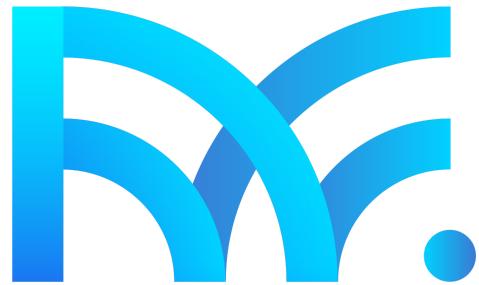


Proposal for A Digital Wallet Solution for Sierra Leone



Netwire Limited

3rd Floor West Wing, Volta Place,
Airport Residential Area,
P. O. Box KIA 30414, Airport, Accra, Ghana.



Background	3
Netwire Limited – Quick Facts	3
About Netwire Limited	4
Intent and Objectives	4
How it will be Achieved?	5
What is Netwire EasyPay?	5
Marketing Plan	9
Implementation Framework & Methodology	10
Requirement and Delivery Responsibility Matrix	14
Proposed Project Timeline	14
Project Management Structure & Team Composition	15
Post-Production Support Framework	15
Support Framework	17
Primary Single Point of Contact	18
Appendix A	19
EasyPay Features & Services	19
Process Flow: Sign Up & Log In	20
Process Flow: Deposit/Cash In from Agent	21
Process Flow: Deposit/Cash In from Bank Account	21
Process Flow: Withdraw/Cash Out	22
Process Flow: Send Money	22
Process Flow: Mobile Airtime Recharge	23
Process Flow: Merchant Payment	23
EasyPay User Categories	24



Background

NetWire Limited is proposing a disruption of the Sierra Leone digital payments landscape by bringing to market a Digital Wallet that is directly targeted at commercial activity. The idea is to put a simple, fast, easy to use, network agnostic and secure payment application in the hands of consumers (who we already know from the success of mobile money love the convenience digital payments offer) wherever they do commerce.

Because of the quick transaction facility that digital wallets allow both from individual to individual and individuals to businesses, technology has been able to become the most used element of the FinTech Industry in countries like USA, Denmark, China etc. Mobile commerce is the dominant factor driving strong digital payments growth, due to rising smartphone adoption, an increasing shift towards online shopping, and improvements in network bandwidth. According to the 2018 McKinsey & Company Global Payments Report, mobile commerce accounts for 48 percent of digital commerce sales globally as of 2017 and is forecasted to reach 70 percent by 2022 (tripling to \$4.6 trillion). More and more consumers are getting access to mobile phones and the internet. In just four years, global mobile internet penetration has risen sharply, from 29 per cent in 2013 to 43 per cent in 2017, and is projected to increase to 61 per cent by 2025. In Sub-Saharan Africa, this has risen even faster, doubling in the last five years to 21 per cent. An additional 280 million subscribers are estimated to come online between now and 2025.

A Government backed approach towards Digital Financial Services is a sure means to promoting a financially inclusive economy and converting Sierra Leone into a cashless society. As smartphones become ever more pervasive in our society, consumers are gradually warming to the convenience that using a phone's digital wallet feature provides. Think of the digital wallet as an electronic storage center where customers can securely keep their encrypted financial information.

Netwire Limited – Quick Facts

Name of Company	Netwire Limited
Registered Address	3 rd Floor West Wing, Volta Place, Airport Res. Area P. O. Box KIA 30414, Airport, Accra.
Telephone	+233 (0) 302 781 124
Website	www.netwireghana.com
Email	info@netwireghana.com
Type of Company	Private Limited



About Netwire Limited

Netwire Limited is a privately Ghanaian owned Fintech company limited by shares and duly incorporated under the laws of the Republic of Ghana. The company was founded by serial entrepreneurs and a technology professional who has extensive knowledge of the financial technology sector backed by a strong Advisory Board and a management team of experienced financial services, operations and IT professionals.

Netwire Limited is a Turnkey solution provider and a specialist software vendor that has a footprint in the Financial Inclusion domain. Backed by one of the world's leading players in Financial Inclusion, our focus remains primarily in branchless banking solutions. With highly trained and knowledgeable resources in the business of Financial Inclusion and Fin-Tech, our single-mindedness allows Netwire to constantly innovate new ideas and services together with our clients to help create competitive products.

Our keen specialization in designing & developing Software products for the 21st century along with our national and international partners makes Netwire unique compared to other solution providers in the market.

Intent and Objectives

The intent of this document is to provide the requirement analysis, a business case and technical proposal for developing a Digital Wallet for the Sierra Leone market in collaboration with a local Partner Bank.

The objective of this project is to design, develop, demonstrate, refine and deploy a Multi-Channel Payment Solution with a Digital wallet which can facilitate payments for goods and services.

This document will cover the following technical issues:

- Project Requirements
- Project Deliverables
- Project Resource Information
- Development Timeline
- Project Development
- Delivery and Deployment Methods
- Project Risks and Opportunities
- Change Management
- Security Issues related to the Project



How it will be Achieved?

As banks are looking to add value beyond traditional banking services, including providing relevant offers to consumers for their business, the Digital Financial Services era has exposed new opportunities to reach the unbanked population and expand into new areas of doing business. It has become obvious that digital wallets will bring a great deal of value to banks.

Delivering a standout digital wallet user experience can only be achieved when experts from each part of the customer's buying journey come together. Based on our experience in technology and banking, Netwire has developed a Unified Payment Platform enabled Digital Wallet that will be the most effective Strategy cover ground in financial inclusion efforts and provide a superior service for consumers.

An efficient checkout process is the biggest advantage offered by digital payments around the world today. It offers a high conversion rate, as it is a very pleasant and uncomplicated means of payment for customers. By controlling the checkout process we can guarantee the success of our digital wallet by building a comprehensive merchant network for payment acceptance. With the transfer of the funds to the merchants after payment being processed immediately, this will have a profound effect on the economy.

What is Netwire EasyPay?

The Netwire EasyPay is a USSD and Mobile App based Digital Financial Service (DFS) which uses QR codes for transfer and payments. The EasyPay is a combination of USSD and mobile application-based wallet platform that can be used by feature/ÿam" phone and also by Smartphone of Android or iOS operating system. Using the app, customers can add multiple debit/credit cards and mobile banking information, by which they can make payments while purchasing from physical shops and online stores. Users can either scan QR codes to complete transactions or send payment via Merchant ID or NFC where there is a POS.

Through the USSD channel, any feature or ÿam" phone can be part of the EasyPay and they can use the basic functions of the platform. With the EasyPay E-Wallet, a person can also store his/her credit cards and banking information inside to access source of funds with their phone at anytime and anywhere. A person can make payments without entering card or account information every time once he/she has registered and created an E-Wallet.

For sending or receiving money or even paying physical or online merchants, Netwire will integrate a QR code which can simplify the payment process through the mobile app.

Benefits to Customers:

1. Users can store multiple bank cards and account information in the app for repeated use for remittance or payments.



2. Users can purchase from physical shops and online stores without hassle.
3. Users can utilize the QR code feature to complete transactions as fast as cash.
4. No need for SME customers to handle cash, as they can manage all their sources of funds in one app.
5. With USSD support, users can access their wallet via any phone.
6. Transactions are as fast as cash and even more secure.
7. Easy adoption through self-registration feature that will complete KYC process automatically via GVIVE and NIA database.
8. Capability of receiving cash before registration - Tokenization.
9. Customers will have access to all their funds in one app 24/7.

In today's world new payment technologies are emerging such as cards, e-wallets, cryptocurrency, invoicing, ACH etc. and this requires a more agile approach to payment processing for merchants eliminating the hassle of managing multiple partners for multiple types of payments. While payment services traditionally have been provided by banks, the emergence of technology is leading into a new era of Payment Services Providers for merchants of Micro and SMEs providing not just payment solutions but also an array of back office software solutions making them more efficient.

With Netwire EasyPay, merchants are able to offer their clients a secure way to make payment for products and services from their bank accounts, debit cards or credit cards, proprietary cards, mobile money, digital wallets as well as mobile banking and internet banking.

Robust and feature-rich, the gateway delivers processing of all international credit/debit cards, online direct debit, and many global alternative and local payment options. E-commerce and brick and mortar merchants will rely on the gateway's extensive risk management functionality to minimize fraud exposure and liability, and the Netwire back office suite delivers real-time data and comprehensive reporting.

It has become evident that small merchants are underserved by present payment systems and that opened a huge opportunity exists for convenient means of digital payments. Small merchants remain unserved/underserved by Digital Payments as conventional payment technologies are designed mostly for relatively larger payments and companies.

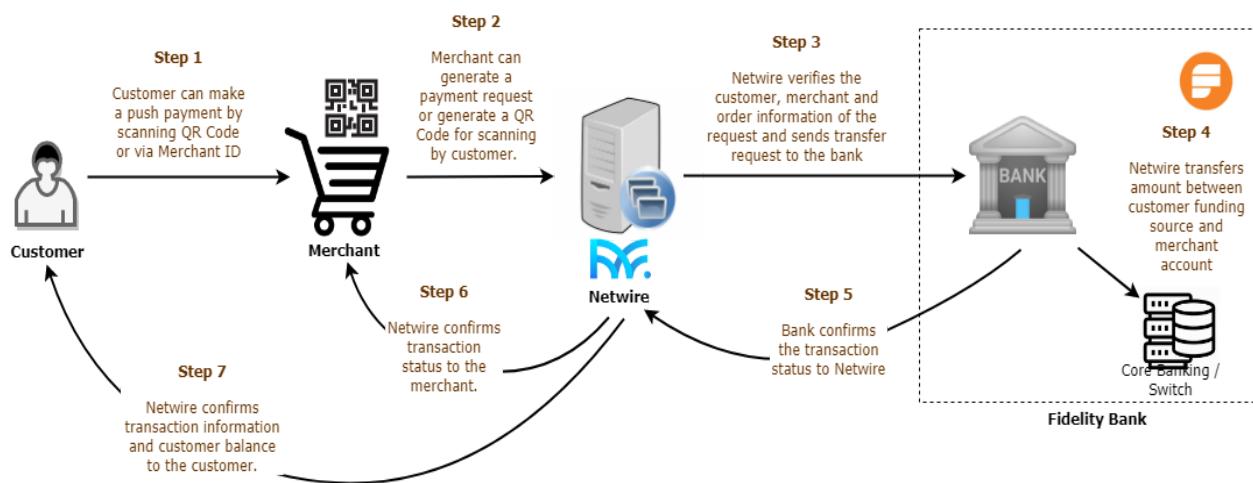


The design of the Netwire EasyPay backed by a Unified Payment Platform is structured in such a way so that it can facilitate payments from all existing and advanced technologies. It uses encryption and an end-to-end data authentication system to assure clients of security. Netwire will also developed e-commerce websites for many companies with integration to the Payment Gateway for transferring payments from the customers' funding source to merchant's account or wallet.

Benefits to Merchants

1. Supports all major domestic and International credit cards, mobile money, digital wallets & domestic bank accounts (over secured connectivity to the payment processor).

2. Future proof as any new payment method can be integrated at a single point enabling acceptance by all customers.
3. One contract per merchant for acceptance of all payment methods.
4. Tailored solutions to suit any type or size of business be it in-store, online or mobile.
5. Provide customers with one point of contact for support for all their payment needs.
6. Wide ranges of transaction reporting for merchants providing easier ways to reconcile payments with purchases.
7. Give customers the flexibility to choose their payment acceptance based on what best suits their business and industry needs.
8. Pave an easy path for businesses into E-Commerce with no coding knowledge requirements and provide support to online businesses in setting up merchant accounts.
9. Provide merchants with extra value-added features such as Loyalty and Invoicing services.

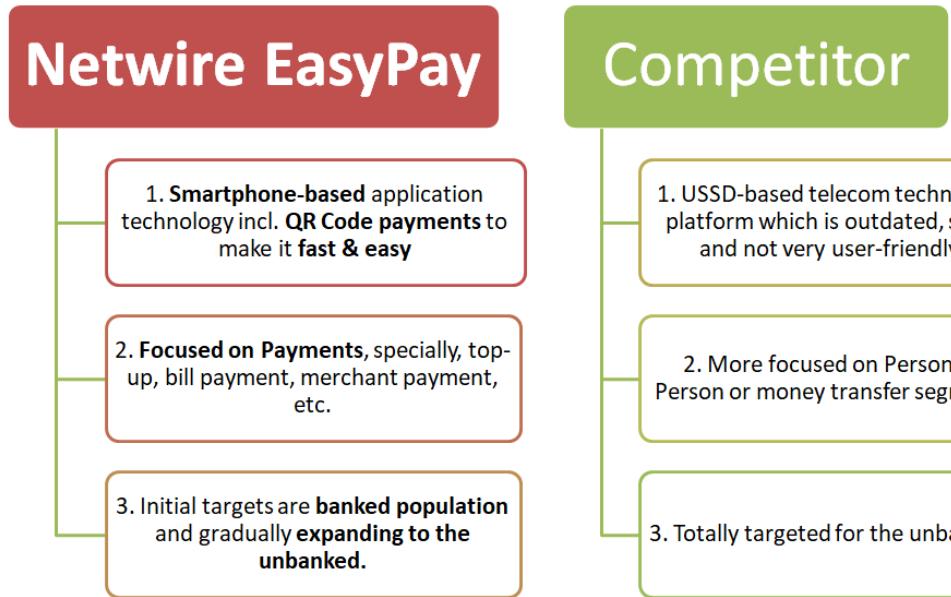


Benefits for Bank

1. Control of a Nationwide Payment acceptance platform with low/no additional investment for merchants.
2. Ability to provide a unified payment platform to your SMEs, Business Banking and Corporate Customers that will provide additional revenue streams.
3. Potential to increase the Bank's customer base by cross-selling banking services to the unbanked.
4. A good source of Cheap funds



5. Additional features such as integrated loyalty programs and other potential add-ons could help drive consumer interest in banking services.



Marketing Plan

Netwire can integrate comprehensive promotional activities to make the use of EasyPay a practical option for the people of the country at large.

- Full internet and digital marketing will play a key role in promoting these services. Because urban customers will be the first to adopt this service. Examples include banner advertisements, pay per click, targeted email lists, achieving higher search engine rankings and higher level of website traffic and so on.
- Social media marketing such as through Facebook will also be an important tool to bring our services to the younger educated people easily and increase social media outreach.
- The mobile operators may work with us to promote the Wallet service to consumers and demonstrate how they could use it if there is revenue share for them.
- Netwire can also promote the E-Wallet services through placing billboards on different locations of the country.
- Netwire will organize various events to demonstrate to attendants our services and show the practical usefulness of these services in the context of our country.



- Netwire will employ a specially trained marketing team to reach more merchants to enable their wallets at different retail and business locations around the country.

Netwire and their partner Bank will form a special project management team who would be committed to ensuring sound strategy and planning to spread this platform around the country. Their tasks are given below:

- They will assess the market for taking suitable distribution strategies.
- While taking strategies, they will focus on how to increase service coverage, service base and market share of E-Wallet service.
- The most important plan will include managing support from the government which has always been interested in bringing the whole country under digital services.
- One of the many distribution strategies would be to increase digital payments use for commerce in our country.
- This distribution team would work on strengthening people's trust level so that they feel secure about Digital Payments through the EasyPay. Customers should feel assured that the whole system would be free from risks of unauthorized access to their records.

Implementation Framework & Methodology

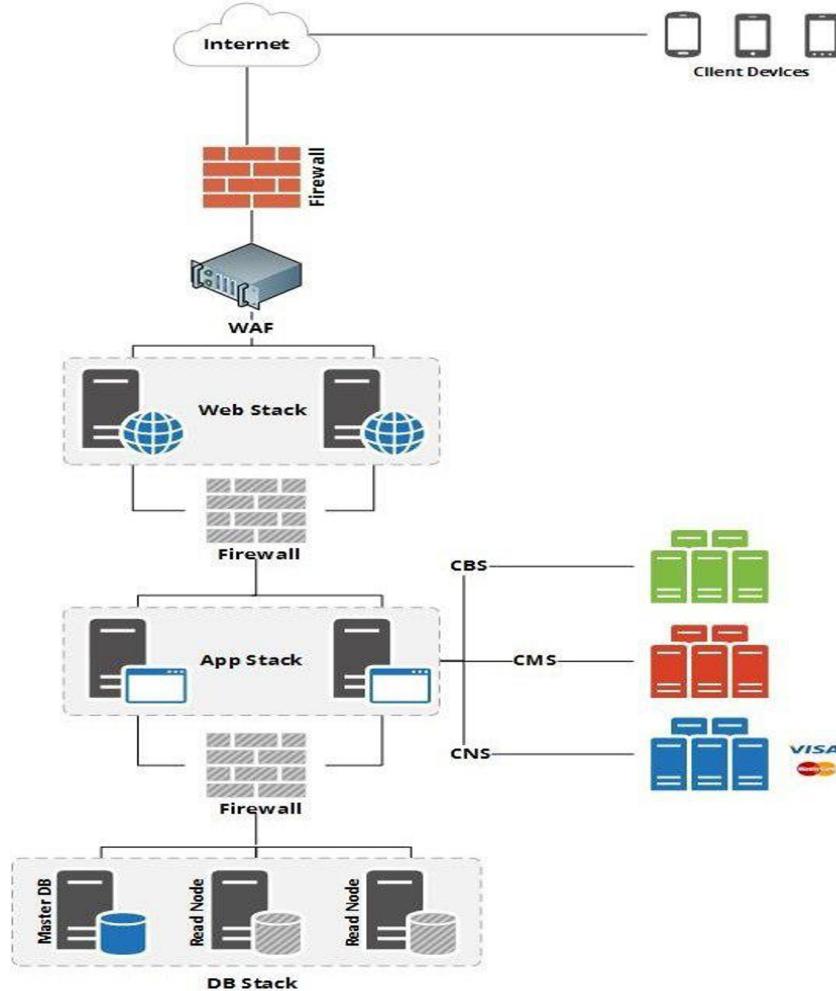
The main purpose of this project is to develop, deploy and manage a Digital Financial Services Platform to provide customers across the country a platform from which they can conveniently conduct commercial activities.

The project will establish a one-stop solution for mobile based payments. This solution package will help users to make maximum use of the Digital Financial Services from a secure mobile-based application. The mobile application will be platform independent, light, user friendly and surely safe.

In the following sections, we have described the methodologies and approaches of development of the Digital Application.

System Architecture

The conceptual system architecture of the Entire Platform is given below.



Development and Deployment Approach

The Applications Stack for the EasyPay E-Wallet platform have been fully developed and tested so therefore would only be configured and deployed during the execution of this project.

As we are going to implement the project within a very short time with fixed requirements, we would like to follow the Agile Model of Software Development. The lifecycle of this model which will cover mainly Front-End application development, integration into Core Banking Systems and other independent services that will provide the needed interactions with the various services would be as follows:

The overall development model can be explained as follows:



- Requirement Gathering and Analysis: All possible requirements of the project to be developed are captured in this phase and documented in a requirement specification doc.
- System Design: The requirement specifications from first phase are studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and helps in defining overall system architecture.
- Implementation: With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing.
- Integration and Testing: All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
- Deployment of System: Once the functional and nonfunctional testing is done, the product is deployed in the customer environment or released into the market.
- Maintenance: There are some issues which come up in the production environment. To fix those issues patches are released regularly. Also, to enhance the product some better versions are released. Maintenance is done to deliver these changes in the environment.

Security Measures

For the security of the Software Projects, Netwire always maintain the following measures:

The following measures will be taken for all deployments:

1. Payment Card Industry Data Security Standards (PCI DSS) Compliance
 - PCI DSS tell merchants how sensitive data used in payments should be secured. It requires data encryption and tokenization to provide payments without using real financial data that could be visible while processing. Doing business should be based on trust and PCI compliance helps improve security.
2. SSL Certificate (HTTPS)
 - The site will be protected by SSL Certificate (HTTPS) so all data transmitted from browser to server are always encrypted and protected from phishing and any attempt of eavesdropping from unauthorized users.
3. SQL Injection Protection
 - SQL Injection is the hacking technique, which attempts to pass SQL commands (statements) through a web application for execution by the backend database.
4. Cross Site Scripting Protection



- Cross-site scripting refers to hacking technique that leverages vulnerabilities in the code of a web application to allow an attacker to send malicious content from an end-user and collect some types of data from the victim.

The following measures will be taken for Digital Wallet App to make them secure:

1. Session Hijacking Protection

- The Session Hijacking attack consists of the exploitation of the web/app session control mechanism, which is normally managed for a session token. Customized algorithms will be used to create Session IDs so the sessions can be protected from hijacking.

2. Encryption Technology:

- When data is stored or handled over the web/app platform they will be managed via secure encryption technologies. This ensures the security and safety of data used by the user of the web/app systems.



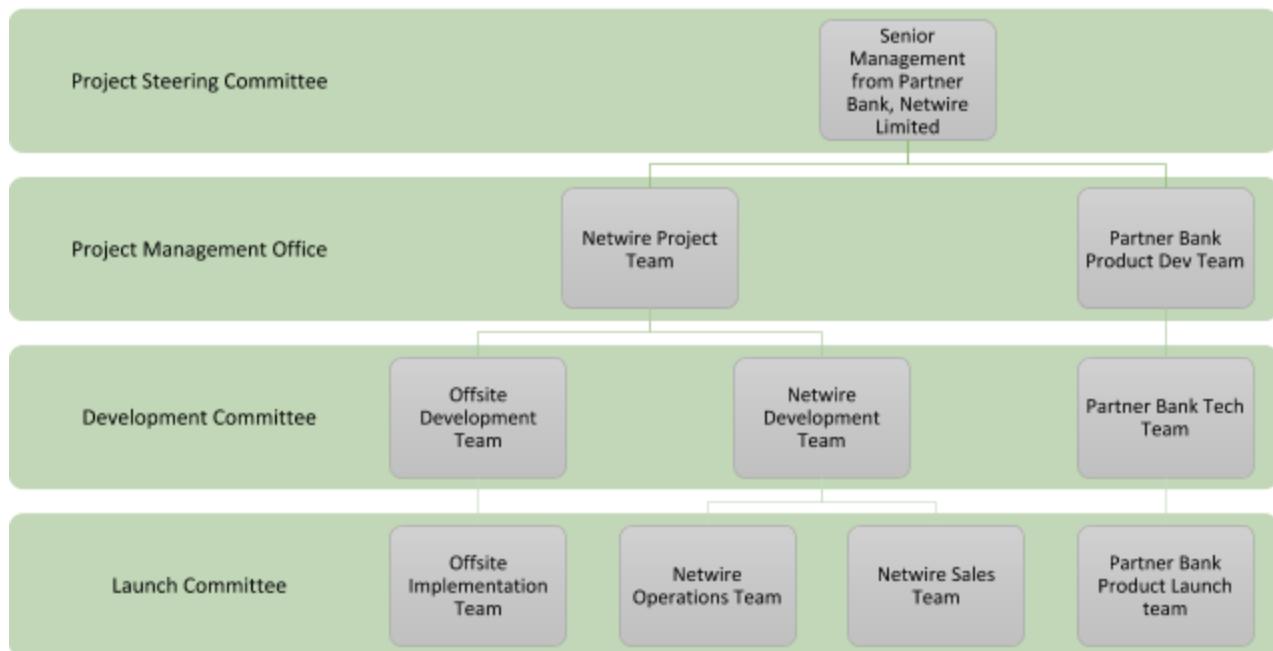
Requirement and Delivery Responsibility Matrix

No	Partner Bank	Netwire Limited	Comments
Planning Phase			
1	Market Research & Product Development		
2		Project Requirement Specification (PRS)	
3	Confirmation of the PRS		Required to finalize the Plan and Proceed for Development
Development Phase			
4		Detailed Layout Design	
5	Confirmation of the DLS	Customizing Modules and Integrating Services	
6		Developing Back-End Admin Panel	
Final Demo Presentation			
Testing Phase			
7		QA Testing	
8		UAT	Fixing and proceeding to Deployment
Deployment Phase			
9		Training on how to Manage the Software	
10		Changes as per UAT	
11		Live Deployment	
Marketing Campaign Phase			
12	Digital Wallet & OmniPay Marketing Campaign	Technical management and maintenance of the platform as well continuous improvement and Integrations.	

Proposed Project Timeline



Project Management Structure & Team Composition



Post-Production Support Framework

Beta Test Phase

The project will be tested by both Netwire and Bank officials/staff before deployment. After the test is successful and requirements are fulfilled, the project team will proceed to final implementation in a production environment.

Testing Methodologies

The system will be tested in two phases:

- After each module is developed
- After the complete project development

The testing methodologies that will be used are:

- User Acceptance Testing (UAT): Test and confirmation from the customer that what the customer has received is as per expectation.



- White-box QA Testing: White-box testing is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality.
- Black-box Testing: Black-box testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: Unit, integration, system and acceptance. It typically comprises most if not all higher-level testing but can also dominate unit testing as well.
- Load Testing: Testing of the project's load accepting ability.
- Security Testing: Testing whether the project has become safe and secure or not.
- Integration Testing: Testing that whether all the modules, extensions and connected external web services are integrated properly with the core system or not.

Training (Proposed)

NETWIRE will provide adequate formal training to the designated Client with approved training manuals. NETWIRE will provide TOT to the Client to make them competent enough to administer and maintain the Reporting Software. Client will provide the necessary resources and equipment for conducting the training such as classroom, printing and photocopy of materials etc. Client will bear the cost of traveling (at actual) and daily allowance of the trainer(s) which will be finalized after during the negotiation stage.

Training Program

The training program will be operated by a Senior Trainer from NETWIRE who will provide all the instructions and guidelines to run, manage and maintain the Administration & Reporting Software.

We will be guiding through:

- Live Training Sessions
- Providing Guideline via Email and Telephone as Post Training Support

We will be providing the below materials while giving the Trainings:

- Class Lectures
- Practical Computer-based Practice
- Tests to be sure that the Users of the System have learnt to operate the System
- Guidebooks for operating the System



Training Plan

Step 1 - Fixing Training Date

Step 2 - Developing and Finalizing Training Contents

Step 3 - Outlining the Training Structure

Step 4 - Making Training Sessions

Step 5 – Providing Training Documents with User Manuals

Deployment

After the project is developed according to the requirement, it will be deployed. Deployment time will be within the development timeline. If hardware procurement and hosting setup takes extra time, it will not be considered within the development timeline given above.

Documentation

The necessary documentation for the maintenance of the system will be provided to the Client so that the site administrators/users can develop/update the Reporting Software content from time to time. The document will not explain the technical mechanism but will focus on the operational processes so that any user can manage and run the Reporting Software.

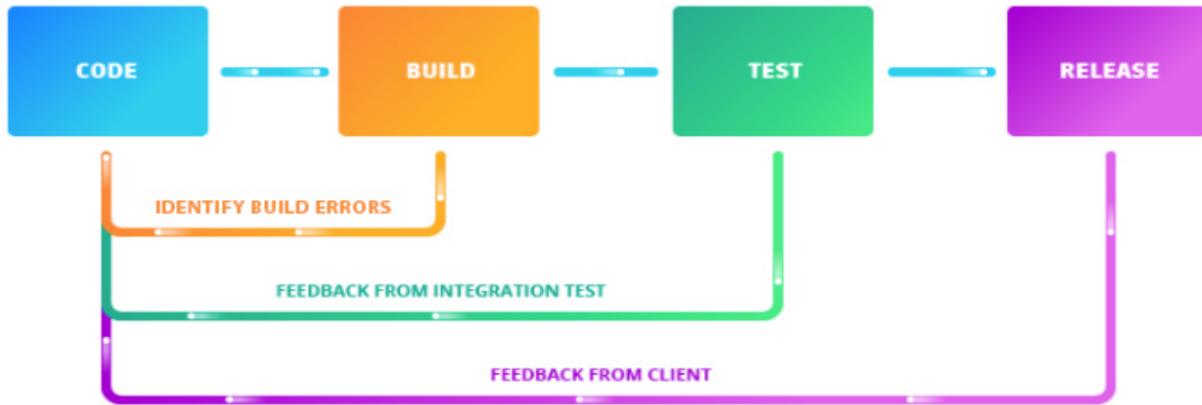
The following resources, documents and diagrams will be delivered to the client after the development and deployment will be done:

- Configuration Manual
- Administrative Manual
- User Manual

Support Framework

Netwire will adopt an Agile and Continuous Development process to streamline the launch and deployment of each of their products. Continuous development describes a process for iterative software development and is an umbrella over several other processes including continuous integration, continuous testing, continuous delivery and continuous deployment.

Through this approach, Netwire will continue to develop new features to maintain a competitive edge in the Digital Financial Services market to be able to quickly respond to market trends and implement new ideas. This will allow Netwire to quickly introduce new code, gain actionable feedback, and reduce the amount of time between development and deployment.



Once the Minimum Viable Product has been cut over to Production (Live) and the Continuous Development Process cycles to add and modify features, Netwire will also jumpstart into the next logical process for supporting the system.

The Support Process ensures:

- Netwire provides a 24/7 support for deployed Systems to representatives of the Partner Bank and will provide access to an Issue Management System for tracking raised issues.
- Product fixes and patches/updates will be initiated by Netwire and reviewed with the Partner Bank Digital Financial Services team on a periodic basis.
- Service Level Availability for Digital Wallet and Merchant Omni-Payment Platforms will adhere to a minimum of 99.5% as prescribed by the Payment Systems and Services Act 2019.
- Regular Investigation and error correction of defects found in the application delivered by Netwire and Partners.

Primary Single Point of Contact

Name: Jerome Tabiri	Designation: CEO
Email: jtabiri@netwireghana.com	Phone: +233 277 555 903 / +1 954 982 0322



Appendix A

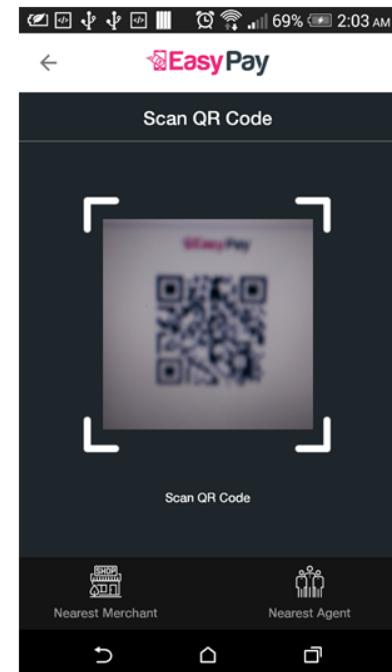
EasyPay Features & Services

Key Features:

- Send/Receive Money via QR Code

- One-Time Passwords (OTP)

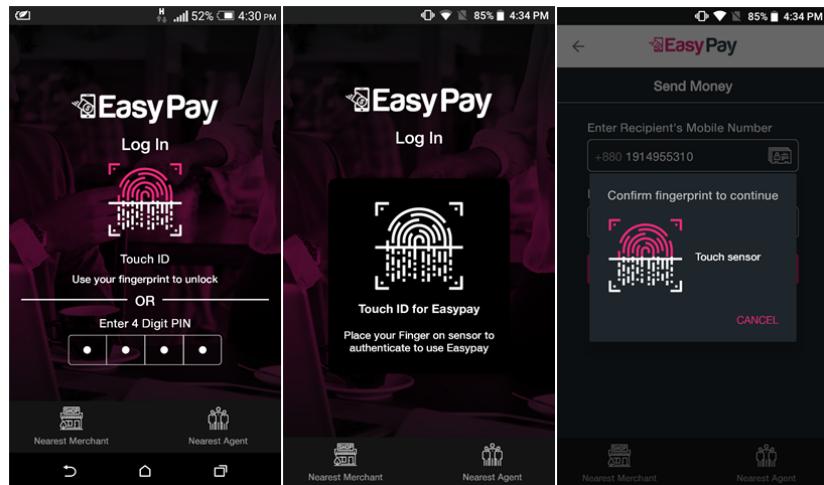
- To counter fraud, an OTP is sent by SMS to the mobile number of the user. The transaction is confirmed and completed immediately upon correct entry of the OTP.





Biometric Authentication/ Touch ID:

- Log In with Touch ID



- Transfer Confirmation with Touch ID

- While confirming payment, send money or any transaction, Touch ID can be used instead of entering 4 Digit PIN.

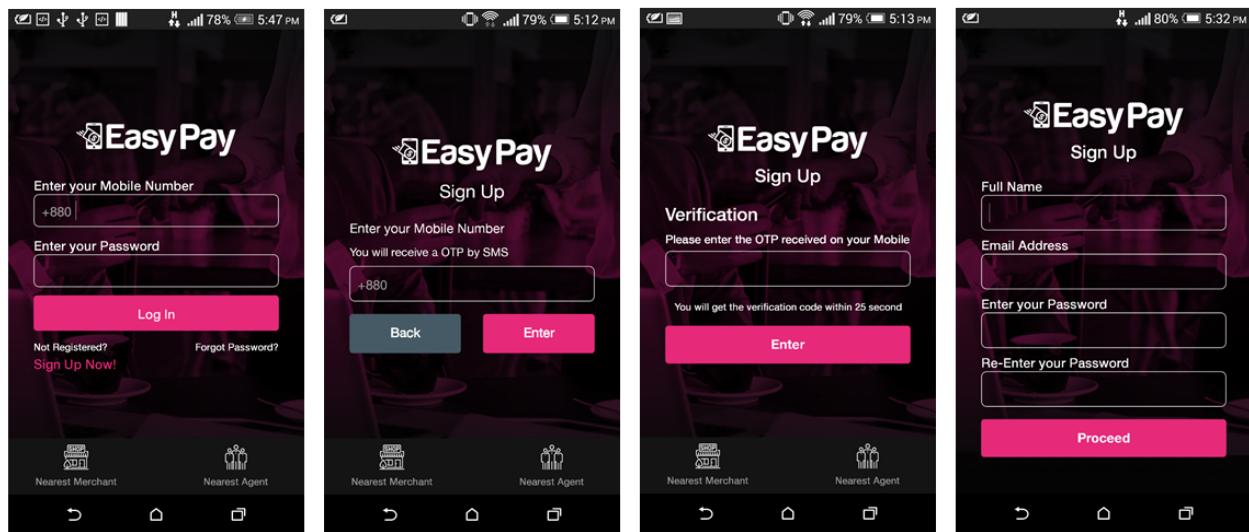
Process Flow: Sign Up & Log In

Tap the **Easy Pay** app icon to open the app.
The **Log In** screen appears.

For the first time use, tap on **Sign Up Now!**
Enter your Mobile Number.

Enter the Activation Code/ One-Time Password (OTP) received in the entered Mobile Number.

Complete the Sign Up by entering Name, Email Address & Password. Now you can Log In.



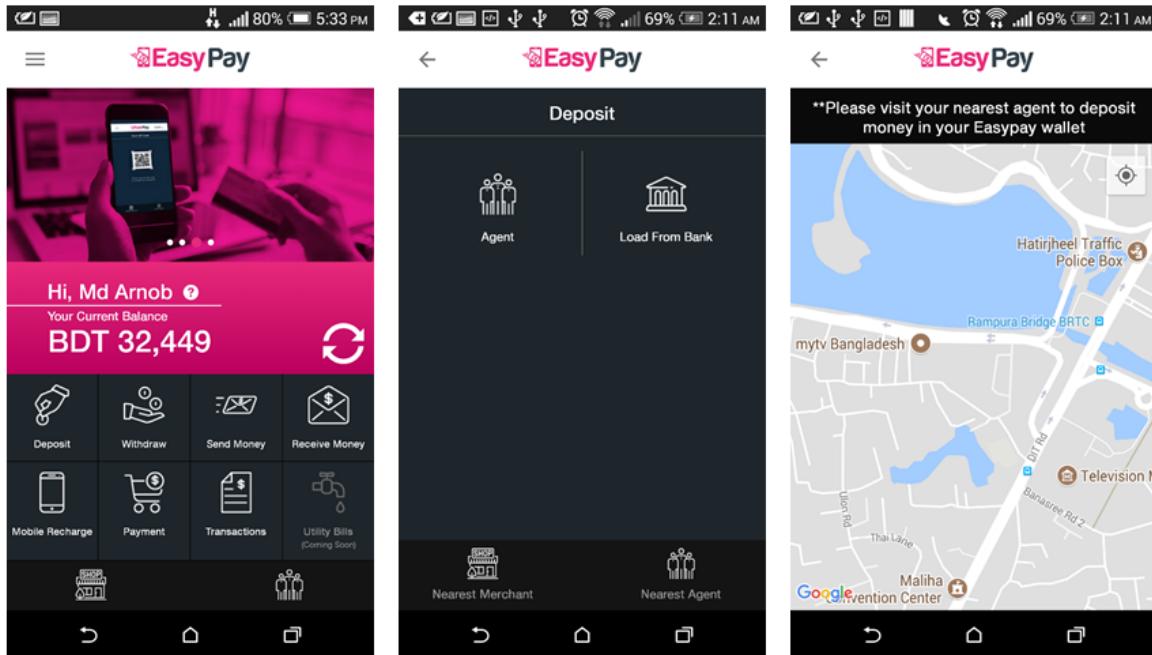


Process Flow: Deposit/Cash In from Agent

After log in you can see available balance. To deposit (cash in) money tap **Deposit**.

To cash in from an agent, need to physically visit agent point. To search nearby, tap on **Agent**.

Redirected to Google Map showing nearest* agent point from where you can cash in.



*It is possible to search for nearest Agent, Merchants anytime by tapping on the respective button from the Home menu.

Process Flow: Deposit/Cash In from Bank Account

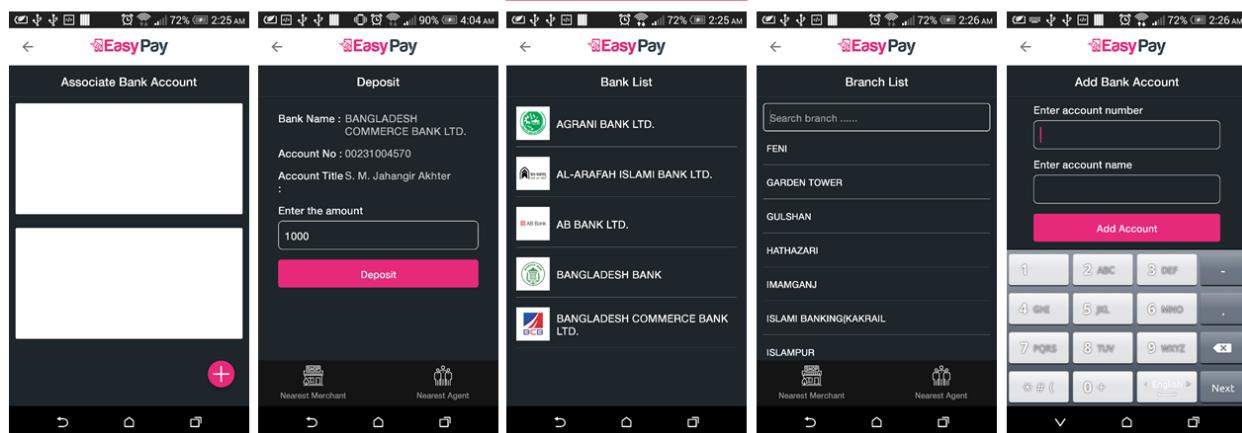
To cash in from bank account, tap **Load From Bank** under **Deposit** screen. **Associate Bank Account** list will appear. Select any one.

Enter the amount you want to transfer from your bank account into the Easy Pay Wallet and tap on **Deposit**. The amount is added to **Current Balance** in Home screen.

To add new Bank Account, tap '+' under **Associate Bank Account**. Select & tap on desired bank name from the **Bank List**.

Search for or select the branch name of the bank that your account is associated with from the **Branch List** (scroll up-down).

Enter account number and name, and tap **Add Account**. This account will be added. Next time you can transfer fund from this account into Easy Pay Wallet.





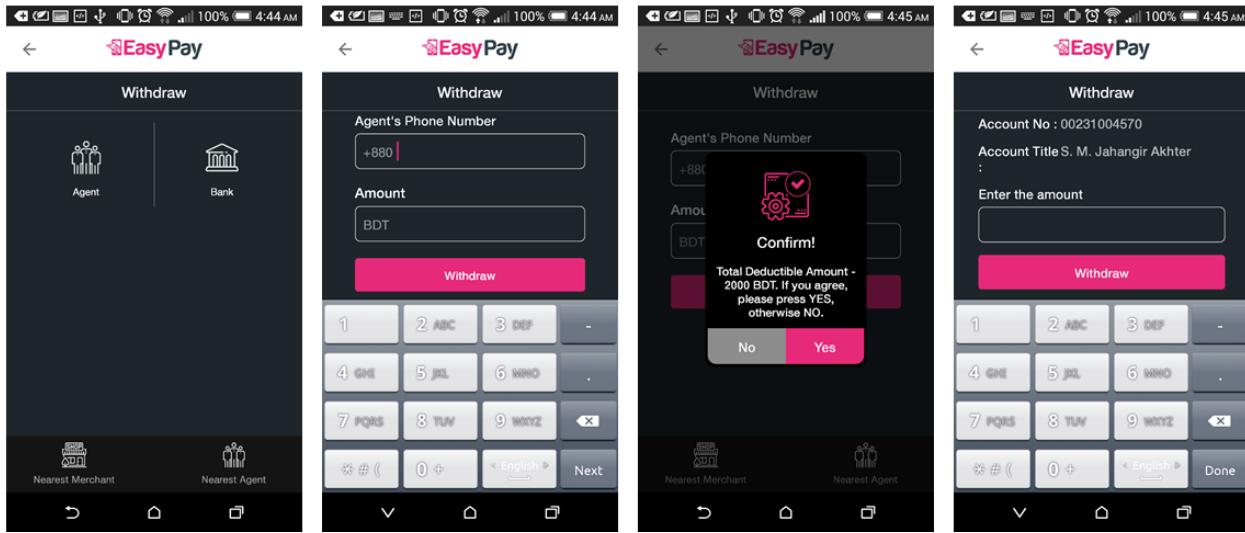
Process Flow: Withdraw/Cash Out

From Home Menu, tap **Withdraw**. There are two options, from **Agent** or **Bank**.

To cash out from agent, tap **Agent** and then enter **Agent's Phone Number** and **Amount**.

When tapped on **Withdraw**, a confirmation message will appear. Tap '**Yes**' to get the cash.

To cash out to bank account, tap **Bank**, select the account, **Enter the amount** and tap **Withdraw**.

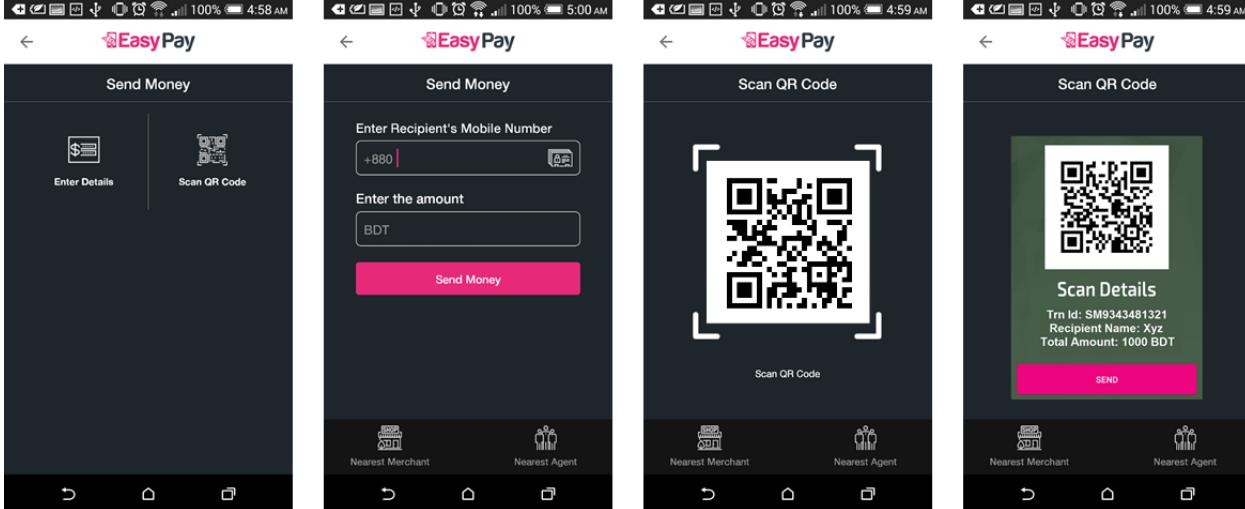


Process Flow: Send Money

From Home Menu, tap **Send Money**. There are two options, **Enter Details** or **Scan QR Code**.

Enter Details: Enter Recipient's Mobile Number and the Amount to send, and tap **Send Money**. Amount will be sent after OTP verification*.

Scan QR Code: The recipient will go to **Receive Money** option and generate a **QR code**. Tap on **Scan QR Code**, scan the receiver's QR code. This will automatically show the details of the recipient in your app. Tap on **Send**. *An OTP will come to the phone through SMS and after entering the OTP, the transaction will be complete.



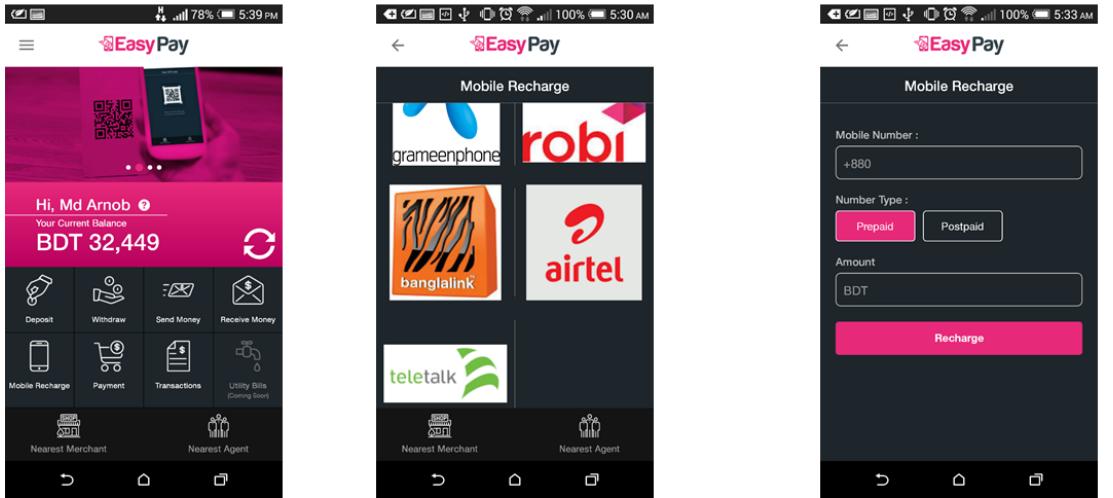


Process Flow: Mobile Airtime Recharge

From Home Menu, tap **Mobile Recharge**.

Select the Telecom Operator by tapping on respective logo.

Enter the Mobile Number to be recharged, Number/Connection Type, enter the Amount to recharge and then tap on **Recharge**. An OTP will come to the phone via SMS and after entering the OTP, the recharge will be complete.

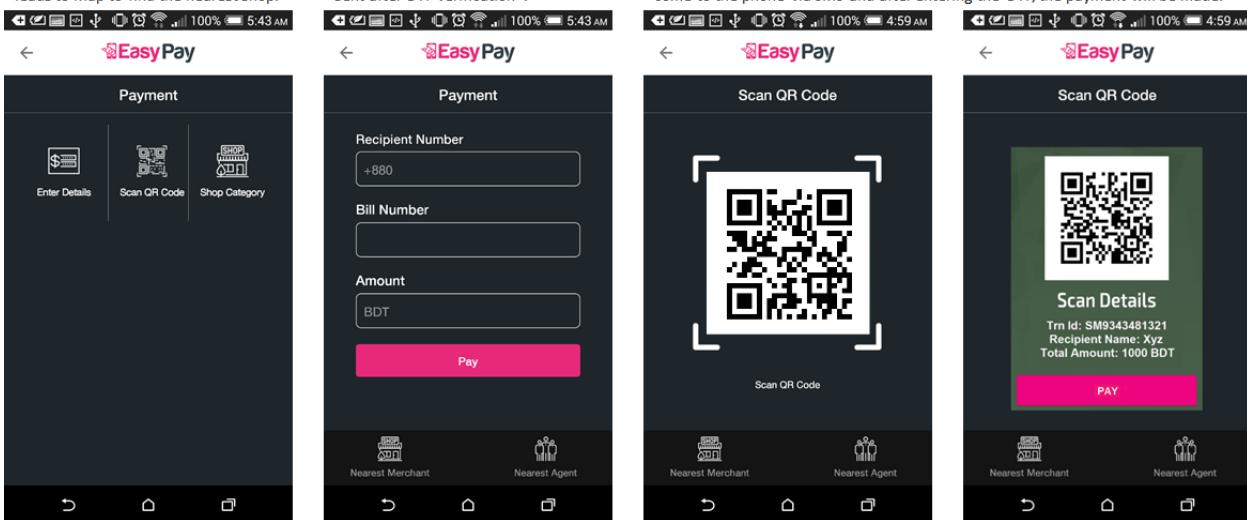


Process Flow: Merchant Payment

From Home, tap **Payment**. There are two options, **Enter Details & Scan QR Code**. Another option **Shop Category** leads to Map to find the nearest shop.

Enter Details: Enter Merchant's Mobile Number, Bill Number and Amount, and tap **Pay**. Amount will be sent after OTP verification*.

Scan QR Code: Scan the QR code printed with the product (for physical shop) or the QR Code generated in website (for online merchants). This will automatically show the details of the product along with price in your app. Tap on **PAY**. *An OTP will come to the phone via SMS and after entering the OTP, the payment will be made.





EasyPay User Categories

Netwire EasyPay will come with 3 separate categories each having different levels of KYC and on-boarding based on the capabilities available to the users as shown below:

