Payment system options for Daya users: mobile or postal money?

Empowering rural female craft artisans in Tunisia

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1. Introduction

The Daya platform serves as a wholesale marketplace, catering to rural female artisans by providing them with access to international markets and tools necessary for managing their small businesses. This platform plays a crucial role in enabling these women to navigate the entrepreneurial ecosystem in Tunisia. However, the platform has faced obstacles in navigating the intricacies of the local banking system, which limits the options available to artisans for collecting their earnings from Daya, restricting them to either postal offices or a mobile money app.

Given that the primary aim of the Daya platform is to promote women's entrepreneurship in Tunisia and to empower women, it is imperative to devise an intervention to assess which payment system best supports Daya users. The present study aims to determine which payment option is most effective in fulfilling the platform's objectives, with the ultimate goal of enabling Daya to make informed decisions about the payment system it may decide to promote.

2. Background

In Tunisia, women make up 49.9% of the population yet account for only 13% of the total entrepreneurs (Drine & Grach, 2012). One-quarter of those are in the craft sector (Laffineur et al., 2018), which accounts for 3.9% of the country's GDP (EU Neighbours, 2014). The Tunisian government has made several efforts to foster women entrepreneurship. The 2018 Start Up Act tried to address the diminishing national entrepreneurial activity over the years, from 9.4% in 2009 to 4.8% in 2012 (Belkacem & Mansouri, 2012) by simplifying legal frameworks, focused funding, and entrepreneurial hubs. However, men are still 2 to 3 times more likely than women to start a business (Dorsaf et al., 2020). This is because the nation's entrepreneurial ecosystem,

while not legally barring women from state provided resources (Maayoufi, 2020), does not specifically facilitate their access to compensate for the existing gender gaps.

In this context, a marketplace, such as the Daya platform, presents itself as a much-needed wholesale intermediate marketplace, with the objective of solving many of the challenges entrepreneurs face in terms of accessing information, markets and financial services (OECD, 2020). Specifically, the platform introduces craft artisans - an industry with untapped potential for female entrepreneurs (Laffineur et al., 2018) - to international business opportunities, whilst expanding their sales and export capacities, so that they can focus on what they are experts on, craftsmanship.

2.1. How Daya works

Daya currently only operates with Tunisia's greatest trading partner, the EU, which accounts for 48.3% of Tunisia's imports and receives over 70% of Tunisia's exports. The EU Free trade agreement (Grumiller, et al., 2018) provides an opportunity to access markets for female rural artisans, yet most do not understand how to tap this opportunity on their own. This

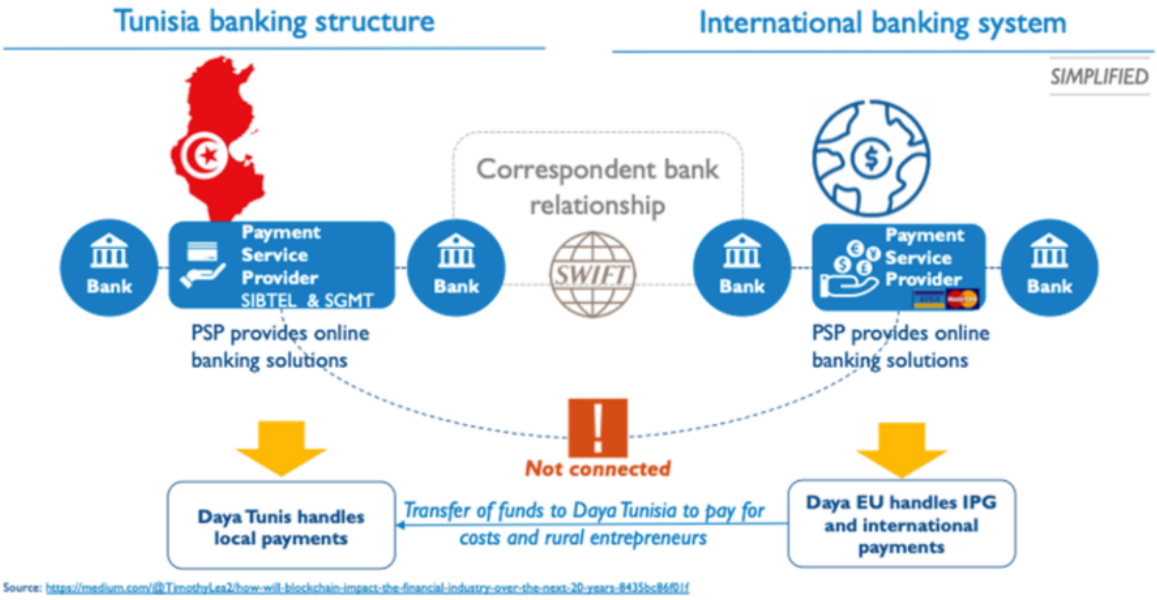
perpetuates the mismatch between large established exporters and smaller artisans in terms of knowledge on how to navigate the complex environment. Daya provides assistance to its users, rural female Tunisian artisans, not only by introducing their businesses to new markets, but also by providing them with training and resources to navigate the intricate business environment. However, their biggest obstacle is operating under the difficult Tunisian banking system, which is not globally accessible.

2.2. The Tunisan banking system

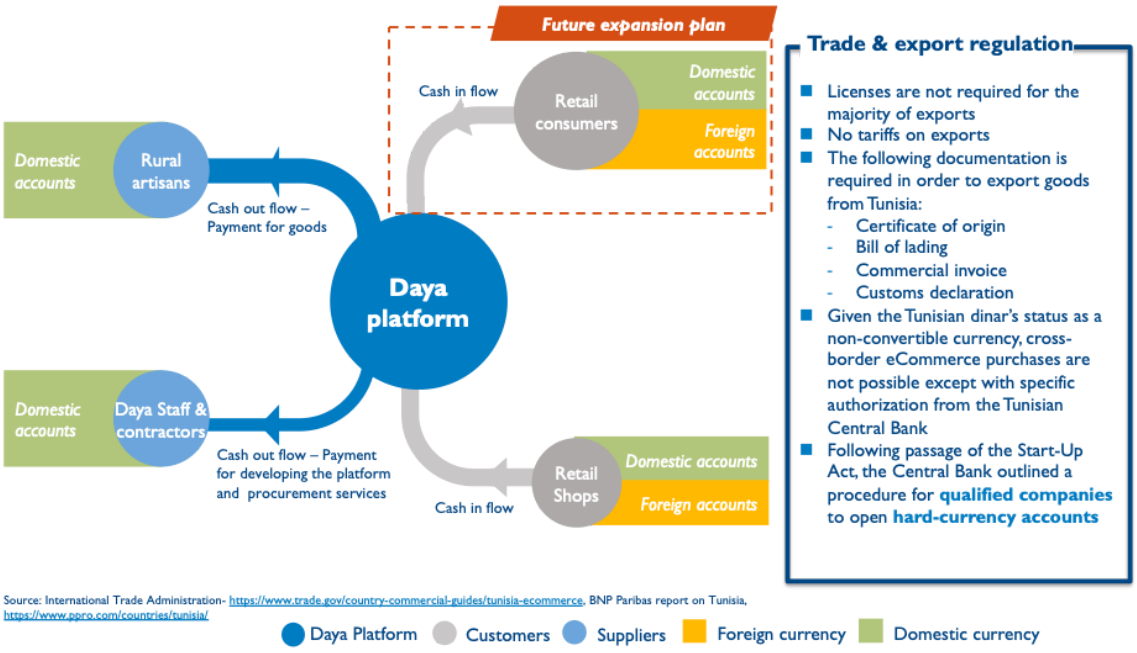
Tunisia's undeveloped banking sector is one of the biggest barriers that affect the ability of women to grow their business, particularly at the international level. Tunisia has its local payment service providers, SIBTEL and SGMT, under the supervision of Tunisia's Central Bank. Although there are no legal barriers to exporting goods from Tunisia, there is no access to international online payment solutions such as Visa and Mastercard within the country. Furthermore, the banking penetration rate is low in Tunisia, averaging 34.6% in 2020, and 22.4% in rural areas (Statista, 2021) where the bank branches are scarce. This has led to unmet demand for financial services, particularly among women, who lack access to financial services, such as credit, that enables them to start or expand their businesses (IFC, 2019).

How Daya navigates the complex Tunisian banking system

To overcome the knowledge gap and the lack of access to international banking, Daya has set up a foreign legal entity parallel to its local legal entity to provide easy online solutions for foreign customers overseas:



Once the funds arrive in Tunisia, it is the local legal entity handling the payments to the users. However, transferring funds within the country through traditional banking systems is extremely difficult, particularly due to the mentioned low banking penetration. Daya navigates this issue through the following transfer system which connects female rural artisans to the wider EU market and ensure secure payments and transfers to the artisans:



After the transfer of funds from foreign customers abroad has been received on the Daya platform, the next step is to transfer the funds to the rural female artisans who are the intended recipients. Due to the payment restrictions aforementioned, there are only two collecting methods by Daya: Post Money (e-Dinar) and Mobile Money (through an app).

3. Experimental design

3.1. Intervention studied

The purpose of the study is to understand which of the two options offered to rural female artisan entrepreneurs to collect the money from the sales of their products, (A) Post Money (e-Dinar) or (B) Mobile Money has a higher impact on the economic empowerment economic empowerment of Daya's users, who are solely rural female Tunisian artisans.

Post Money (e-Dinar)

As an intermediary platform, Daya has been facilitating the cash-out process for its users through post money, which is also known as e-Dinar. This approach has allowed Daya users to easily withdraw their earnings by visiting the nearest post office that provides financial services. The post office has long been established as a trusted and reliable institution in Tunisia, offering financial services to a significant portion of the population. In fact, according to Hyunh (2014), there are currently six million postal financial accounts for a population of 11 million people in Tunisia. Despite the benefits of post money, accessing a physical postal office can present a challenge for rural artisans, particularly those who live far away or have limited availability due to their work. Additionally, while postal offices are distributed fairly evenly throughout the country, only slightly over half of them offer financial services, further limiting access for some individuals.

Mobile Money

In light of these challenges, Daya has been exploring alternative payment options such as mobile money to provide its users with more flexibility and convenience in accessing their earnings. By doing so, Daya aims to further empower its users, by enabling them to participate more fully in the economy and achieve greater financial stability. Leveraging the high rate of mobile ownership in Tunisia, which stands at over 90 percent among the adult population (Statista, 2021), our team introduced mobile money as a novel means for rural artisans to collect their earnings. J-PAL defines mobile money as "a digital payment platform that allows for the transfer of money between cellphone devices. Users can receive, withdraw, and send money without being connected to the formal banking system" (Parekh & Hare, 2020). Moreover, mobile money presents a potentially more expedient approach for users to retrieve their earnings, as withdrawals can be made at designated kiosks or retail establishments. Despite the potential benefits of mobile money, it is not yet widely used as a payment option in the country,

particularly among certain groups such as rural artisans. One of the primary reasons for this is that mobile money is a relatively new and unfamiliar concept, requiring a certain level of digital literacy and training to understand how it works. As a result, efforts must be made to educate individuals about mobile money and provide them with the necessary skills to effectively use this technology.

The following table summarizes the pros and cons of both payment options:

Payment solution	Pro	Cons
Treatment		
1 Mobile money	■ All registered suppliers must have a cellphone to register ■ Mobile ownership of approximately 81%	■ Needs the user to have a registered sim card with one of the providers
2 e-Dinar (post money)	■ 6m postal financial accounts, one of the highest ratios in the world	■ Access to the postal office ■ Of 1,030 branches only 600 are connected

3.2. Women Economic Empowerment

Defining empowerment is challenging as it involves a complex process that can have varying meanings in different contexts. The Bill and Melinda Gates Foundation (2019) has defined women's economic empowerment (WEE) as a transformational process that enables women and girls to move from having limited power, voice, and choice in their homes and the economy to possessing the necessary skills, resources, and opportunities to compete fairly in the markets, while having agency over their economic gains. To measure women's and girls' empowerment in impact evaluations, we follow J-PAL's practical guide (Glennerster et al., 2018) and utilize Naila Kabeer's (2008) definition of empowerment as "the process by which those who have been deprived of the ability to make strategic life choices gain that ability" . Kabeer (2008) also delves into the concept of empowerment through three closely interconnected dimensions:

- **Resources:** gaining access to material, human, and social resources that enhance people's ability to exercise choice, including knowledge, attitudes, and preference. Examples: access to capital, digital technologies and business training.
- **Agency:** increasing participation, voice, negotiation, and influence in decision-making about strategic life choices. Examples: control over income and expenditures, and control over time.
- **Achievements:** the meaningful improvements in well-being and life outcomes that result from increasing agency, including health, education, earning opportunities, rights, and political participation, among others. Examples: increased sales and economic profits.

Upon joining Daya, users are already able to experience empowerment in two dimensions, namely resources and achievements. Through our business training and credit services, users can gain access to resources, while our platform can support their achievements by helping them expand their customer base and increase sales. Given that data regarding resources and achievements are automatically collected, the study will focus on collecting information related to the third dimension of empowerment, agency, through a survey. The survey will allow us to understand the users' perceptions of their own agency and how it may have changed since joining Daya.

The Role of Mobile Money on Women Empowerment

The utilization of mobile money has brought about benefits such as enhanced resilience to economic shocks, decreased poverty rates, and encouraged entrepreneurship. Mobile money capitalizes on the use of mobile phones, providing a more convenient option for depositing and withdrawing cash. This has addressed some of the major challenges faced by numerous rural

female artisan entrepreneurs, including long distances to postal offices and cultural restrictions preventing them from leaving their homes for extended periods. Specifically for women entrepreneurs, Dupas & Robinson's (2009) research indicated that a significant portion of female micro-entrepreneurs in rural areas encounter considerable constraints when it comes to saving. In an experimental study, women who were granted access to formal savings accounts (such as mobile money accounts) utilized them to save money, leading to amplified business expansion and income.

3.3. Multiple outcomes & Hypothesis testing

The ultimate objective of the study is to investigate which payment solution (Post Money or Mobile Money) has a greater positive effect on women's empowerment (WE).

The data collected from all three dimensions of empowerment, combined with the use of the alternative payment options, will provide valuable insights into what the impact of the two payment methods is, and how Daya's intervention is contributing to the empowerment of its users since joining. In particular, we are interested in measuring the three following target outcomes:

- Reduced **individual** financial stress
- Increased time spent on **business**
- Increased time spent with **family**

The outcomes stem from the previously mentioned survey, which is crafted to assess agency using our unique set of dimensions. Our new dimensions aim to evaluate empowerment not only at the individual level but also at the business and family level, thus providing a comprehensive view of female empowerment in all aspects of the lives of Daya's users. The

questions asked per each dimensions are:

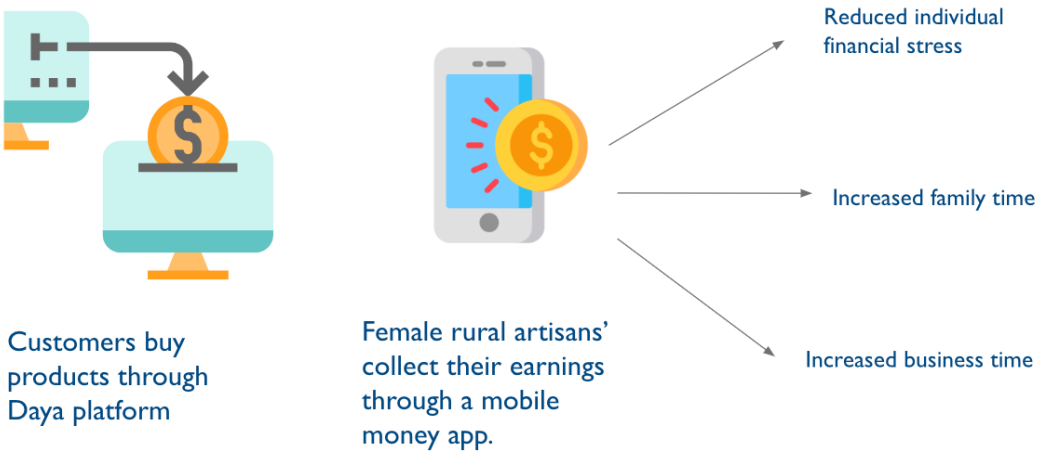
- **Individual**:
    - How easier has the business become for you?
    - How stressed are you about money?
    - How many hours have you spent on your own leisure in the past week?
- **Family:**
    - In the past seven days, how many hours did you spend with your family?
    - How much money have you spent in family in the last four weeks?

- **Business:**
    - In the past seven days, how many hours did you spend working in your business?
    - How much money have you invested in the business in the last four weeks?

3.4. Treatment, channel and targeted outcomes

The main goal of this study is to examine which payment option (Post Money or Mobile Money) has a more significant positive impact on women's empowerment (WE). To accomplish this, Daya users will be divided into two groups. The first group, the control group, will continue to use post money as the collection method since it has been the preferred method until now. The second group, the treatment group, will utilize mobile money instead, and women in this group will no longer have access to post money. As above mentioned, our targeted outcomes tackle three dimensions of the lives of Daya's users, but the channel through which we will measure the targeted outcomes will be the uptake of the mobile money app to collect earnings by the users.

A simplified version of the study for the treatment group can be found below:



4. Research Methodology

Our study will leverage a Randomized Control Trial (RCT) covering 6,800 Daya users from six northwestern regions of Tunisia: Beja, Jendouba, El Kef, Siliana, Tunis and Manouba.

These regions were selected due to the established presence of the cooperative ACEA (Action Collaborative pour les Exportations Artisanal), as the organization had already built a relationship of trust with artisanal groups within the selected regions. Our aim is to partner up with ACEA to ensure participation and to use the higher concentration of urban artisan

entrepreneurs in the Greater Tunis region as a means to balance the sample selection. In fact, the regions were selected due to the variation in assumed distances from post offices, with Tunis and Manouba being assumed to be the regions with the highest concentration of branches, compared to the more rural Jendouba and Siliana

4.1. Enrollment Criteria and Assignment Protocol

The study utilizes all current users of Daya as participants, while continuing the standard process of active artisan recruitment. Users need to be considered a microenterprise, defined as those ones declaring from one to nine employees (OECD, 2023), which targets our chosen population of under-represented female-led businesses. To be eligible for sample selection, the women must be enrolled and active within the platform, meaning that the artisans must have fulfilled at least one order through Daya by the start of the data collection process. Considering the platform only allows one account per user, duplication should not be an issue unless intended, and the data collected should be consistent with real-time user information.

The users in the treatment group will be prompted with a pop-up advertisement promoting the use of the mobile money app as an opt-in program that is exclusively available to them. They will be provided with step-by-step guidance on how to use it through tutorials and instructional videos. The cooperatives will also be available to instruct women in how to use this system, and pamphlets will be distributed to artisans during the usual monthly product pick up to encourage participation in the selected areas.

The control group will consist of women already enrolled in the platform and utilizing postal money. The treatment and control groups will contain an equal number of participants. To

account for spillover effects (i.e., woman artisans who are well-connected might inform the control group about the new mobile money program), group assignment will be conducted at the village level. If a village has fewer than 17 entrepreneurs, clustering will be done at the village level. In case of larger towns or cities, clustering will occur by area or neighborhood, assuming that the level of contact or communication remains consistent across both rural and urban areas.

Our weights will be based on the 2014 Population and Housing Census (NIST, 2014), with the 400 planned clusters being distributed evenly across the six regions. These records will allow us to take into consideration family size, connectivity levels, and potential difference in access to the Daya platform by users, as well as categorizing each cluster as either rural or urban.

4.2. Data Collection and Processing

The data required for our study will be gathered from two different sources:

- **Daya platform's database:** for *Access* and *Achievement* metrics, which include personal and business performance data (e.g., sales and revenue). This information is automatically saved within the platform.
- **SurveyCTO:** for *Agency* metrics. A ten-minute survey will be deployed to collect data from our own developed dimensions being individual, business and family, thus pr
- oviding a comprehensive view of female empowerment in all aspects of the lives of Daya's users.

The ten-minute surveys will be delivered through the platform, which will automatically store the information within an encrypted database. New users will be automatically selected into the treatment group and will receive instructions to navigate the mobile money app directly,

potentially allowing to increase the initial takeup. Existing users will just be prompted to sign the consent form, upon which both will be directed to answer the initial baseline survey. By conducting the surveys online through SurveyCTO, it is possible to enhance the accuracy of women's responses. This is because many women can answer the questions privately at their own convenience, without the influence or pressure of their spouses or other family members.

4.3. Survey Design and Content

The objective of the surveys is twofold, first to obtain additional personal and business information needed to compare baseline characteristics and to use as controls within our regression models, and second to measure agency. The questions included in the survey were designed based on our Women Empowerment Framework, particularly from the agency dimension, from where our three outcomes of interest derive from. These three primary outcomes are asked in the following way:

1. **Financial stress.** *Do you feel less stressed about money?*

   A likert scale question to measure how women feel about their financial status. Interviewees can select from five different answer choices: Strongly agree, agree, neutral, disagree, and strongly disagree.

2. **Business time.** *In the past seven days, how many hours did you spend working in your business?*

   A numeric, open-ended question to determine whether women increased or not the amount of time they spend growing their business.

3. **Family time**. *In the past seven days, how many hours did you spend with your family?*

   A numeric, open-ended question to determine whether women increased or not the amount of time they spend with their families.

In addition, the survey will ask questions regarding:

- **Personal information.** Name, age, marital status, number of children in the household, mobile phone and SIM Card ownership.
- **Business-oriented information.** The main objective of this section is to determine whether women receive any help (paid or non-paid) from family or colleagues. Given the local cultural context and the informal practices among many microenterprises in these regions, it might be possible that the help received is voluntary. In an effort to account for any type of business support, we ask the following questions:
    - How many people (including you) work in your business?
    - Are any of these workers volunteers (non-paid)?
    - How many volunteers?

4.4. Program Procedure

In the study, participants assigned to the treatment group will use the Daya platform, but only with the mobile money app option enabled for collecting their earnings. Meanwhile, those in the control group will have the standard option of receiving their earnings via post money. It is important to note that both groups will still be able to use the Daya platform and its services in the usual manner.

As mentioned, users in the treatment group will see a pop-up advertisement encouraging them to participate in the mobile money app program, which is only available to them as an opt-in option. The opt-in advertisement will inform users that choosing the mobile money app option means they will no longer have access to collecting their earnings in postal offices. While support will be available to address any issues with the program, this restriction is necessary to avoid spillovers and prevent cross-contamination between the control and treatment groups.

After, the outcomes of both the control and treatment group in each region will be evaluated, and their respective differences will be compared to those of the other five regions. The purpose of this comparison is to determine whether any disparities in product selection, percentage of rural distribution, or proximity to postal services may have influenced the program's success or failure.

The specific regression formulas are specified below:

$$\Delta business\_time_{it} = \Delta\beta_1 mobile + \Delta\beta_2 help + e_{it}$$

$$\Delta family\_time_{it} = \Delta\beta_1 mobile + \Delta\beta_2 help + \Delta\beta_3 sales + e_{it}$$

$$\Delta stress_{it} = \Delta\beta_1 mobile + \Delta\beta_2 help + \Delta\beta_3 sales + e_{it}$$

Where:

Model 1 analyzes the variation in the time allocated to one's business, taking into account the payment method used and whether any assistance was received for the business.

Model 2 assesses the variation in the time spent with family, accounting for payment type, received aid, and sales difference. It is presumed that having more income would lead to increased family time.

Model 3 analyzes the difference in the likelihood of experiencing stress when accounting for the aforementioned three variables.

The variables used are:

- *business_time* : the hours spent investing, working and caring for their artisanal business
- *family_time* : the hours devoted to taking care of family members, performing household tasks, or enjoying leisure activities with immediate family members.

- *stress* : using a dummy to determine whether a woman is experiencing financial stress or not, where 0 represents stress and 1 represents no stress.
- *mobile*: using a dummy to determine if an user is utilizing the mobile money option as per her assignment. In this case, it is assumed that participants who opt for the treatment will be required to utilize the mobile money app exclusively. This choice of options is mutually exclusive. Although participants are free to revert to the postal service, doing so will result in their classification as "attrition." The research team will continue to track attrition throughout the study period.
- *help*: a dummy tracking if a woman is conducting her business activities on her own or if she is receiving any assistance from other people.
- *sales*: the difference in the number of items sold by each user between the baseline and endline evaluations.

4.5. Collection Frequency

Throughout the project, we will implement a total of five surveys: one baseline, three midline, and one endline survey. Our data collection will start by obtaining several baseline figures from the users participating in our intervention, including current sales and information on any possible help received. After month three, six, and nine, new data on the same variables assessed at the baseline will be collected to more accurately measure changes in the targeted outcomes over time. These midline surveys will also include data quality checks (High Frequency and Back-checks).

At the 12-month mark, an endline survey will be administered to all participants, containing the same questions as the baseline survey except for the demographic inquiries. The information gathered from the midline surveys will not only supplement the findings from the endline survey,

but also assist in confirming the actual effect of the intervention, that is, to ensure that the growth of the user's business was not influenced by any other activity beyond Daya.

4.6. Data Privacy

Our data collection process will adhere to the Minimal Data Collection standard, which means we will only ask for relevant and essential information. However, we will still retain some Personally Identifiable Information (PII) such as the names of survey respondents, date of birth, and geospatial data, to ensure each participant is unique. This PII will help us determine which payment method (mobile money or post money) is more effective in promoting economic empowerment among Daya users. Before publishing any public data, we will obtain explicit consent from program participants.

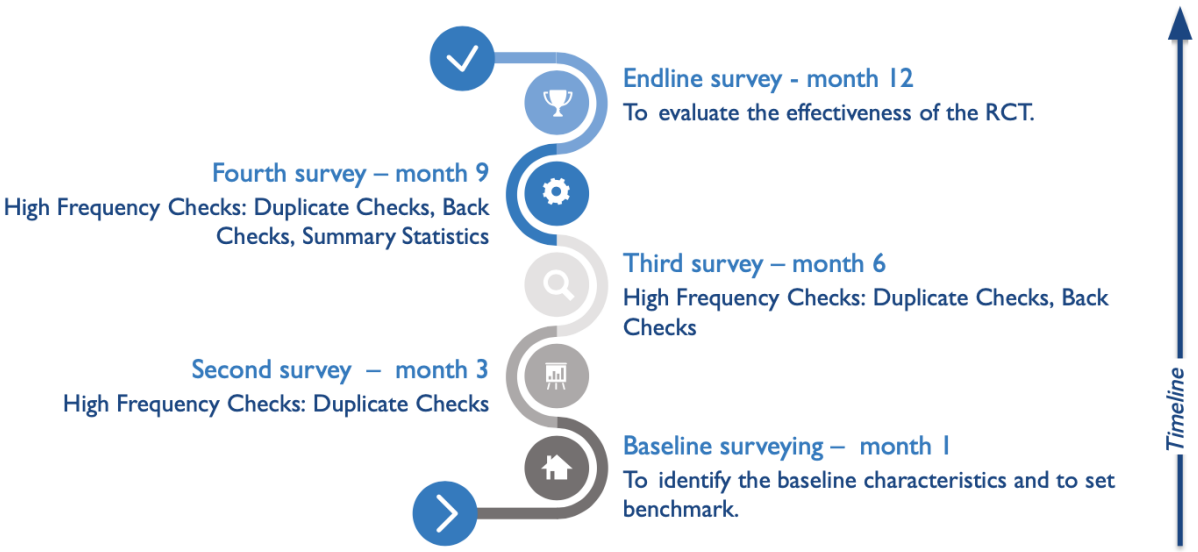
The SurveyCTO form used to survey participants will be encrypted to ensure the privacy of the information shared by the respondents. Once downloaded, the PII collected will also be protected by storing it into an encrypted folder, and later encoded to ensure that the data remains private and safe from third-party actors.

4.7. Timeline

Our timeline includes approximately two months to complete the research design process, such as choosing the sample size, meeting ethical requirements, preparing the consent process and data management. The intervention is expected to last one year, with the five following data collection stages:

1. **Baseline survey (First week)** - To gather information on the initial state of the various target outcomes.

2. **Second survey (Month 3)** - The first midline survey will be conducted to check the quality of data collected so far through High Frequency Checks. These checks will identify any data irregularities such as duplicate observations.
3. **Third survey (Month 6)** - A second midline survey will be conducted which will include High Frequency Checks as well as Back-checks (BCs). The BCs will be used to analyze how respondents' answers have changed between the baseline and intermediate surveys. These back-checks are short, audit-style surveys that will be administered to respondents who have already completed the survey.
4. **Fourth survey (Month 9)** - In addition to High Frequency Checks and Back-checks, the third intermediate survey, at this point, the data collection transitions into data analysis. The creation of summary statistics will be initiated.
5. **Endline survey (Month 12)** - We will conduct a final data collection to assess the impact of our RCT by comparing the changes in outcomes from the baseline survey. This will enable us to evaluate the effectiveness of our intervention.



4.8. Power Analysis

Given the limited data available, we made assumptions on the baseline levels of the outcomes under study. The power analysis was based on an alpha level of 0.05 and a power threshold of 0.8, with the recommended number of clusters being 400, each consisting of 17 artisans. The Minimum Detectable Effects at varying levels of rho for each outcome are presented in the table below, including the absolute difference in the number of hours spent on business or family and the percentage point change in the probability of a woman experiencing financial stress.

Minimum Detectable Effect Size			
Business Time	*Family* Time	*Individual* Financial Stress	Rho
.1442	.1537	.01074	.1
.2154	.2296	.01611	.3
.2683	.286	.02014	.5
.3124	.333	.02352	.7

5. Limitations of the Research Design

While data collection will be automatic, and the design allows for a lower chance of spillover, there are several threats to internal and external validity that would need to be addressed before rolling out the intervention.

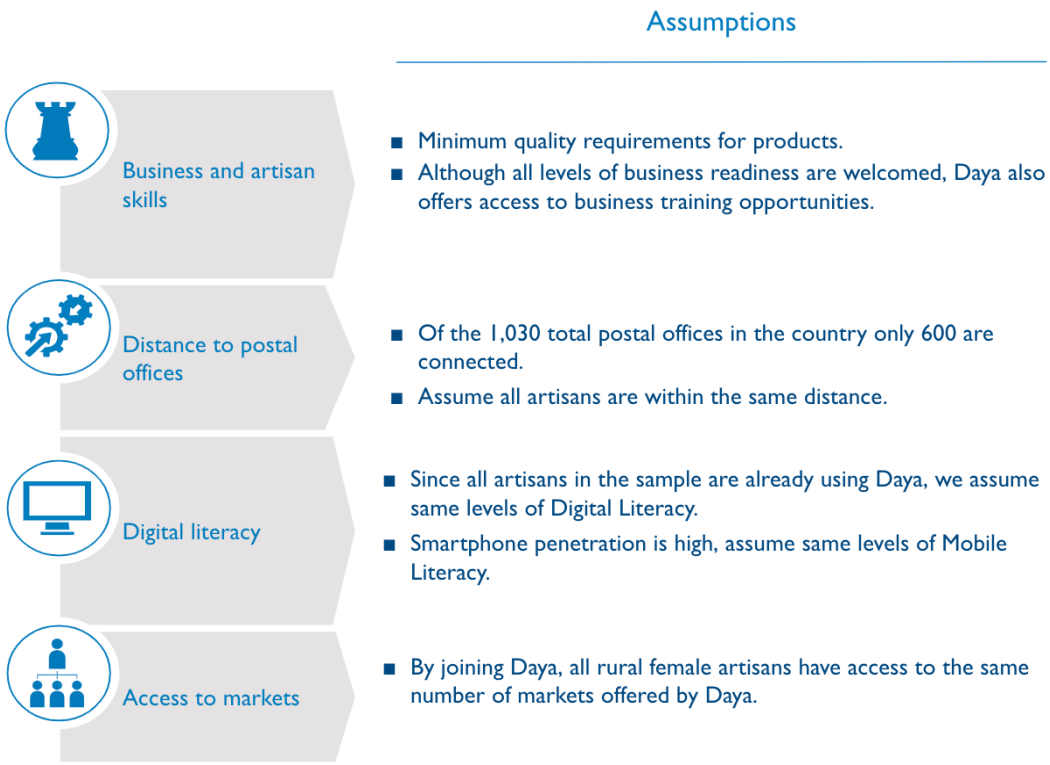
5.1. Data Bias and Attrition

Since the mobile money app payment option is voluntary, women assigned to the treatment group may choose not to participate. Several factors could impact the program's uptake, including familiarity with digital currencies, the inconvenience and expense of traveling to post offices, or preference for cash transactions. While the first two factors are controllable through confounding variables or fixed-effects modeling, the latter may vary across surveys and result in biases in self-selection within the program.

On the other hand, common issues such as attrition, artisan death, or business shut-down could affect the follow-up sample size and skew results toward more successful enterprises or younger artisans more comfortable with digital tools. It is crucial to address these data collection issues as early as possible to avoid potential errors during analysis.

5.3. Assumptions

The study's scope is confined to Daya platform users, and as a result, certain assumptions were made to establish the baseline characteristics. These assumptions include the belief that all users have the same level of access to markets, business skills, and digital literacy because they have joined the Daya platform, which provides the same services to all users without distinction. Additionally, the addresses of the users, which are accessible via the Daya database, were used to determine the six Tunisian regions where the intervention would take place. A summary of the assumptions is found below:



5.2. Potential issues and proposed solutions

Our proposed timeline consists of approximately two months dedicated to the research design process, which includes determining the appropriate sample size, meeting ethical requirements, preparing the consent process, and establishing data management procedures. One of the most challenging aspects of this process will be obtaining accurate housing data to assign each user to the correct district cluster, and collecting sufficient data to justify adjusting for postal offices access. Moreover, it is crucial to define the criteria for urban-rural differentiation and to determine the extent to which limited access to postal offices qualifies businesses as "rural" or precludes female participants from the control group. Our primary objective is to enhance the generalizability of the program's outcomes, given that the sample population is limited to female artisans using Daya's platform, which may impede the applicability of the findings to other digital payment programs in the MENA region. Furthermore, we intend to proactively monitor

potential data collection issues, such as attrition or business shutdown, which could impact the follow-up sample size and introduce bias into the analysis.

A further challenge that may arise in our program is the effectiveness of the tutorials provided to the users who are taking up the mobile money app. Additionally, we must take into account the potential willingness and capacity of the participants to accurately complete the survey. To address these concerns, we will first, meet with some artisanal women to understand the best approach, and second, pilot the questionnaire and establish contact with the district assigned ACEA members. It is crucial for the surveys and tutorials to be simple and intuitive to reach a wide range of digital literacy levels.

During the initial half of the testing period, we will send participation notifications to users and process consent forms for randomized selection. To prevent selection bias, it is essential to execute this process without knowledge of the users' location, business size, or predicted outcome. Restricting the sample to six regions creates challenges in monitoring the cash collection activities of the control group, as they may not utilize the postal offices available within their assigned districts. One potential solution to this issue is to offer users a few selected postal offices that provide financial services. However, this approach may introduce geographical bias and require a significant number of staff members for effective data collection.

After the three-month data collection period, a staff member will be hired to clean and process the collected data, which will incur additional costs that need to be accounted for in the project budget. Nevertheless, the majority of the budget will be allocated towards promoting the take up of the mobile money app for the treatment group. This will include funding cooperative

campaigns, sponsoring informational materials and events, and hiring a mobile money app supplier to prepare Daya's platform for the intervention.

6. Study implications and potential conclusions

The findings of our study will have significant implications for the Daya platform. If the study concludes that the use of mobile money increases Daya users' empowerment, the goal will be to encourage users to adopt the mobile money app. To achieve this objective, nudges will play a crucial role in motivating users to opt-in for mobile money. Some strategies that may be employed include designing awareness campaigns and expanding training programs to ease the transition from cash to mobile money accounts.

Moreover, the study's results will contribute to mobile money research in Tunisia. While the study is limited to Daya users, its findings provide evidence of the impact of mobile money on women's empowerment. If mobile money is found to have a significant effect on women's empowerment, we recommend that the Tunisian government develop policies that support women's entrepreneurship and participation in the economy to capitalize on mobile money's potential. In this case, we suggest that Tunisian policymakers revise their financial regulatory framework to create an environment that facilitates the use of mobile money. The policies should target reducing the cost of mobile infrastructure, including mobile devices and SIM cards, and promoting interoperability among mobile operators. Additionally, the government should enact regulations on consumer protection, cybersecurity, and personal data protection to foster trust in digital services. Finally, while our study did not assume any digital literacy barriers, it is essential to enhance digital education efforts to accelerate the adoption of mobile technologies.

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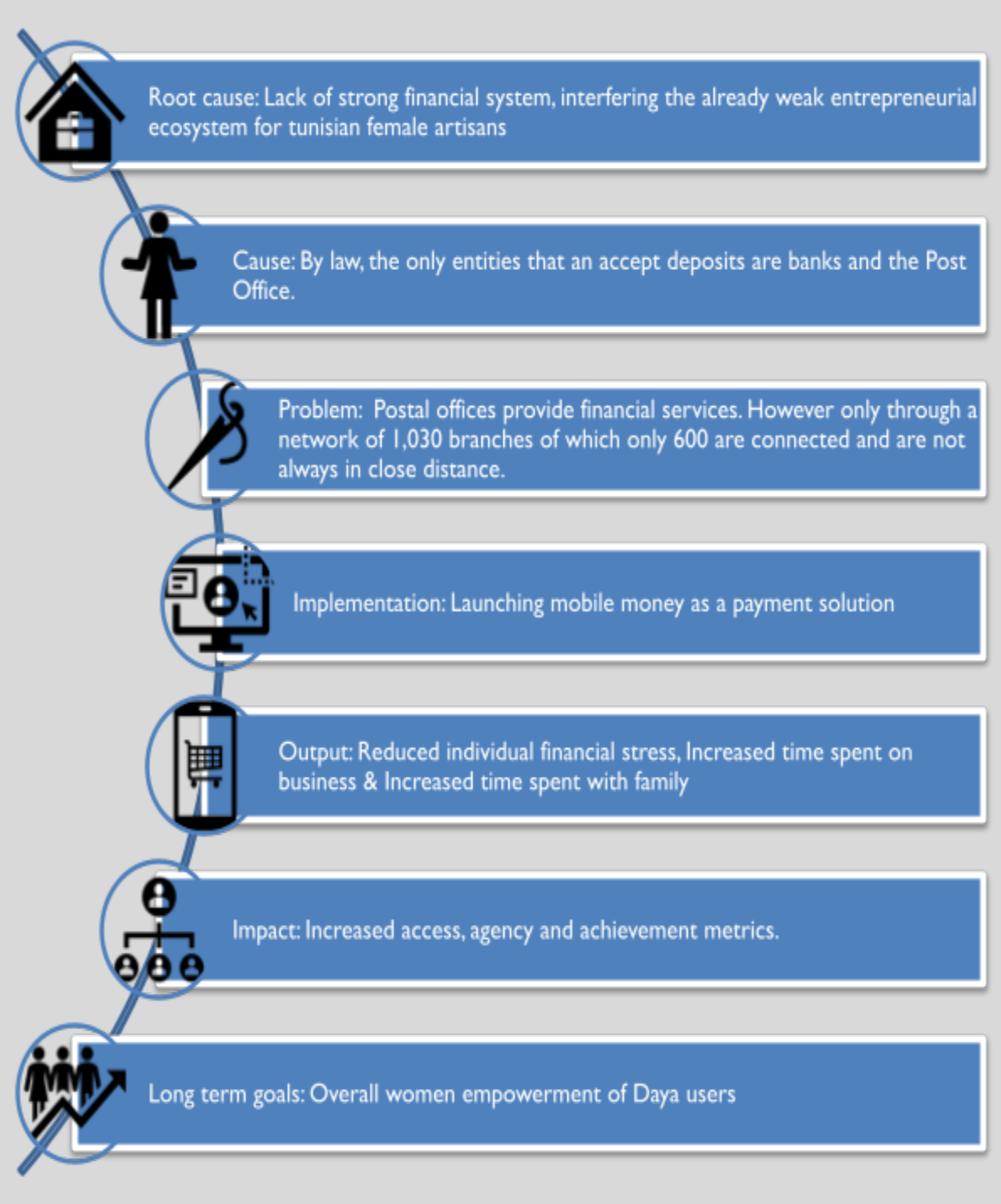
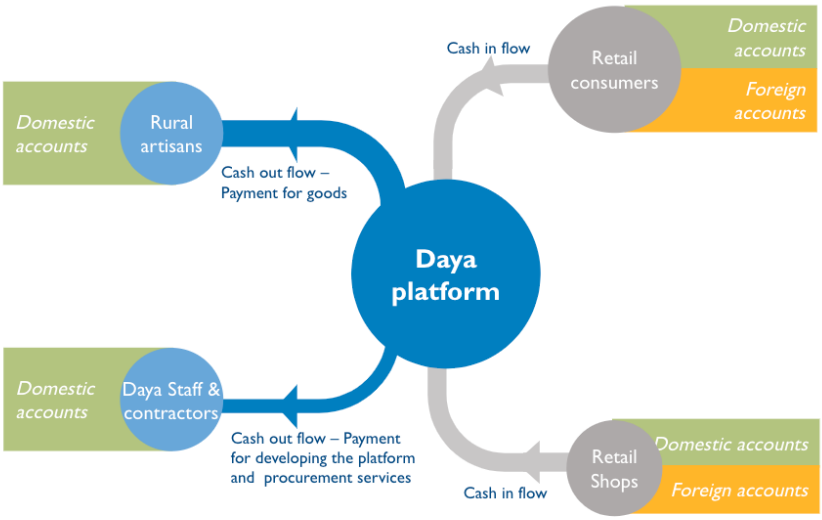
APPENDIX

Theory of Change



Playing as an intermediary and market connector, Daya has to secure payment and transfers within the regulatory context



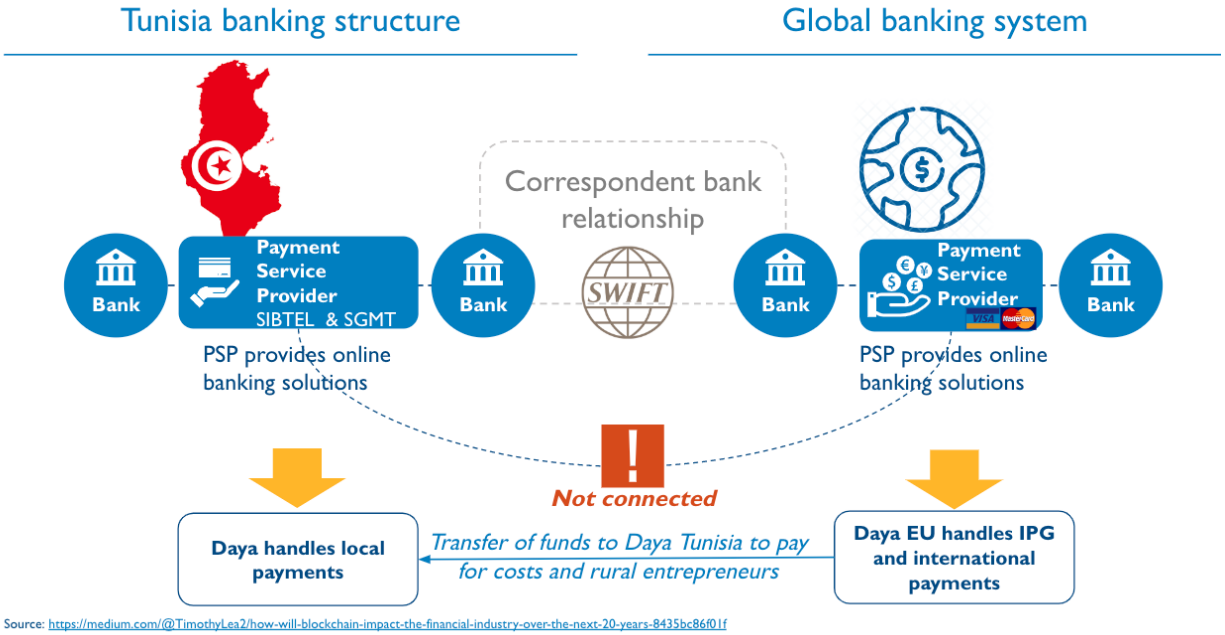
Trade & export regulation

- Licenses are not required for the majority of exports
- No tariffs on exports
- The following documentation is required in order to export goods from Tunisia:
  - Certificate of origin
  - Bill of lading
  - Commercial invoice
  - Customs declaration
- Given the Tunisian dinar's status as a non-convertible currency, cross-border eCommerce purchases are not possible except with specific authorization from the Tunisian Central Bank
- Following passage of the Start-Up Act, the Central Bank outlined a procedure for **qualified companies** to open **hard-currency accounts**

Source: International Trade Administration- https://www.trade.gov/country-commercial-guides/tunisia-ecommerce, BNP Paribas report on Tunisia, https://www.ppro.com/countries/tunisia/

Daya Platform · Customers · Suppliers · Foreign currency · Domestic currency

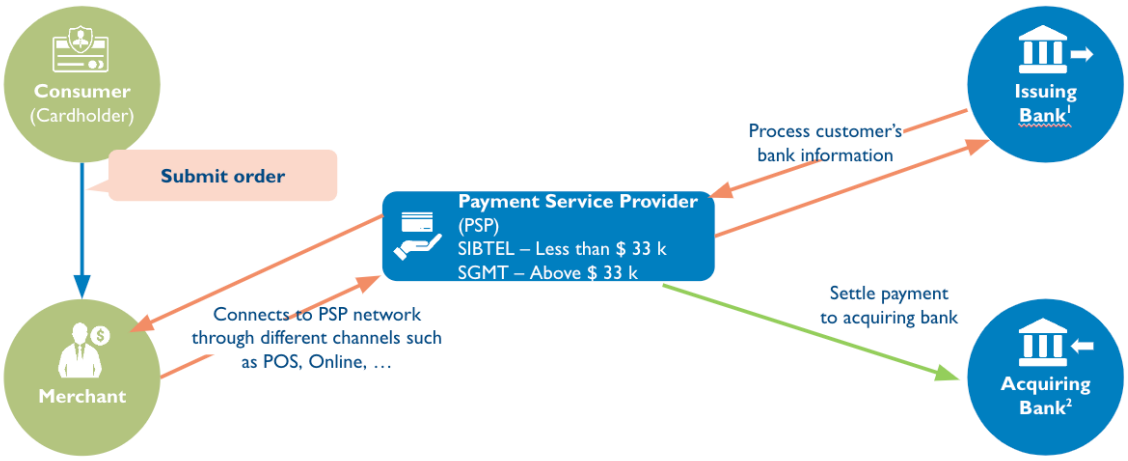
Daya can set up a legal entity abroad to provide international online payment solutions, while handing local payment by a local legal entity



Source: https://medium.com/@TimothyLea2/how-will-blockchain-impact-the-financial-industry-over-the-next-20-years-8435bc86f01f

Tunisia has two payment service providers, categorizing the transactions based on the value of transactions

Money flows for payment transactions in Tunisia



Source: BNP Paribas report on Tunisia,
Note: 1)Customer bank 2)Merchant's bank

Use payment method

Purchase transaction

Balance inquiry

2