cost. It could be worth exploring to include that cost as part of the allowances and make it explicit to the worker in the training stage (for example).

As mentioned in previous sections, we acknowledge the probability of 30% for a payee to lose cash is considerably high. It significantly impacts Case 2 (we assume a 25% probability that a health worker who received an MM will cash out the total amount). Case 2 would be a more reasonable than Case 3 for health workers where this probability is substantially lower (i.e., to 5%, as shown in the table below).

Probability of losing cash	Case 1	Case 2	Case 3	Case 4	Case 1	Case 2	Case 3	Case 4
5%	**KES 934**	**KES 1,076**	**KES 2,116**	**KES 443**	**-4%**	**-19%**	**0%**	**0%**
10%	**KES 971**	**KES 1,335**	**KES 2,120**	**KES 443**				
20%	**KES 1,044**	**KES 1,853**	**KES 2,127**	**KES 443**	**8%**	**39%**	**0%**	**0%**
30%	**KES 1,117**	**KES 2,372**	**KES 2,134**	**KES 443**	**15%**	**78%**	**1%**	**0%**
50%	**KES 1,263**	**KES 3,408**	**KES 2,148**	**KES 443**	**30%**	**155%**	**1%**	**0%**

The costs of the recipients are largely driven by where payments take place

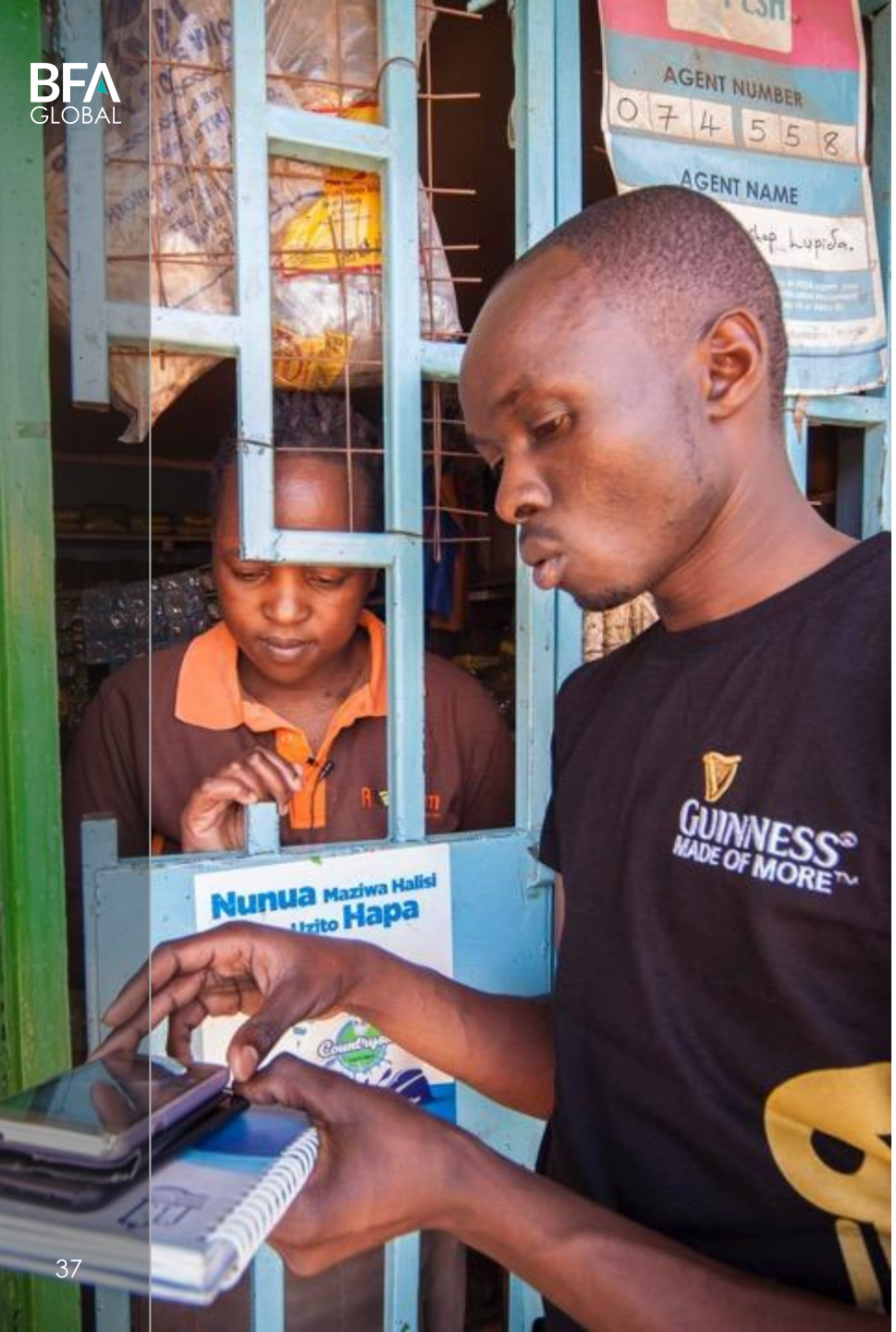
	Case 1: Cash payments		Case 2: M-PESA, immediate cash-out		Case 3: M-PESA, multiple cash-out		Case 4: M-PESA, fully digital spend cycle
	Territory type 1: Remote territories that lack digital payments distribution	Territory type 2: Vaccination centers are close-by and cash-out points are concentrated	Territory type 1: Remote territories that lack digital payments distribution	Territory type 2: Vaccination centers are close-by and cash-out points are concentrated	Territory type 1: Remote territories that lack digital payments distribution	Territory type 2: Vaccination centers are close-by and cash-out points are concentrated	
Cost to get the cash payment							
Transportation cost to the pay out facility:	KES 700	KES 350					
Cost to cash-out:							
Transportation costs	NA	NA	KES 700	KES 350	KES 2,100	KES 1,050	
Cash out costs	NA	NA	KES 112	KES 28	KES 84	KES 84	
Cost to use of cash:							
Cost to lose cash	KES 143	KES 0	KES 954	KES 64	KES 7	KES 7	
Cost to use of MM:							
Transportation cost to deposit the cash at M-PESA outlet or bank	KES 210	KES 175					
Transactional costs on MM platform	KES 133	KES 222	KES 0	KES 443	KES 443	KES 443	KES 443
	KES 1,186	**KES 747**	**KES 1,766**	**KES 885**	**KES 2,634**	**KES 1,584**	**KES 443**

Aspects of the territories in which the campaigns are deployed, such as the economic activity development and the concentration of CICO points, may significantly impact the costs for the recipients.

Looking at Case 1, when health workers receive cash payments in far-flung areas and with little development of digital payments distribution, they may not only incur higher transportation costs to receive their payments but also a higher risk of losing their money. In the case of areas with developed digital payments distribution, this risk may decrease considerably due to a greater chance to make deposits at M-PESA or bank.

In terms of cost incurred by workers, inequality is apparent between those workers in territories Type 1 and Type 2. Those with the most complex and challenging conditions make the greatest effort in transportation, time and money.

05 Drivers of adoption: **finance and administration**



Cash operations from the point of view of finance

Several key themes surfaced in our discussions with finance and administration personnel in the public sector

- Control of financial risks
- Cost of cash operations
- Security risks
- Accountability risks
- Tax risks

These themes touch on intrinsic features of cash operations, which may be emphasized more or less depending on the specific geography and financial infrastructure of the country where SIAs occur.

When SIAs seek to transition from cash to digital payments, these are the themes that should be emphasized in advocating change with finance and administration staff.

Key themes in finance and administration

The accounting staff loves our new system. It is much better than in the past. The information is extremely timely and accurate. There is no risk of errors from financial operations. Any failed payments can be traced to the specific record that could not be paid. All funds are accounted and controlled using this system.

There is no longer a need to spend money on cash logistics. Cash operations were very expensive.

Authorizations for payment trigger the creation of a fund with its own disbursement account. Only one employee has access to the disbursement account. Payment confirmations provide an audit trail for every transaction. Balances are accurate to the shilling and are reported on a daily basis.

Anything that involves cash involves a lot of fiduciary risks.

We used to arrange for cash in transit. We would go to the bank. The bank would park the money. Then a security escort would move the money to the pay point. Security becomes a challenge.

Cash operations sometimes require an advance to our own personnel. That money comes to his personal account. The banks would lock the money. There were also issues with anti-money laundering. Why should someone who earns 2,000 be able to pay 20,000? The staff could experience challenges at the personal level.

The moment you pay in cash, you do not have proof who has been paid. You must identify the person on the ground. That process is open to errors.

06 Conclusions: **organizational change**

Digital payments require organizational change

SIAs are complex undertakings with a variety of roles and responsibilities for participating organizations. Moving away from current payment systems — whether cash-based, paper-based, or something else — requires leadership and an understanding of the incentives facing specific offices.

As we saw in the Payment Use Case Maps, there are no universal standards for who does what. An international donor may provide the funds for payments to frontline healthcare workers. Yet the disbursement of those funds may be carried out by local health officials; by state-level finance and administration teams; by national-level offices of the health ministry; or by third parties, such as United Nations Office of Project Services (UNOPS).

Effective leadership in managing organizational change requires **clear communication about the specific benefits** of digital payments systems for each local stakeholder.

Stakeholder analysis

FINANCE & ADMINISTRATION

Finance and administration will support digital payments, provided that they achieve:

prompt disbursement,

confirmation records, and

enhanced accounting reports

1

FRONTLINE WORKERS

Frontline healthcare workers will support digital payments, provided that they achieve:

prompt disbursement,

near-universal access, and

easy access to cash-out points.

2

DONOR CONSORTIUM

Donors will support digital payments, provided that they achieve:

better service for frontline workers,

control of fiduciary risks, and

success in meeting campaign goals.

3

Summary of **benefits and risks** of digital transition

Stakeholder	Principal benefits	Opportunities and Limitations	Principal risks
Donor	Better service for staff Efficacy in achieving coverage targets Control over fiduciary risk	Depends on nearly universal access to payments and cash-out	May require greater expenditure depending on local costs of cash logistics and payment tariffs
Ministry of Health, immunizations office	Efficacy in achieving coverage targets	Depends on nearly universal access to payments and cash-out	None
Ministry of Health, finance and administration	Control over fiduciary risk More timely disbursement Verifiable disbursements	Offers enhanced accounting and reporting Additional burden of maintaining a database of payees	Reluctant to give up control over disbursement function
Frontline healthcare workers	Timely payments Clear point of access for questions	More choice over holding digital and cash balances. More choice over digital spending	Additional costs of cash-out, both in tariffs and travel time / costs
Local government and health officials	Reduces staff risk for accountability with cash in transit	Eventually, could streamline workflows with fully digital reporting of wage and salary approvals	Reluctant to give up control over disbursement function
Third party payment services providers	Expanded business for digital payments, banks and telecoms	Cash-out problems could hurt the reputation of the payments vendor	Expanding cash-out networks could be costly in the short run

07 Further research

Delivering on the value proposition of digital payments

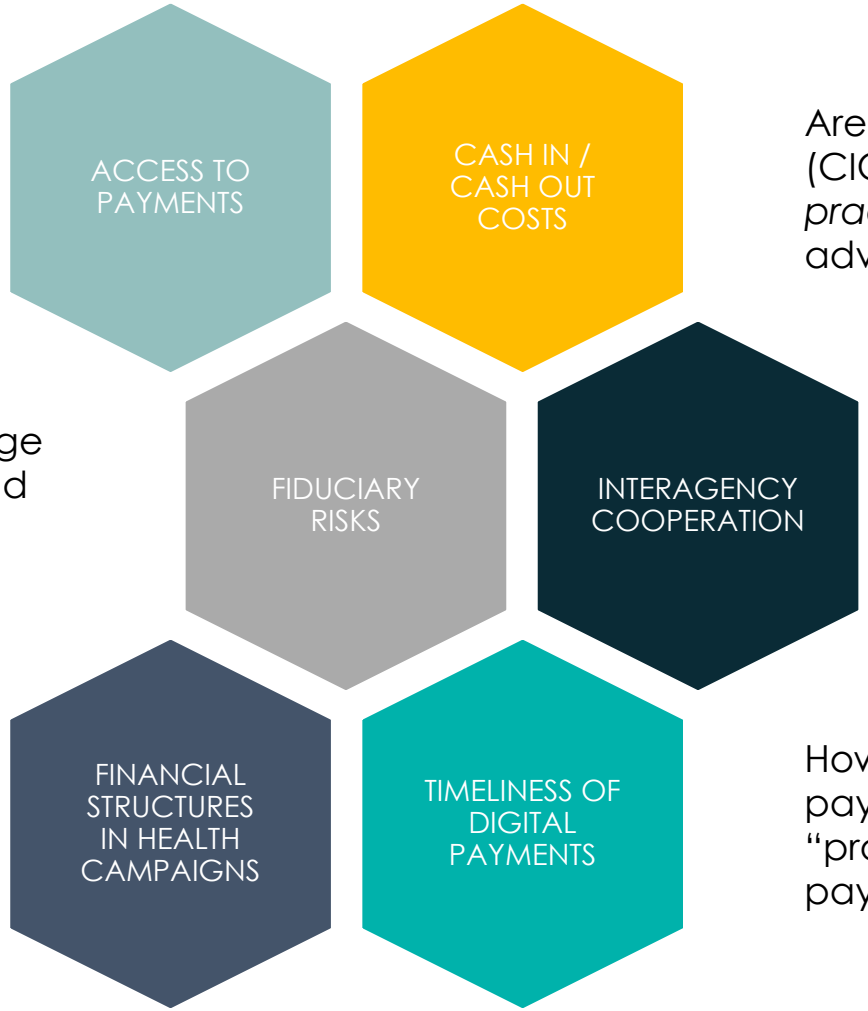
The experiences of these four countries and five campaigns are by no means universal. BFA Global recommends further research in countries undergoing a transition to digital payments in the healthcare sector. Our research suggests that the benefit of digital payments is greatest when certain conditions are met.

1. **Cash-out access** must be broad-based.
2. Access to **digital payments** — whether through mobile money or bank-based payments — must be nearly universal.
3. **Enrolling users** in digital payments solutions should be relatively frictionless and cheap.
4. Collaborating offices must use **compatible technology** to communicate about presence, performance, and payment.
5. **Offices that share longitudinal databases** of payees must have trust in one another's systems and personnel.
6. The policy environment for privacy and payments must be conducive to **universal participation**.

The model we have developed could be applied to a wide variety of health campaigns: typhoid conjugate vaccine campaign, meningitis A campaigns, multi age cohort vaccination campaigns such as HPV; pre-emptive oral cholera vaccine campaigns; COVID 19 mass campaigns; other health interventions such as bednets; and intensification of immunization with Vitamin A and deworming.

Topics for further research

How many healthcare workers already accept digital payments?
See also: Global Findex



Are the cash-in and cash-out (CICO) costs experienced *in practice* the same as advertised on tariff sheets?

What rates of cash leakage are considered "high" and "low" by finance professionals?

Are legal and governance structures in place to permit cooperation for payments across healthcare offices and administrative levels?

How do donors and implementing partners collaborate on financial functions, and why?

How successful are digital payments in achieving "prompt and verifiable" payments, as promised?

Thank **you!**

Benjamin Mazzotta, Ashirul Amin,
Jorge Hernandez
www.bfaglobal.com
info@bfaglobal.com
@bfaglobal