Nakshi Hat: A Social E-commerce Platform for Empowering Rural Women Artisans

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Supervised by

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Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Computer Science and Engineering



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SONARGAON UNIVERSITY (SU)

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APPROVAL

The project titled "**Nakshi Hat: A Social E-commerce Platform for Empowering Rural Women Artisans**" submitted by Md. Moshiur Rahman (CSE2102023008), Shepon Hossain (CSE2102023027), Md. Taiful Hasan (CSE2102023092) and Dalia Akter (CSE2102023042), to the Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents.

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DECLARATION

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Prof. Bulbul Ahamed**, Head, Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The rapid growth of technology has slimmed the way people interact, trade and communicate, and e-commerce serves as a powerful tool for the promotion of small businesses. But rural women artisans in districts such as Jamalpur, Bangladesh, still find it difficult to get digital platforms to sell their hand-crafted items. Even though they are skilled at making traditional items like Nakshi Kantha and handmade garments, they are dependent on local markets or intermediaries, which keeps them disempowered and their income small. Nakshi Hat, a Laravel built social e-commerce platform developed to provide online empowerment to rural women artisans in this regard. It empowers them to sign up as vendors, operate their own digital stores and sell directly to customers in the whole country. Publish features such as secure login simple dashboard to operate, product upload, order management, digital payment, and costumer review. The initiative is aspiring to increase financial inclusion and digital empowerment, less reliance on middlemen, fair pricing and local economic development as well as conservation of legacy handicraft skills by leveraging technology to make artisans market-able to a larger customer base.

ACKNOWLEDGMENT

At the very beginning, we would like to express my deepest gratitude to the Almighty Allah for giving us the ability and the strength to finish the task successfully within the scheduled time. We are auspicious that we had the kind association as well as supervision of **Brig. Gen. (Retd) Prof. Habibur Rahman Kamal, ndc, psc,** Dean, Faculty of Science & Engineering and **Professor Bulbul Ahamed,** Head, Department of Computer Science & Engineering, Sonargaon University, whose heartfelt and valuable support, with best concern and direction, acted as necessary recourse to carry out our project.

We are also thankful to all our teachers during our whole education, for exposing us to the beauty of learning.

Finally, our deepest gratitude and love to my parents for their support, encouragement, and endless love.

LIST OF ABBREVIATIONS

API	Application Programming Interface
CSS	Cascading Style Sheets
DB	Database
HTML	HyperText Markup Language
JS	JavaScript
MVC	Model-View-Controller
PHP	Hypertext Preprocessor
SSL	Secure Sockets Layer
UI	User Interface
UX	User Experience

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CHAPTER 1
INTRODUCTION

1.1 Background of the Study

Technology has changed the world of business on a global scale by allowing people and companies to access a whole new world of market opportunities. A case in point would be e-commerce, which has enabled the sales of products by small scale industries on a world wide level, transcending geographical barriers. In Bangladesh Jamalpur region is an example where the advantages of the digital marketplaces are yet to be harnessed.

A portion of the work force in Jamalpur region comprises of women artisans who have been making finely embroidered Nakshi Kantha (embroidered quilts), sarees, panjabis, prayer caps (tupi) and wall mats since time immemorial. Not only are these artisans skilled but they are equally hardworking, with most of them sending their finished products through the bid that they have to pay. These women artisans have no direct means of selling their work and as a result, have to deal with unscrupulous middlemen who rip them off. Together with the above, many of these artisans do not possess the requisite skill and system to market their products beyond online platforms which protects them from fair prices in larger markets.

This problem will be solved by the project through the development of Nakshi Hat, an social e-commerce platform tailored to the needs of women artisans in the rural regions of Jamalpur. It enables these artisans to have their own virtual shops. They can provide product details, upload items, manage their own pricing, and conduct transaction safely without leaving their homes. The intent of this initiative is to remove the middleman enchancement of earnings by artisans and ensure to digital marketplace access them harnessing appropriate remuneration for their efforts.



Fig: Rural women in Jamalpur sewing Nakshi Kantha.

1.2 Objectives

he objectives of the project are categorized as follows:

1. To develop an e-commerce website application that will empower rural women artisans by enabling them to market their products and interact with customers directly.
2. To ensure that the user interface is simple so that even the most technologically challenged artisans can use the system without much training.
3. To provide artisans with the ability to receive payments conveniently through direct bank transfers and easily access their funds.
4. To help rural women achieve a higher level of independence by equipping them with the appropriate resources to manage their own digital enterprises.
5. To help preserve and promote Bangladeshi handicrafts by providing a national marketing platform which may also appeal to international audiences.

1.3 Problem Statement

Many rural women artisans, particularly in Jamalpur, craft a range of traditional handcrafted products like Nakshi Kantha, sarees, and wall mats. Unfortunately, these artisans face challenges such as:

- Lack of market reach: Due to absence of digital technologies and physical showrooms, artisans cannot access a wider customer base.
- Exploitation by middlemen: Artisans frequently sell their handmade products to middlemen for peanuts, receiving less than what their work is actually worth.
- Inadequate training: Many artisans lack the skills necessary to run an online store or manage eCommerce websites.
- Absence of competitive pricing: Artisans are unable to directly market their products and thus not competitively priced.

This diability needs to be overcome by the creation of a digital marketplace where rural women artisans can have full control over their products, sell directly to customers, and assure fair wages for their work.

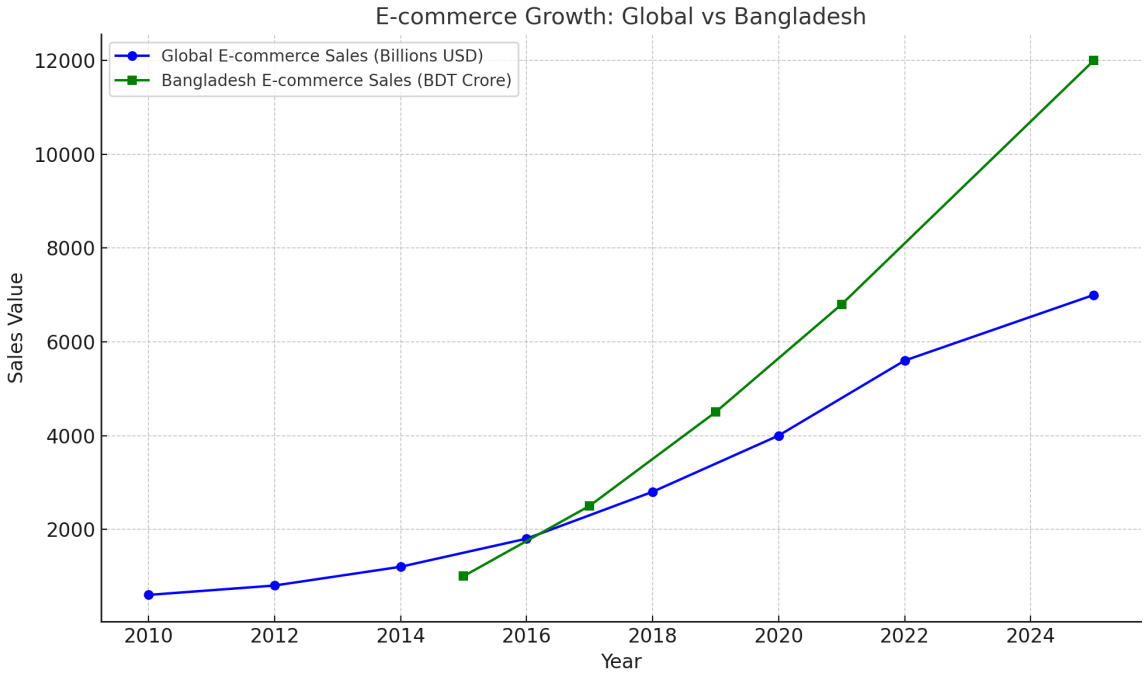


Fig: E-commerce Growth : Global vs B Bangladesh

1.4 Scope of the Project

The project includes development of a women artisan social e-commerce solution for Jamalpur. The features include:

1. Add-On Features for Artisans Vendor Registration – Artisans are able to sign up as vendors with their own profile to manage their product listings.
2. Product Manufacture: Artisans upload product specification independently by means of images, descriptions and prices.
3. Order Management: Artisans can manage order, maintain inventory and chat with customer.
4. 3.Payment Gateway Integrated payment getway will permit artisans to withdraw their money and they also initiate the transactions as well.
5. Customers Interaction: Customers can visit products, give feedback, and interact directly with the makers to inquire about orders.

At first, they plan to focus the social e-commerce system in Jamalpur, and eventually expand to explore other rural areas of Bangladesh and outside it, becoming a scalable tool for rural artisans.

1.5 Significance of the Study

The importance of this work is its impact on the society and economy. This project seeks to create a virtual place where rural women artisans can:

. Boost earnings: Working directly with the artisans, it allows for fair compensation.
. Enable rural women: This is a space for women to become their own boss and empower themselves economically.
. Promoting traditional crafts: This initiative will contribute to the preservation and dissemination of Bangladesh's rich culture of hand-made products to the world.
. Fuel sustainable growth: E-commerce enables artisans to grow their businesses in a sustainable way by reaching global buyers.
. The project will also significantly benefit gender equality, women will have the chance to be entrepreneur and to contribute to the local economy.
.

1.6 Organization of the Report

This article is organized as follows:

2 Chapter 1: Introduction - An overview of the project, what it aims to achieve and the problem it addresses.
3 Chapter-2: Literature Review- This chapter provides a review of the previous research on E-commerce platforms, rural entrepreneurship, and women empowerment.
4 Chapter 3: System Design This chapter explains how the Nakshi Hat system was designed, the tools and the technologies that were used.
5 Chapter 4: Implementation Detail of the process of development and obstacles, and how they were dealt with.
6 Chapter 5: Testing and Evaluation – Presents the testing and the feedback from artisans and normal users.
7 Chapter 6: Conclusion -Concludes the main concepts and identifies some areas for future work.

CHAPTER 2
LITERATURE REVIEW

2.1 Overview of Rural Women Empowerment and Digital Platforms

Recently, the empowerment of rural women has been a major concern in the field of development, especially in countries like Bangladesh. There are severe constraints on the economic independence, education, and mobility of rural women, especially women working in agricultural based and handicrafts dominated economies. Due to the traditional gender based roles and restricted access to resources and sociocultural restrictions majority of them cannot engage in the main stream economy.

Nevertheless, with the emergence of digital technologies, many rural women have begun to break down some of these barriers. E-commerce, in particular, has been a formidable instrument that allows for women to enter into online entrepreneurship. These platforms offer access to world markets, decreases dependence on intermediaries and gives more independence in managing of business. The three tools of the internet, mobiles and digital payments system have therefore been opening new possibilities for rural women to earn a living without moving out of their homes.

Research shows that with access to technology, women can increase fiscal independence, decision-making authority, and overall social status. This has changed their previous role in rural women empowerment, as a good number of women are focusing in a more participatory way in the digital economy, selling products like farm products and homemade products. [1]

2.2 E-commerce Platforms for Handicraft Products

Handicrafts form a crucial part in the livelihoods of many rural areas. Traditional crafts in Bangladesh like Nakshi Kantha, saree and panjabee are traditionally significant both culturally and economically. But the handicraft sector has long been hobbled by poor market access, an obstacle that disproportionately affects handicraft artisans, many of whom are women, in rural areas. Historically, middlemen have ruled the roost and only a tiny percentage of the product's retail price finds its way through to the artisan.[2]

This issue has recently been addressed by e-commerce. With the internet, sites like Etsy, Amazon Handmade, and eBay have permitted artisans to market their work directly to people around the world. Not only that, these platform enables access to a broader range of customers and, to top it off, they typically let the makers decide the selling price, thereby achieving fair pay for their work.

Feature	Nakshi Hat	Etsy	Amazon Handmade
Target Audience	Rural women artisans	Independent artists, crafters	Handcrafted artisans
Product Categories	Handicrafts, textiles, clothing	Crafts, vintage, and supplies	Handmade goods, jewelry, home decor
Platform Focus	Empowering rural women artisans	Global marketplace for handmade	Handcrafted goods with Amazon's reach
Payment Options	bKash, Nagad, Credit card	PayPal, Credit Card, Etsy Payments	Amazon Payments, Credit Card
Vendor Control	Full control over store & pricing	Limited control	Limited control (fees, policies)
Market Reach	Local and National (Bangladesh)	Global	Global
Shipping Options	Custom courier integration	Varies by vendor	Amazon shipping services
User Interface	Simple & Artisan-focused	User-friendly	Professional but complex
Customer Engagement	Reviews, direct contact	Reviews, messaging	Reviews, messaging
Platform Fees	Commission-based	Listing fee, transaction fee	Referral fee, closing fee
Mobile App Support	No dedicated app	Etsy mobile app	No dedicated app

Fig : A table comparing Nakshi Hat to other e-commerce platforms.

In another developing country, Bangladesh, projects like Chittagong E-Commerce Family (CEF) and BDCrafts have been established to link rural craftspeople to the digital market. But a majority of these measures continue to face infrastructure bottlenecks, payment issues and low user consumption in the countryside. Localised solutions are required which take into account the digital literacy of artisans and market situation within the country.

Nakshi Hat seeks to help bridge this gap by creating a user friendly e-commerce platform designed specifically for Bangladeshi rural women artisans. They will be able to sell their product for sale online, handle their sales and guarantee fair price without a middleman.

2.3 Previous Initiatives and Their Impact

Some global and local projects are encouraging to increase the involvement of rural women in digital entrepreneurship. Some of these ventures have brought women into markets and financial independence, others have hit roadblocks.

Rural African women e-commerce platforms: Initiatives like SheTrades and Women for Women International have made it possible for rural African women to set up their own online businesses. These sites provide women with training, support and market access, enabling women to sell agricultural products, handmade goods and crafts. These programs have been shown to help women increase both their income and their confidence, but barriers around logistics, access to the internet and language still prove formidable. [3]

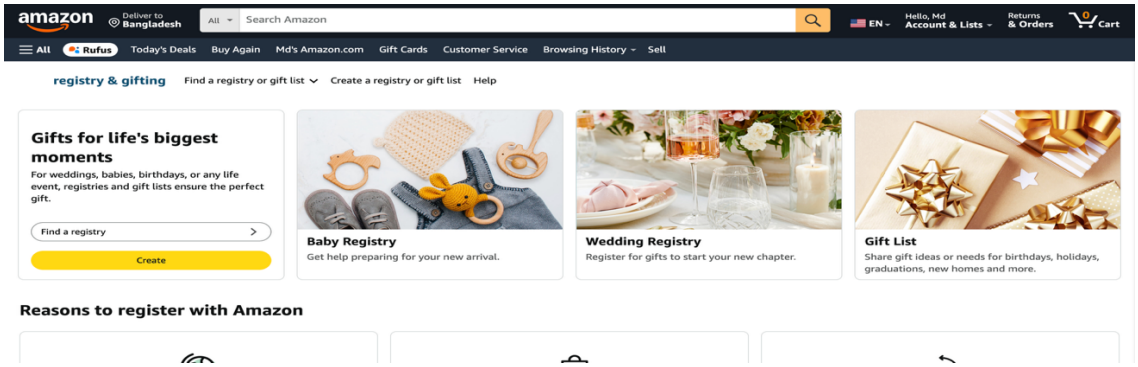
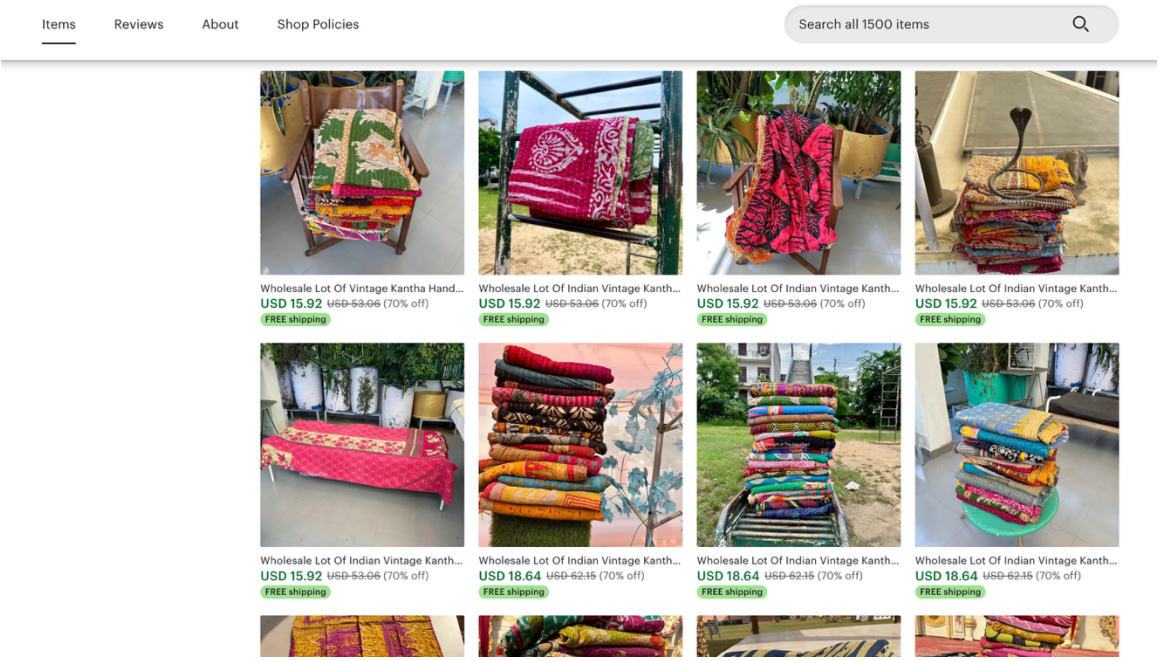


Fig : Handicraft Store view at Amazon.



Fiq : Screenshot of an artisan's page showcasing handmade products

BDCrafts: A local Bangladeshi effort that connects rural artisans with an online market. While it has achieved some success with the project, its results have not been significant; since little user involvement, payment struggles and the absence of personalized assistance for rural artisans have all accounted for it. A lot of them, especially in rural areas, struggle with browsing websites and do not have the digital instruments to run their business efficiently. [4]

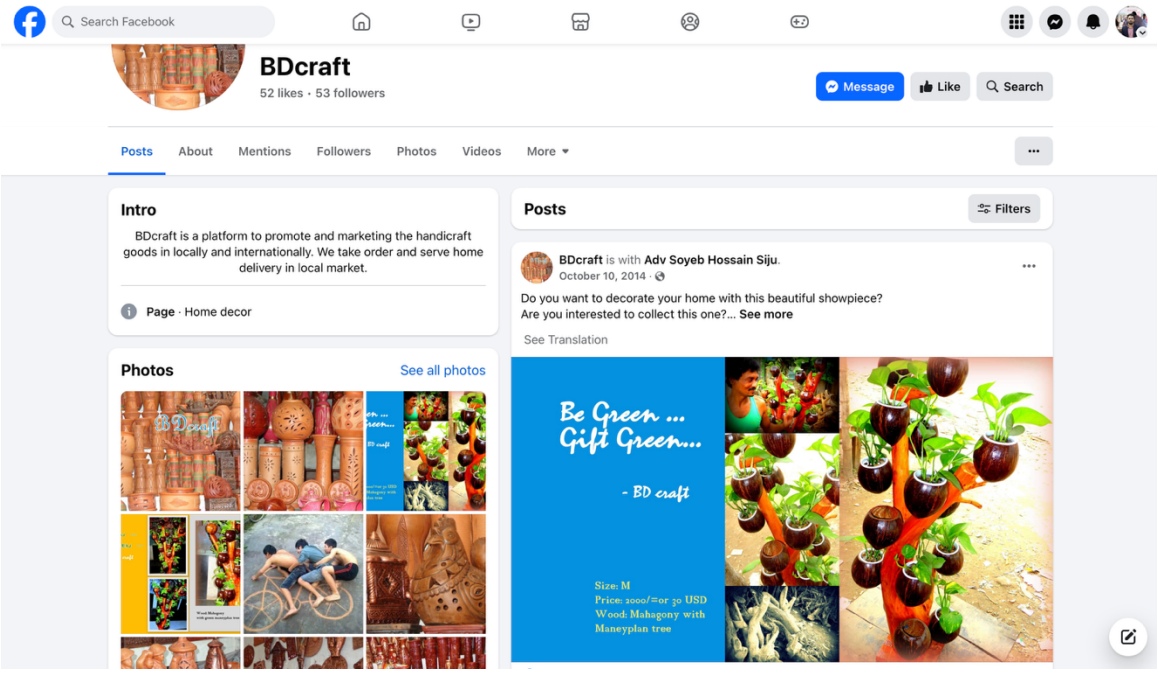


Fig : Screenshot of Bdcraft Page

Such initiatives have highlighted the great scope of how digital platforms can enable upliftment of rural artisans but also exposed several voids that need to be filled. Nakshi Hat aims to take lessons from these initiatives and develop an easy accessible and scalable platform with practical and easy-to-use user interface, mobile responsive verifications and training sessions for rural women artisans.

2.4 Gaps in Current Literature and Relevance to Nakshi Hat

The literature and initiatives reviewed highlighted the promise of digital platforms in enabling rural women, however also outline the following obstacles:

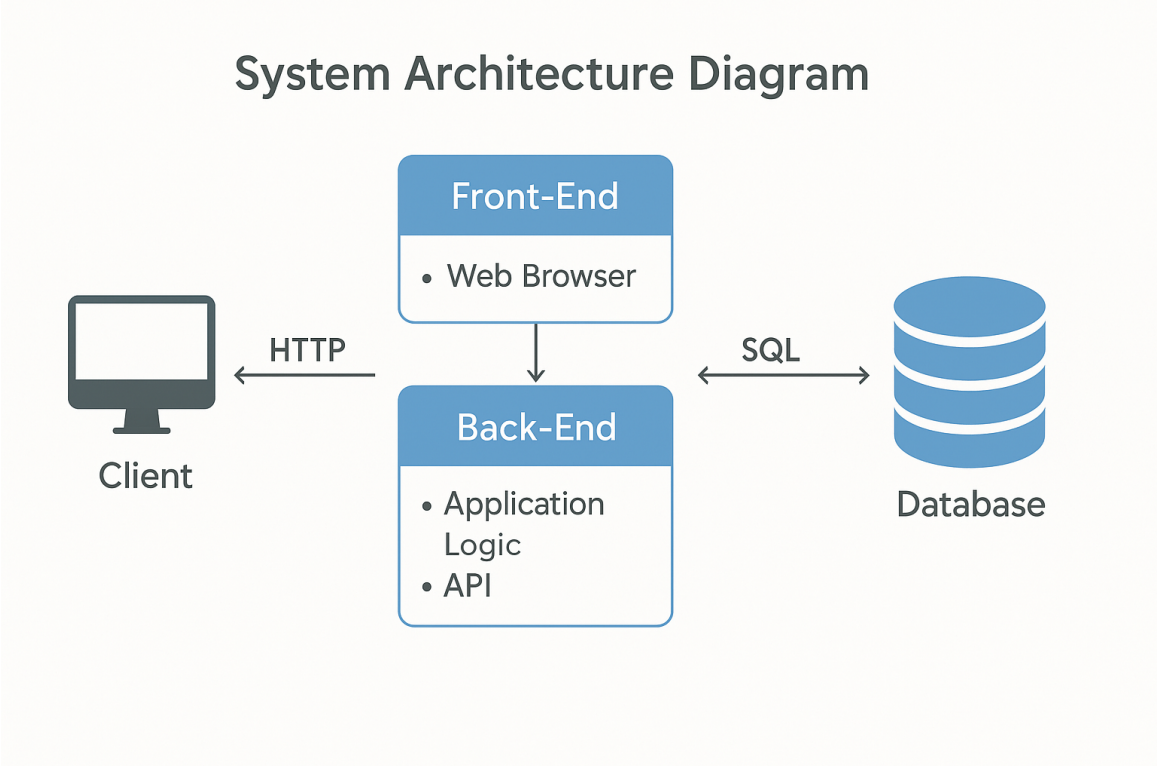
- Digital Literacy: Most of the rural artisans have low levels of digital literacy which makes it difficult for them to use complex e-commerce websites. This chasm has to be eliminated by training courses and intuitive user interfaces.
- Payments: Payment systems that are safe and available to all are critical to ensuring that artisans are paid fairly. A lot of platforms struggle to integrate with local payment methods like bKash, Nagad, and Rocket used in Bangladesh.
- Market Trust and Reach: Trust in the market by the artisans living in rural areas is a major concern including the numerous challenges of their goods reaching a broader customer base. There are some solutions that the customer review systems and marketing tools can be used to use and develop a standing.

Nakshi Hat will simplify e-commerce with local payment systems, artisan training, and community-building to foster trust and engagement.

CHAPTER 3
SYSTEM DESIGN

Any software application undergoes major transformations in its lifecycle. System design is one of the most crucial phases that take place throughout its development. It deals with formulating the software modules and their interfaces including the data to be used in each module, and also the constituent computing elements. Regarding the Nakshi Hat platform, the design aims at developing an uncomplicated, safe, and extensible e-commerce platform to enable rural women artisans sell their handicrafts effortlessly.

This chapter elaborates on the design of Nakshi Hat that contains the centerpiece described system architecture, technologies, and mechanisms to be implemented. Central to the design of Nakshi Hat is a far-reaching user interface whereby even users who possess very basic digital skills can operate their online shops without difficulty. The system also includes security features for payment transactions, product management, customer interaction, and customer service tools.



3.1 System Architecture

The Nakshi Hat has system architecture that follows a client-server model. In this model, each user (artisan or customer) utilizes a front-end application. Both the front-end application and the user interact with a back-end server that processes requests and interfaces with the database. [5]

Front-End:

- HTML5: It creates structure to the web pages and the contents within.
- CSS3: It designs the overall look and style of the website.
- JavaScript: It facilitates the interactivity level of the website and handles actions completed by the user, such as logging in and out, submitting forms, searching for products, or obtaining alerts and notifications.
- Laravel Blade Templates: It is a templating engine provided by Laravel, which is used to show contents dynamically from the server to the user interface.

Back-End:

- Laravel: This framework aids in the construction of the back-end logic of the platform. Laravel helps manage user authentication, routing, interactions with the database and business logic, and even regulates different processes simultaneously.
- MySQL: It stores data relating to users, products, orders, and payments using a relational database.s

Payment Gateway:

- bKash integration: These local payment gateway are used for safe transactions and allow artisans to withdraw their payments without any hindrances.

Web Hosting:

- This platform is hosted on cloud-based servers which enhances reliability and scalability in accommodating heavy traffic of orders and users.

The system design guarantees smooth system interoperability of data concerning the artisans and customers with multi-tier validations, data-security checks and real-time updates.

3.2 System Features

The features that stand out for Nakshi Hat platform are the following:

1. User Registration and Authentication:

- With just a few details such as a name, and contact number, artisans can create accounts.
- Customers can create user accounts which enable them to browse products, order them, and even write reviews.
- A user registration to confirm SMS verification.

2. Product Management:

- Directly from their profile, artisans can product upload products with their description, price and images.
- With the product editing capabilities, artisans can manage their inventory and make required adjustments.

3. Order Management:

- Artisans can view customer orders, process them, and change order statuses in real time.
- Artisans and customers have a direct communication channel for customers to track their orders and artisans

4. Payment and Withdrawal System:

- A payment gateway for secure transactions between customers and artisans.
- Artisans can withdraw directly to their bKash, Nagad, or bank accounts.
- Payments ensures protection against fraudulent transactions for customers, artisans and nakshi hat.

5. **Customer Review System:**

- Artisans' products can be reviewed by customers giving them feedback on what other users to reconsider buying the product.
- Artisans are provided the opportunity to see customer reviews and respond thus enhancing trust and customer's satisfaction.

6. Admin Dashboard:

- Administrators have the flexibility to manage users, check statistics, and moderate reviews, as well as address disputes and process refunds from one central location: the admin panel.

3.3 Technologies Used

The technology stack used for developing the Nakshi Hat platform includes:

- PHP (Laravel Framework): The back-end is developed in Laravel, a popular and secure framework of PHP with high scalability and ease of use.
- MySQL: A relational database management system which keeps track of products, users, and transactions.
- HTML5, CSS3, JavaScript: These are the technologies for client-side development which build the interface of the website and provide the required functionality.
- Bootstrap: One of the frameworks has been utilized for front-end responsive web design to make the platform mobile friendly.
- bKash, Nagad: Local payment gateways added for safe transaction processing.
- GitHub: For managing the different versions of the projects undertaken, collaboration with other developers has been made during the development of the project.

3.4 System Workflow

Below is a description of the system operation:

1. Artisan Registration:

- The artisan logs into the platform, gives information concerning their products, and lists their contact details.
- Subsequent to registering, they are able to upload products, manage their pricing, and control their stock levels.

2. Customer Browsing and Order Placement:

- The customers logs onto the site, reviews the products on offer and make orders by checking off the items they wish to purchase.
- Customers can also create an account and track their previous orders and write reviews for the items they have purchased.

3. Order Processing:

- Upon order placement, artisans get an alert and can start working on the order from their dashboard. They can accept the order, prepare, and send it out.
- Customers are updated on order progress at every point (being processed, dispatched, delivered).

4. Payment Processing:

- Upon order payment by a customer, the payment is credited to artisan's account after deducting platform charges.
- Through the payment gateways, artisans can withdraw their earnings. [6]

5. Admin Monitoring:

The admins checks the listings of products; customer feedback provided on products and how well the system is performing. They keep watch to prevent fraudulent activities and ensure that the system functions as intended.

3.5 Database Structure and Visual Schema Representation

To ensure smooth, secure, and scalable data operations, Nakshi Hat has been structured using a relational database system. The data model was designed to accommodate multiple user roles (admin, vendor, customer), product listings, payment integration, and order tracking while keeping data integrity and normalization in focus.

The following diagrams illustrate the logical structure and relationship among core entities used in the system.

Entity Relationship Diagram (ERD)

An Entity Relationship Diagram (ERD) is a structural representation of the system's database schema, showing entities, attributes, and their relationships. The following ERD illustrates the relational structure of the Nakshi Hat platform, highlighting tables such as products, categories, users, vendors, orders, and payments.



Fig : Nakshi hat Entity Relationship Diagram (ERD)

We can observe the logical data structure of Nakshi Hat, including the tables for users, products, orders, vendors, and relationships among them. The diagram illustrates how products are connected to categories and vendors, while orders are linked to both customers and payment details.

E-R Diagram

The following E-R diagram visually represents the conceptual data model of the Nakshi Hat platform, showcasing how entities such as customers, products, orders, and payments are interconnected within the e-commerce ecosystem.

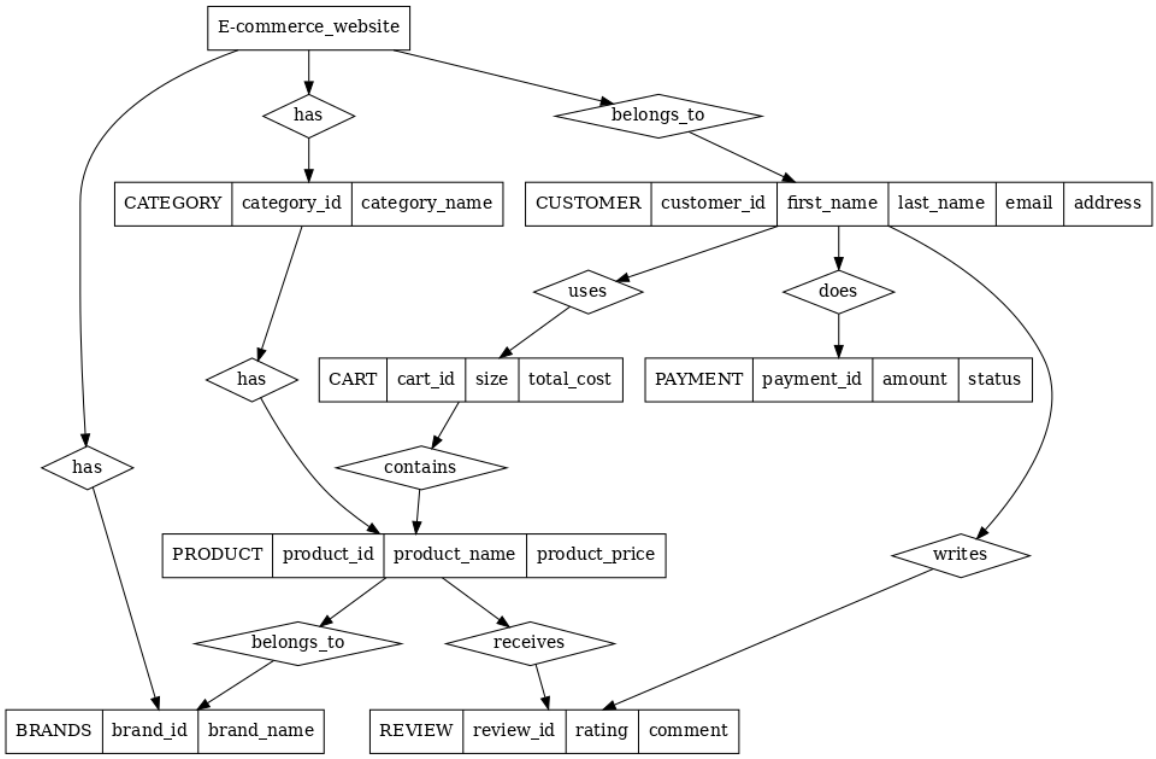


Fig : Nakshi E-R Diagram

Alongside the E-R diagram, the relational table structure defines how each entity is implemented in the database using primary and foreign key constraints to ensure referential integrity.

Each table manages the essential data flow needed for:

- Product management
- Vendor payouts
- Admin moderation
- Customer order tracking

This relational model reflects real-world platform operations and enhances performance, scalability, and data consistency within the Nakshi Hat system.

3.6 Development Tools and Technologies

The technologies and tools listed below were utilized in the creation of the Nakshi Hat platform:

- For back-end development, the Laravel framework of PHP was utilized.
- MySQL was used for the management of databases.
- For website design interface, Bootstrap and CSS were used alongside JavaScript for animations user's experience improvements.
- For payment and withdrawal services, bKash, Nagad, and bank transfer APIs were integrated into the system.
- GitHub was used for collaboration and version control during the development of the project.
- Google Drive was used for documentation as well as collbaration with other team members.

3.7 Challenges and Solutions

In the course of building the platform, challenges were registered as follows:

1. Digital Capabilities: A good number of the artisans had little to no background with technology. Accordingly, we developed a user-friendly interface as well as tutorial videos that skill guides them through product upload and store management.
2. Payment Methods: Mechanisms of payments needed to be both safe and easy to use. Integration of local payment service providers like bKash and Nagad made transactions simpler for users.
3. Server Performance: With an increase in users, server capacity was becoming an issue. We adopted cloud-based hosting to mitigate these problems and ensure the platform can accommodate a high volume of users and data.

CHAPTER 4
IMPLEMENTATION AND TESTING

The execution phase for the Nakshi Hat platform entailed bringing the system design to life. In particular, this chapter focuses on the construction of the platform which includes its programming, uploading, and incorporating other required services. Also, the chapter explains the platform's testing, addressing functionality and performance relative to actual use.

In this phase, the focus was to provide a working e-commerce system that was not complicated for rural women artisans to use in running their business. System features needed to be strong, simple, and capable of performing several activities simultaneously such as uploading products, handling orders, and conducting payment processes securely.

4.1 Development Process

A Putting together the Nakshi Hat platform went through important stages which are, setting up the development environment along with writing application code and the database integration. The platform backend with its business logic was implemented in Laravel while the client-side interface was programmed in HTML5, CSS3, and JavaScript.

1. Developement Environment Setting Up :

- **Laravel Framework:** The back-end logic was developed using Laravel, a powerful PHP framework. Its strong support for Model-View-Controller (MVC) architecture helps maintain clean and easily maintainable code.

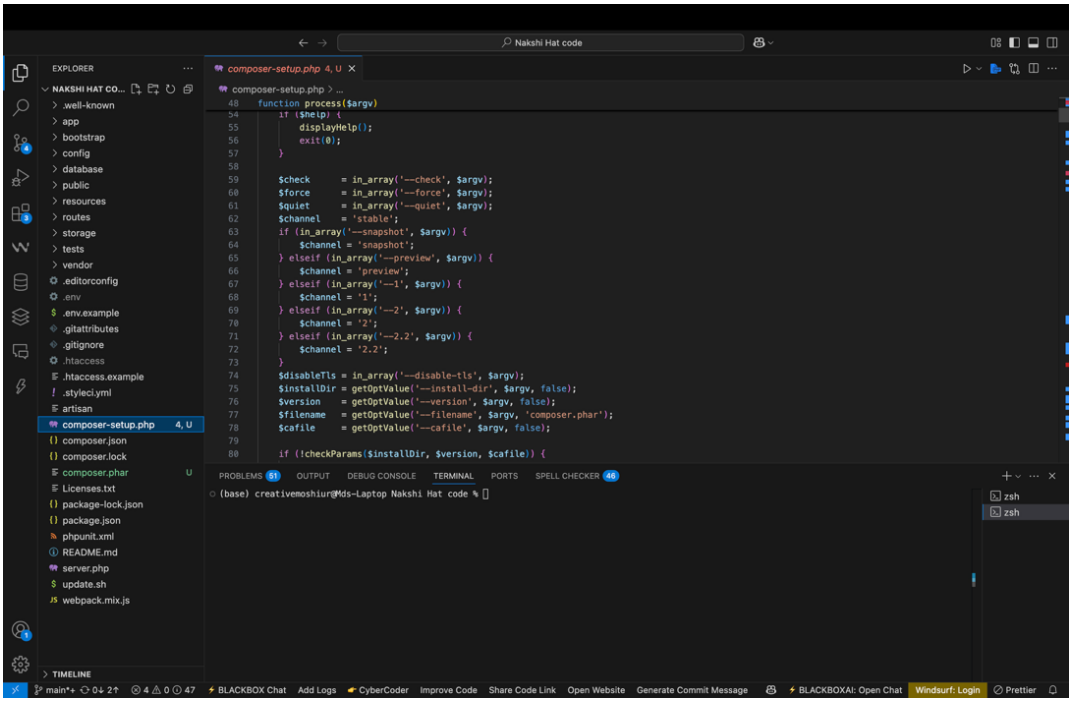


Fig : Development Enviroment setup.

- **Database Configuration:** A MySQL database was created to contain all the users, product and order details, and transactions.

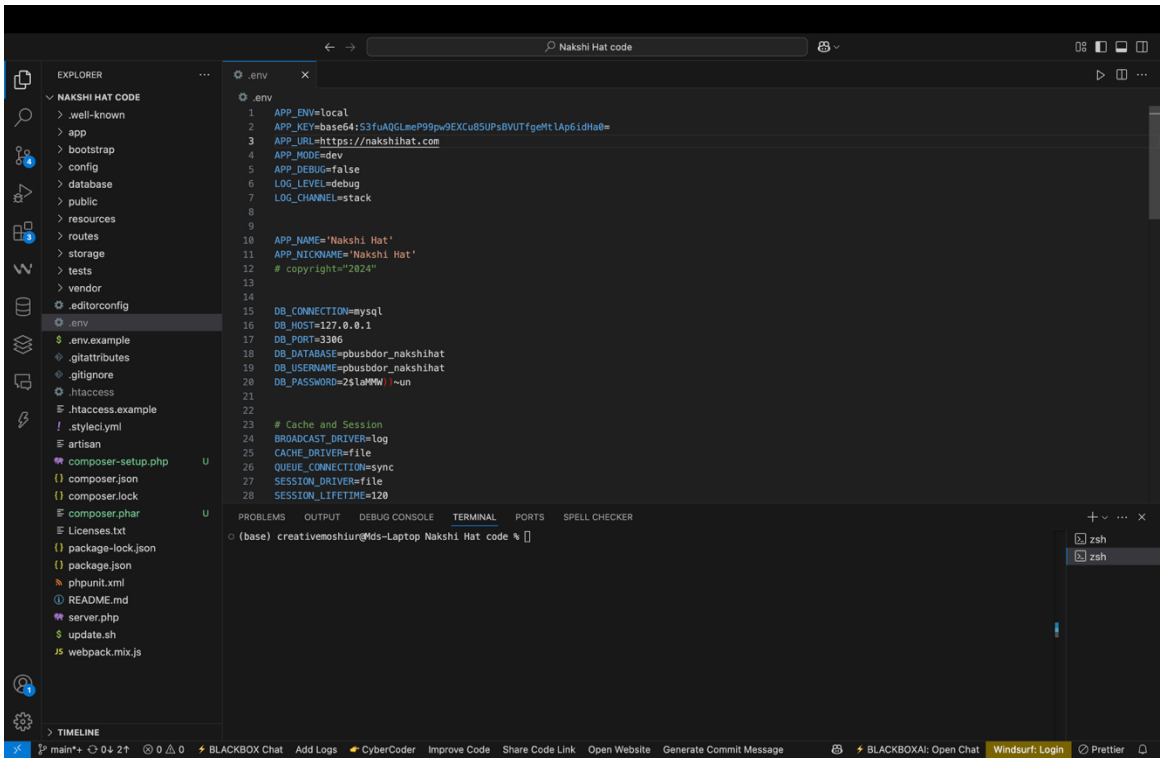


Fig : Database Configuration

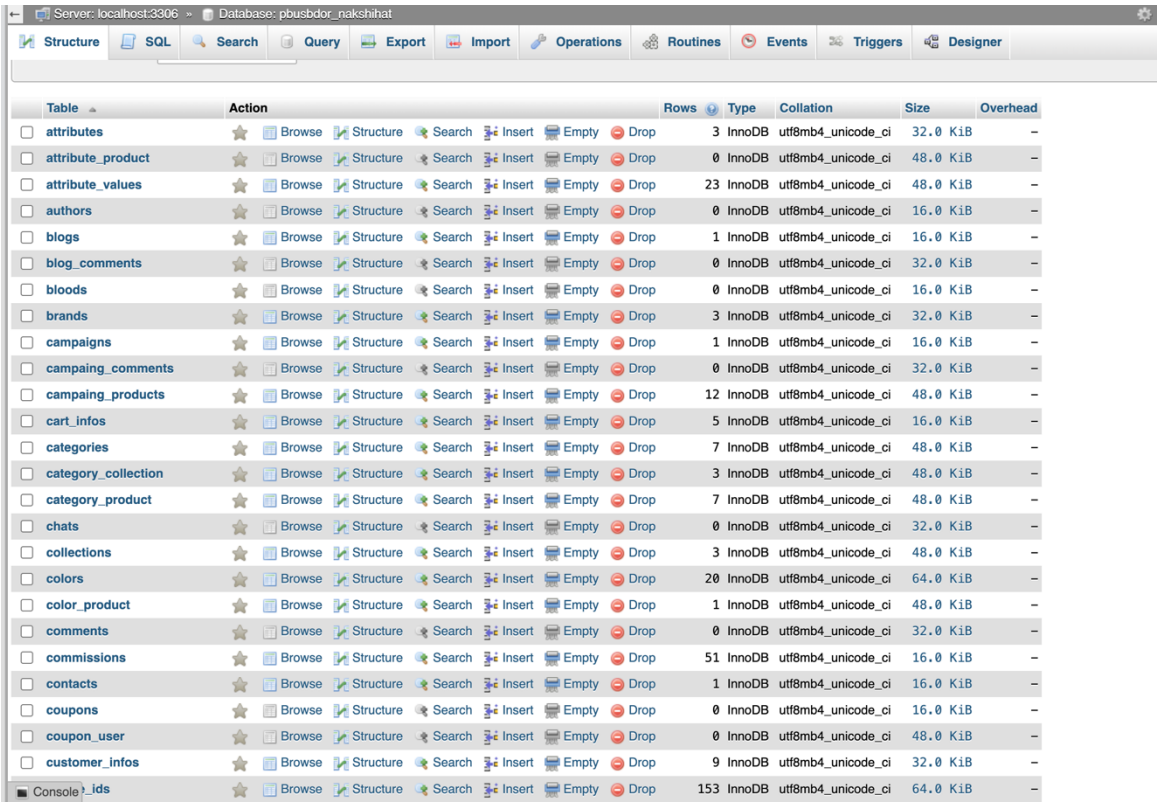


Fig : Database Table (Mysql)

- **Version Control:** Collaboration among developers and tracking changes in the code was done through Git version control.

2. Implementation Of Core Features:

- **User Accounts:** Accounts system with registration and login functionality was implemented using Laravel's Authentication So artisans and customers can access the platform.

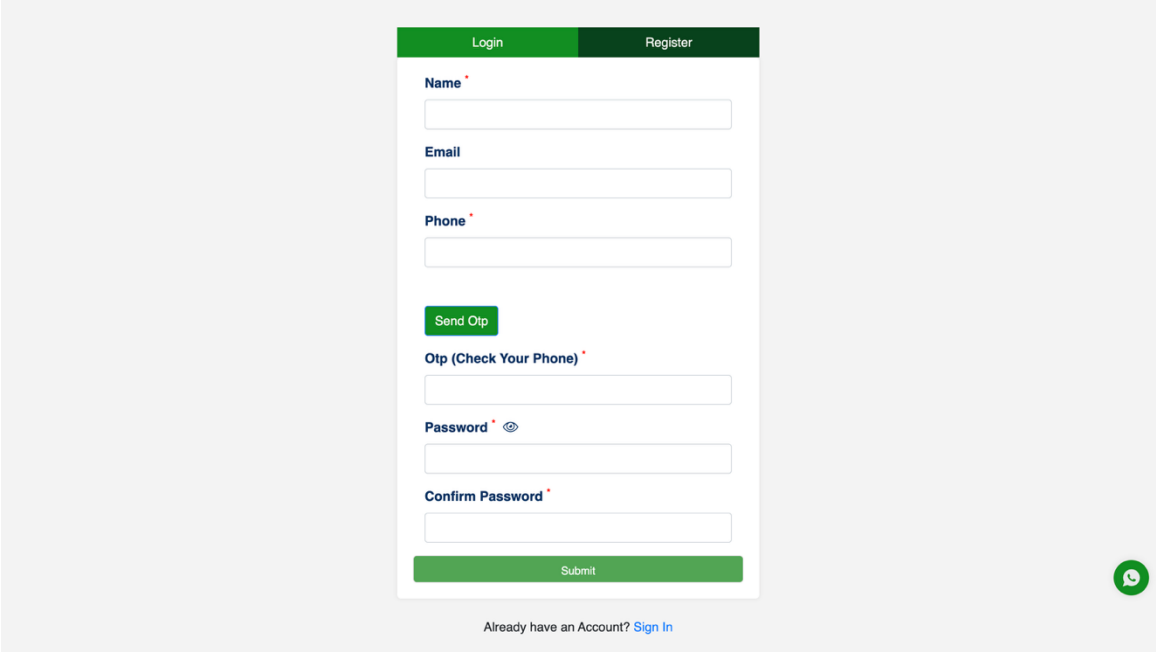


Fig : Login page

- **Product Uploading:** Products with images, description, price, etc can be easily uploaded and updated by artisans through a simple dashboard designed for that purpose.

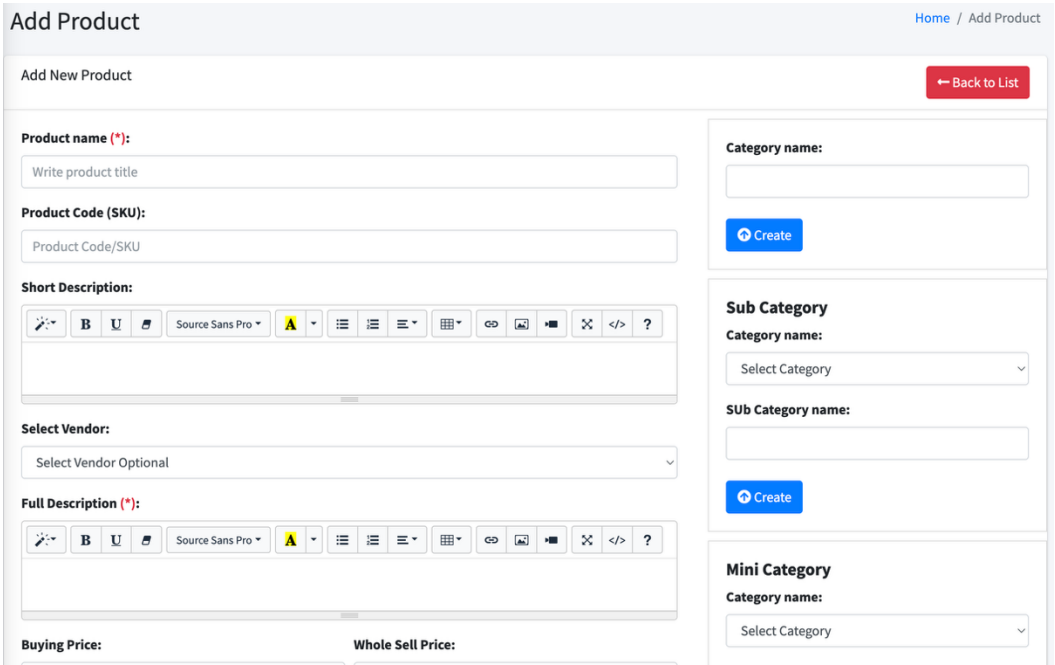


Fig : Product Uploading Page

- **Customer Order Processing:** Artisan can view and process customer orders marking as “processed”, “shipped”, or “delivered”, then customer can track their order status.

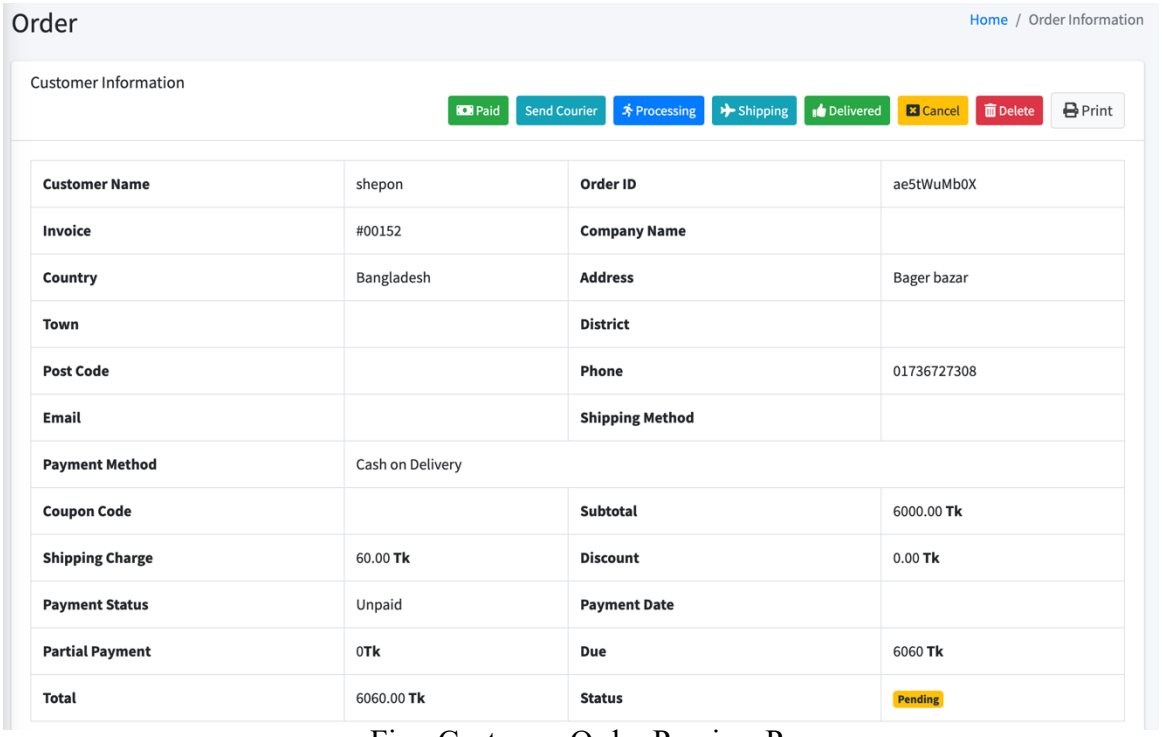


Fig : Customer Order Preview Page

- **Integration of Payment Gateway:** The local payment gateways bKash, Nagad, Rocket and automation tools were integrated into the system for securing transaction processing. These gateways help the customers in paying for products and help artisans withdraw their payments.



Fig : Bangladeshi Payment Gateway Logo

3. User Interface Design:

- The Site's appealing aesthetic as well as usability was accomplished via HTML5, CSS3, and Javascript.
- The platform is responsive with the use of Bootstrap, making it desktop and mobile friendly.

3. Admin Dashboard:

For user and transaction account control, content moderation and overall user administration, an administrator panel was developed. The administrator dashboard enables the administrator to view the overall statistics of the platform.

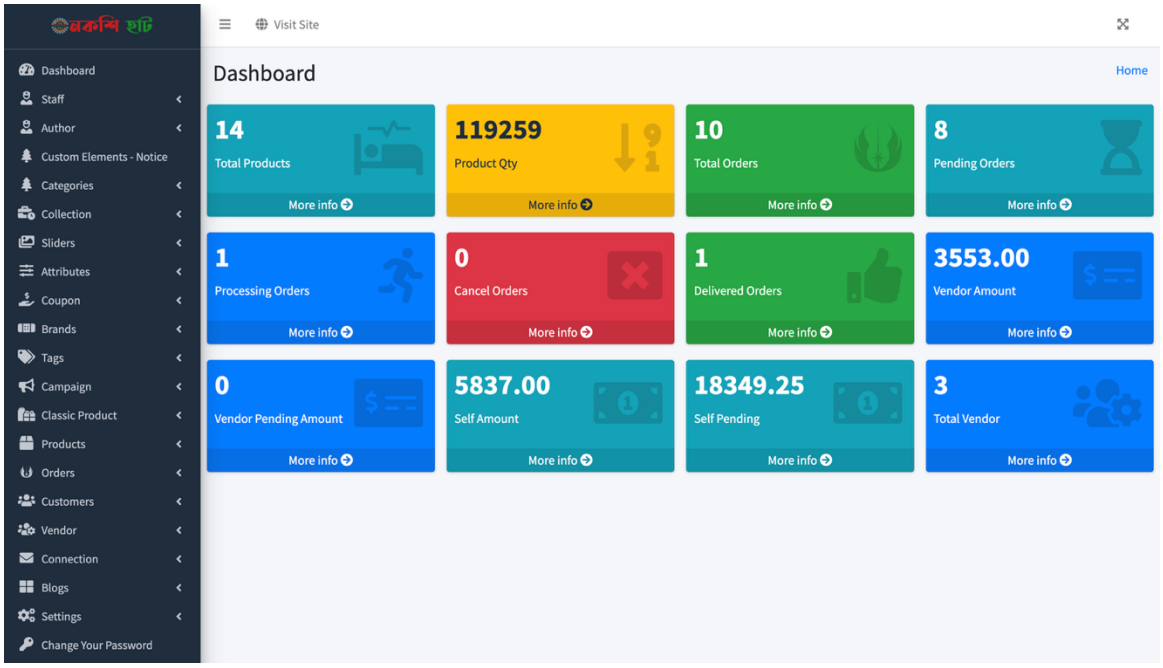


Fig : Admin Dashboard Preview

4.2 Testing Methodology

Once the development is done with the platform, it undergoes a myriad of testsuites to check if everything is functioning optimally. Both automated and manual tests covering all functional and non-functional aspects of the platform were conducted.

Unit Testing:

- In case any of the functions such as payment processing, order management, and user authentication had issues, corresponding unit tests alongside exceptionally granular mocks needed were created to absolutely guarantee proper execution.
- Payment processing, order management, and user authentication all have their respective unit tests to ensure everything is working smoothly. All the tests to the framework were run on Laravel's PHP Unit Testing to have all platform components perform to expectation.

Functional Testing:

- For registration and login to the platform, mock accounts were created and then the mock processes were run using the real end procedures to test the processes.
- Features such as the user registration, product upload, purchase and order tracking were examined alongside their designated workflows as the mock accounts were used.

Performance Testing:

- An attempt to stress the platform with hundreds of thousands users was made just to ensure that it can still retain its speed with more orders coming in.
- To keep the platform still under load while trying to simulate excess traffic, countless transactions were performed and the system continued unphased.

User Acceptance Testing (UAT):

- To make certain that the platform interface would be suitable for the target users, rural artisans were invited to participate in the UAT phase.
- Artisans were asked about the perceived difficulties in uploading products, managing orders, and retrieving payments. The platform's usability was enhanced based on these responses.

Security Testing:

- E-commerce platforms have critical security requirements. The platform was evaluated for potential risks such as SQL injection, XSS, and CSRF.
- Some of the ways security was increased include the use of Laravel's built features like ensuring inputs are validated, passwords are hashed, and other forms of security bolting.

4.3 Issues Encountered and Solutions

While performing the implementation and testing work, the following challenges were noted:

Challenge: Issues with Payments Integration
As a result of the local payment systems bKash, Rocket, Nagad we had problems dealing with the API integration due to local payment service complexities.
Solution: After a number of attempts with the payment providers, we were able to integrate systems fully with orderly functioning of provided APIs and payments as a whole performed order seamlessly from all ends including customers and artisans.

Challenge: Artisans Digital Literacy
Artisans having low digital skills found it hard easies and used this simple platform.
Solution: To some extent, this mitigated the problem through simple guides and platform explanation through video courses that acted as walkthroughs for personnel platform usages as well as creating a Intuitive uncomplicated easy to navigate system which translates designed interfaces intended to address overcome the barriers towards faster adaptation.

Challenge: Server Performance and Load

The platform slowed down during testing phase with a little traffic simulation at first which is focused on checking the platform performance under high user load.

Solution: The speed and performance of the platform were enhanced by optimizing database query along with employing caching methods. Furthermore, we also relocated the platform to the cloud based server which boosted resources alleviation of workload so authoring it to increasing traffic will not stand as a hindrance.

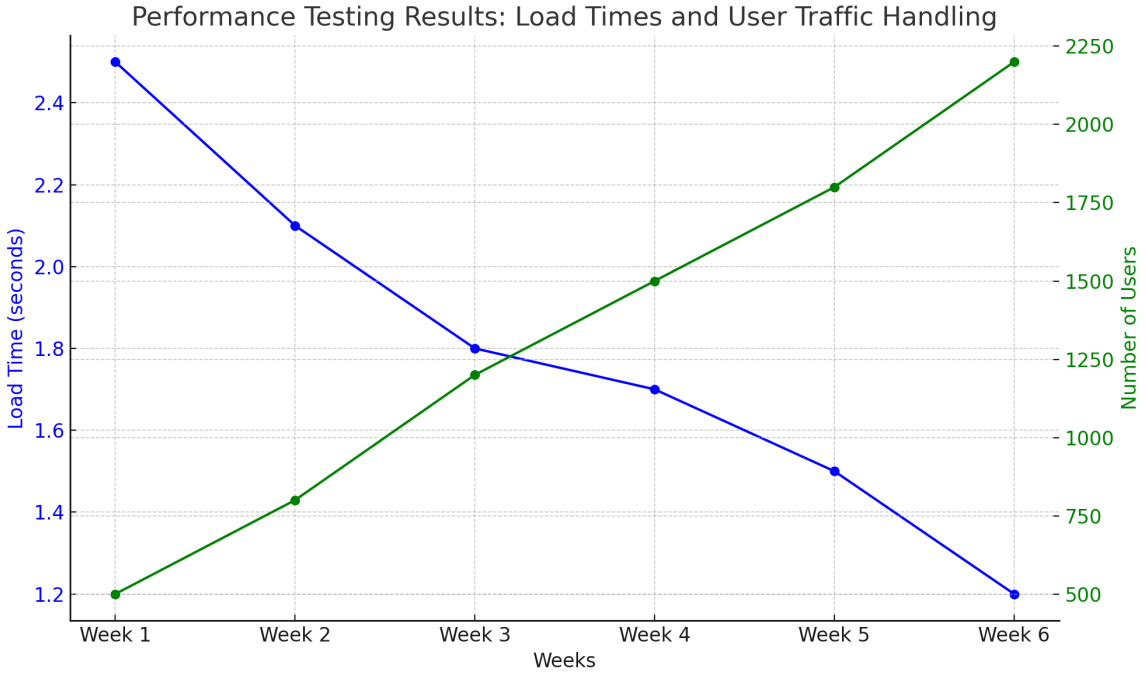


Fig : Performance Testing Results

CHAPTER 5
RESULTS AND DISCUSSION

5.1 Overview of Results

The goal of creating and testing the Nakshi Hat platform was to design an operational e-commerce system that would help rural women artisans in Jamalpur region to market their handicrafts directly to consumers. After implementation and testing, feedback was taken from artisans and users to evaluate the system. The platform was successful in achieving several of its goals such as allowing artisans managed online shops, removing all intermediaries, and establishing fair pricing for their products.

The results were assessed along a number of major dimensions:

- **Usability of the Platform:** The degree of ease expressed by artisans in uploading items, tracking orders, and managing payments on the platform.
- **Access to Markets:** The total geographical reach of artisans as a result of using the platform beyond their local region.
- **Economic Empowerment:** The change in income levels and compensation for artisans' work.
- **Customer Satisfaction:** The experience of customers who bought products from the platform in terms of browsing , order management and payment processes.

5.2 Performance Evaluation

The Nakshi Hat platform has received a considerable amount of recognition as it serves as a unique marketplace specially designed for artisans. However, we track its aim and objectives using the following measurements.

Usability Testing:
For the initial testing phase, we focused on artisans who lacked technological skills, so we selected a few from every remote corner who were not used to handling advanced technologies.
Their task was to upload products, keep track of their inventory, and handle orders.

Results: Overall, the evaluations indicated that the participants found the Nakshi Hat platform promising and captivating hoping to use it in the future actively. Most of the artisans are now able to independently sustain their online shops after simple yet concise tutorials. The majority of the artisans experiences slight difficulties in image uploading, but the issues that arose were simplified through clearer guides and simplified directions.

Order and Sales Management:
The artisans were able to manage orders in real time and could monitor each stage, beginning from order processing to delivery.
Results: The platform's order management system was effective. Artisans could access and edit orders. Purchasers were able to monitor the status of their items. Some rural places provided logistical problems for shipping, thus some orders were delayed. With improved integration with local courier services, this situation is anticipated to change.

Global Market Access:
This platform aimed to enable rural artisans to access markets far off from their local markets. Elimination of middlemen enabled artisans to set their prices and connect with customers directly.
Result: The platform allowed artisans to significantly increase their market reach. Some artisans reported receiving orders from different regions of the country. Due to insufficient marketing, the platform's reach outside of Bangladesh was minimal. Some targeted marketing and social media in the future could greatly increase exposure internationally.

Financial Results:
Empower rural women artisans by giving them the ability to sell directly to customers through the platform, and financially sustain them to achieve independence was the key motivation in developing the platform.
Result: The platform directly impacted many artisans income positively eliminating intermediaries because these artisans now had control over the prices they set. Artisan payment withdrawal using local systems bKash and Nagad was effortless, resulting in artisans claiming the secure payment methods with no disputes.

Customer Satisfaction:
The platform received an evaluation as per customer experience. Inquirees were asked about their ease of purchase, satisfaction level with product quality, and their experience as a user.
Result: Customers were satisfied with the purchased products and the purchasing process itself. A few customers did put forth suggestions regarding the filtering and search features which would ease product browsing and enhance the overall experience.

5.3 Feedback from Artisans and Users

Artisans and customers provided feedback via surveys and direct interviews as outlined below:

Artisan Feedback:
The artisans regarded the platform as helpful since it gave them greater control over the sales of their products and expanded their customer reach.

Positive Feedback: Artisans valued the intuitive site design, their ability to set prices, and the safe payment methods. Many of the artisans felt that the platform empowered them to manage their business affairs more confidently in the digital space.

Challenges: Some artisans had set more granular business expectations. These set more granular business expectations. They had set more granular business expectations. Some artisans had more granular struggles with understanding admin navigation, specifically with updating products and monitoring stock levels. These obstacles were overcome by addressing the streamlined interface and enhanced training. [7]

Customer Feedback:
Customers rated ease of use for the platform as well as the distinctive selection of handmade products. Some customers suggested improvements relating to the search function as well as the addition of more product categories to enhance browsing.

Satisfaction Rate: In general, customers expressed high satisfaction with the majority indicating willingness to shop on the platform again.

5.4 Challenges and Solutions

Throughout the implementation and operational phases of the project, the following problems were identified:

Problem: Low Digital Literacy levels of the Artisans
Solution: A collection of video guides and customer support modules were designed for the artisans as e-commerce platforms were new to them.

Problem: Delivery and Logistical Challenges
Solution: Remote areas faced delays in shipping. Further development will aim at Platform provided Integration for local courier services to enhance shipment delivery efficiency. [8]
Problem: Lack of Marketing and Exposure

5.5 Future Improvements and Recommendations

Following the feedback and evaluation, the subsequent improvements are suggested for Nakshi Hat:

Boosted Marketing and Outreach:

To increase the platform's exposure, digital marketing strategies such as email campaigns, influencer partnerships, and SEO should be incorporated.

Improved User Experience and Accessibility Interfaces:
Adding more product filters as well as improving search functionality will enhance the access and usage experience for customers.

Integration of Logistics and Delivery:
Prioritized integration with additional local and national couriers would enhance speed and reliability of delivery.

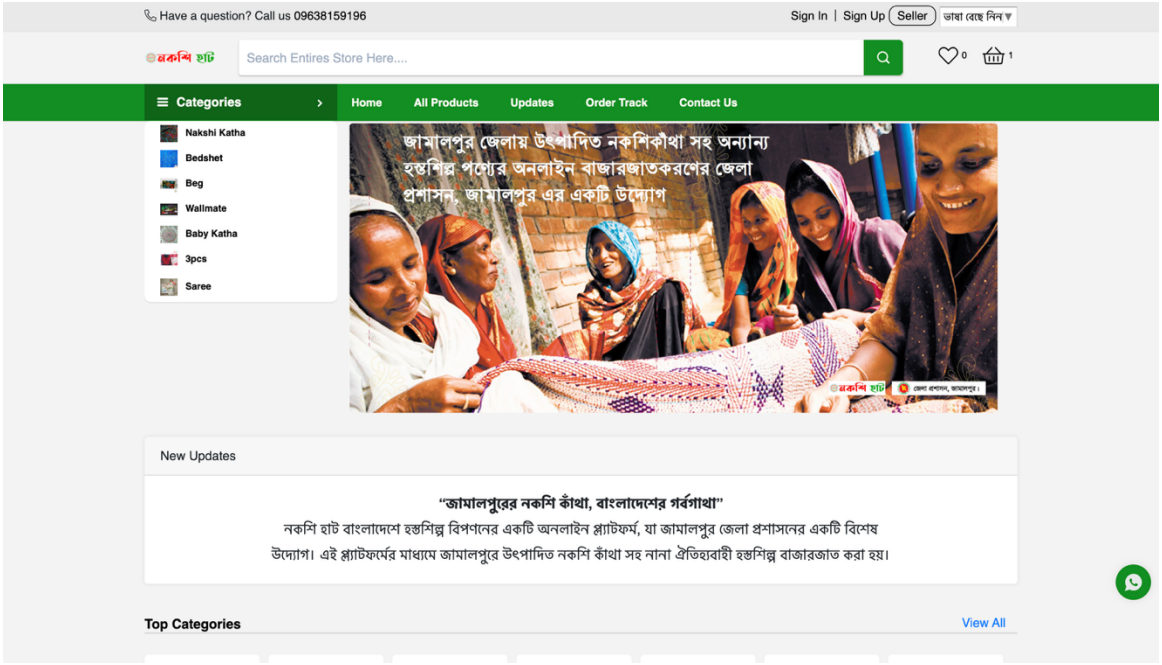
Global Market Expansion:
Supporting multiple languages as well as integrating international payment systems would assist in expanding the platform's accessibility beyond Bangladesh.

CHAPTER 6
VISUAL DOCUMENTATION OF NAKSHI HAT

This chapter illustrates the live deployment of the Nakshi Hat platform with visual representations of its key modules. The screenshots provided below demonstrate how users, vendors, and administrators interact with the system in real time.

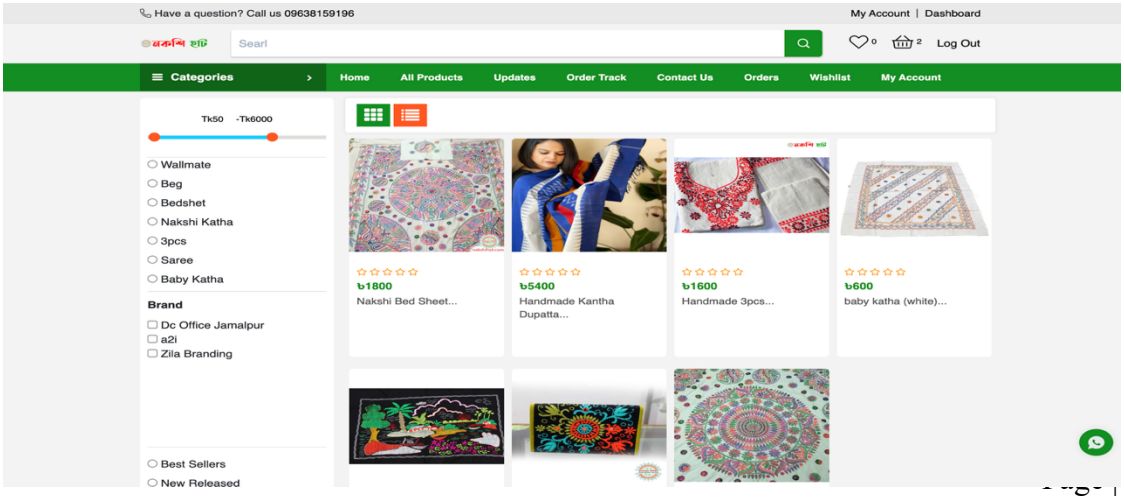
Home Page

The homepage offers immediate access to featured products, categories, search tools, and login/register links. It acts as the central point of engagement for all users.



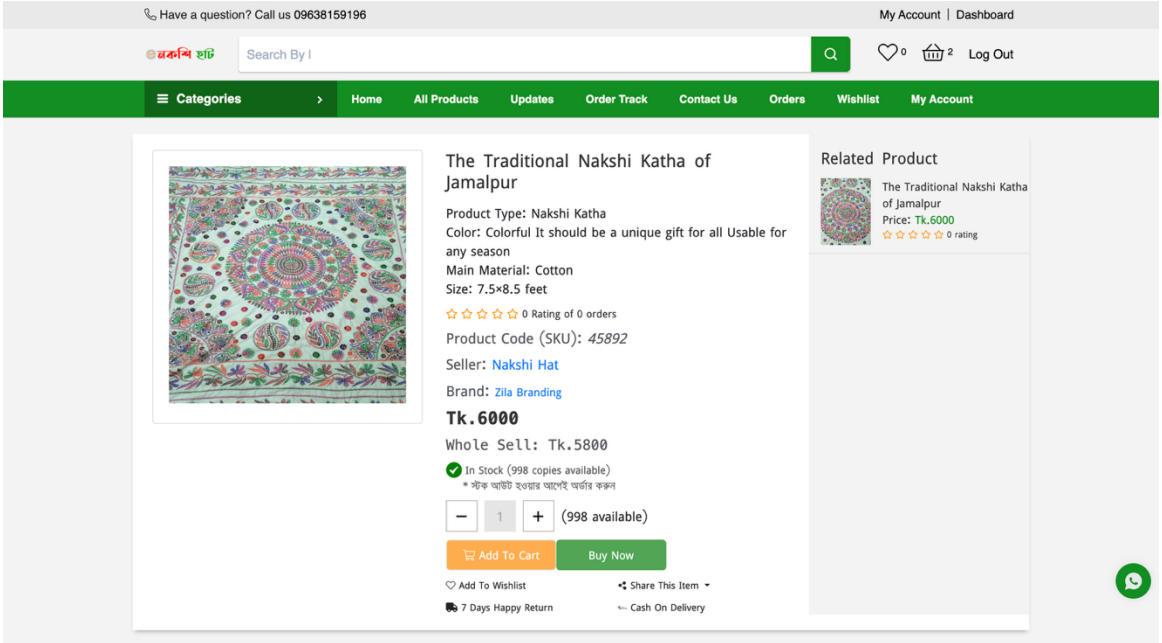
Product Categories

Visitors can explore a wide variety of product types organized under categories such as Nakshi Kantha, Saree, and beg.



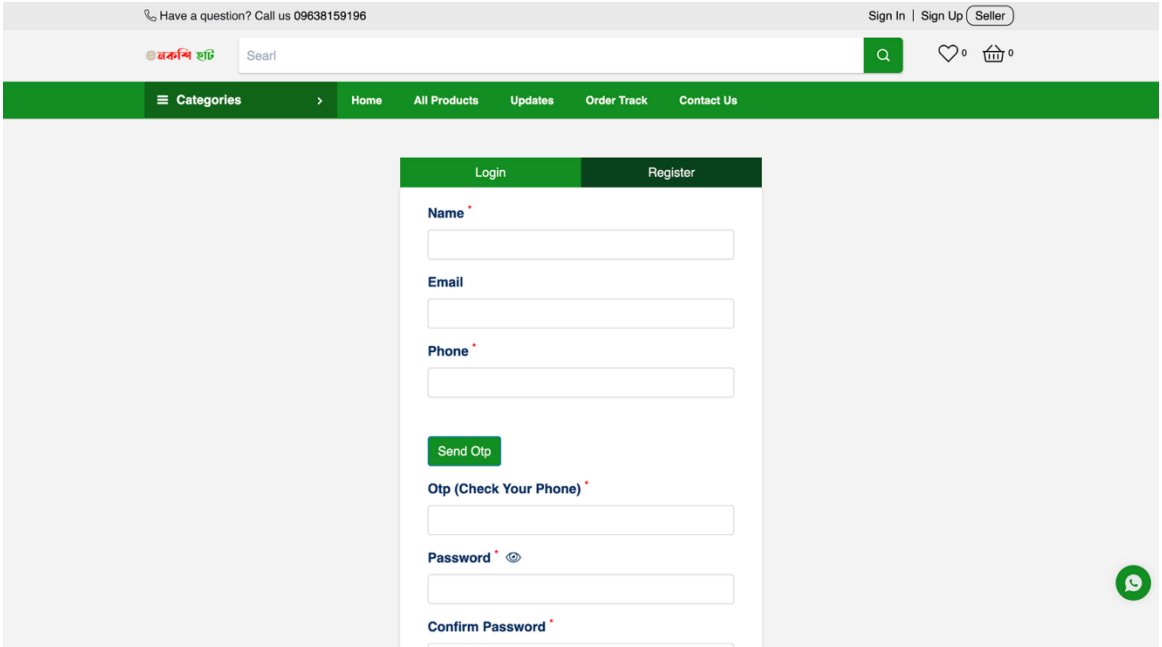
Product Details Display

Each product page provides a detailed view including title, pricing, product specifications, and vendor information with a visual gallery.



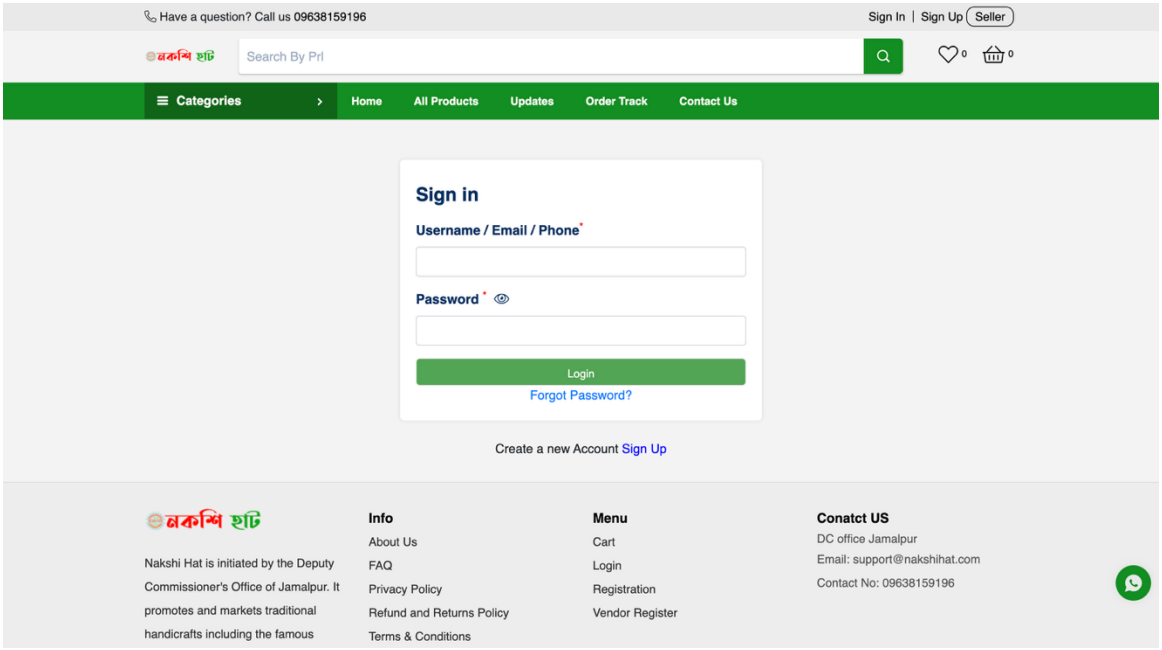
Customer Account Registration

New customers can create accounts through a streamlined sign-up process requiring basic user details. This enables access to ordering, order tracking, and profile customization features.



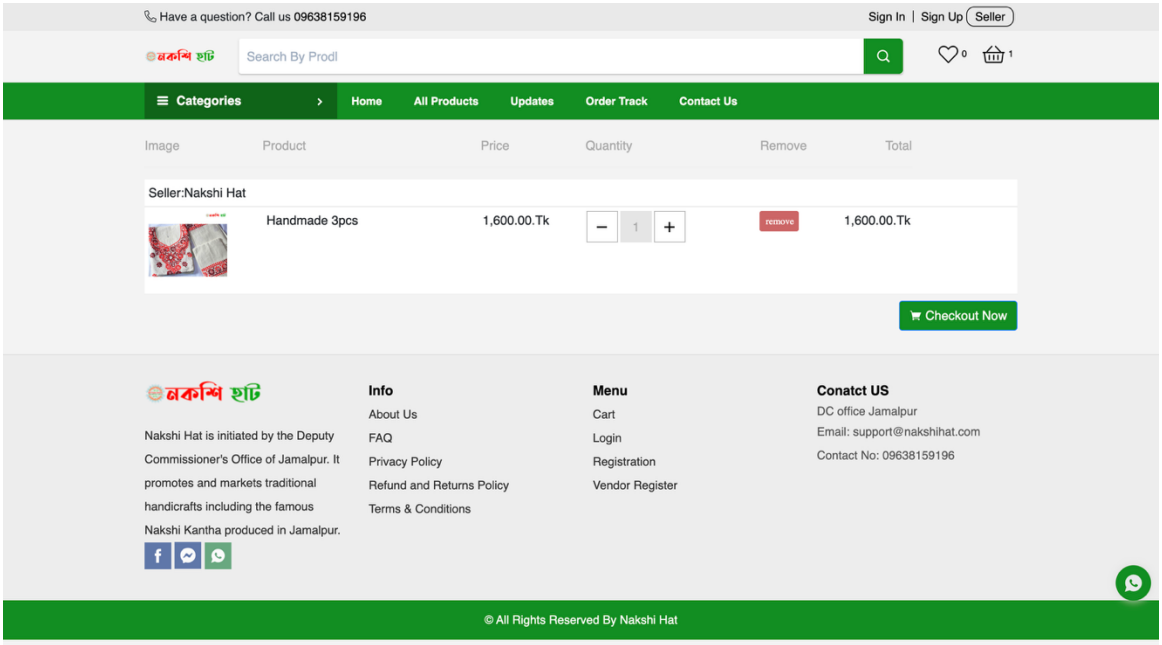
Customer Login Panel

This secured login form allows registered individuals—customers to access personalized dashboards using email credentials.



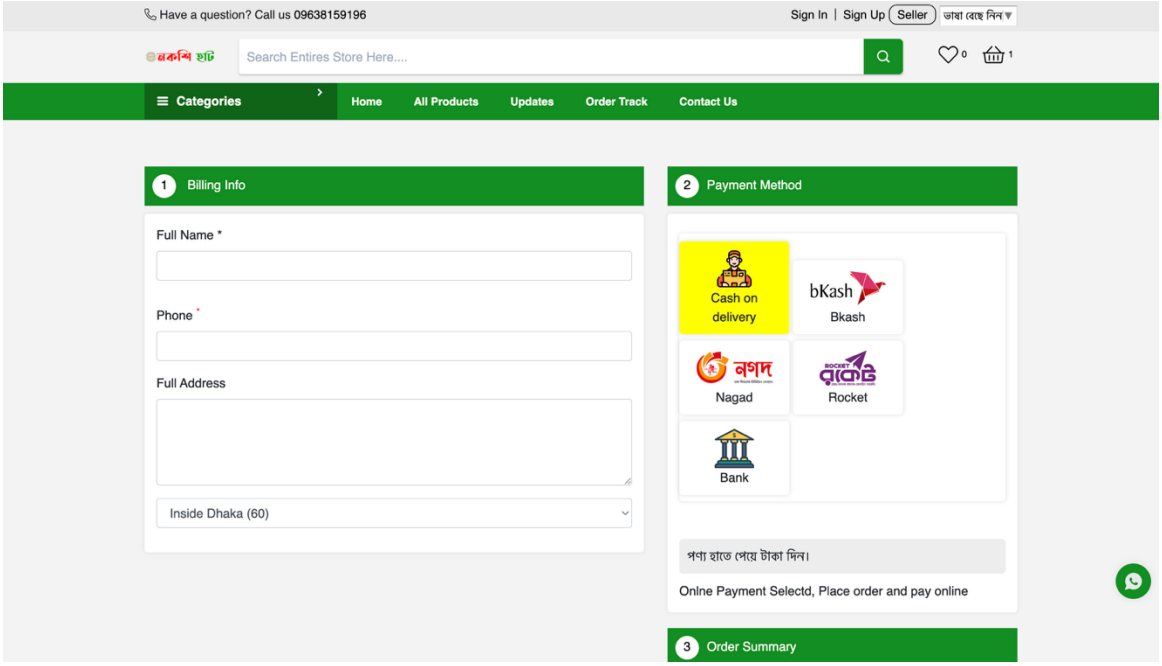
Cart Interface

Users can view selected items, modify quantities, remove products, and preview total costs before initiating payment.



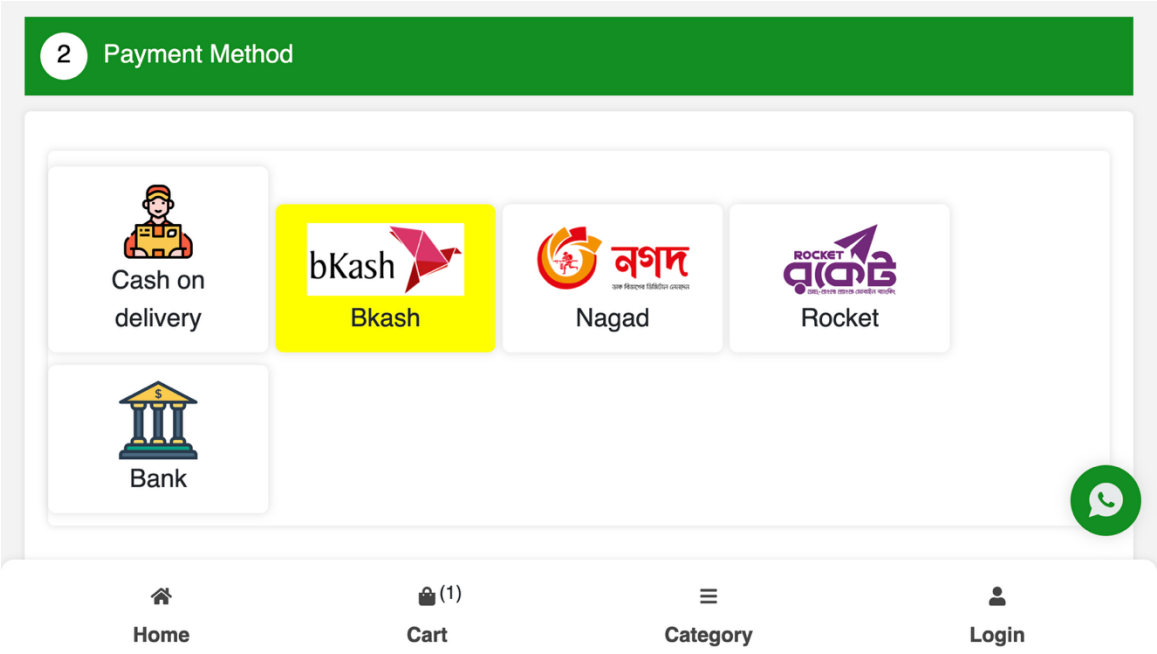
Order Confirmation Page

This section presents a summary of selected products along with billing and shipping details prior to final submission.



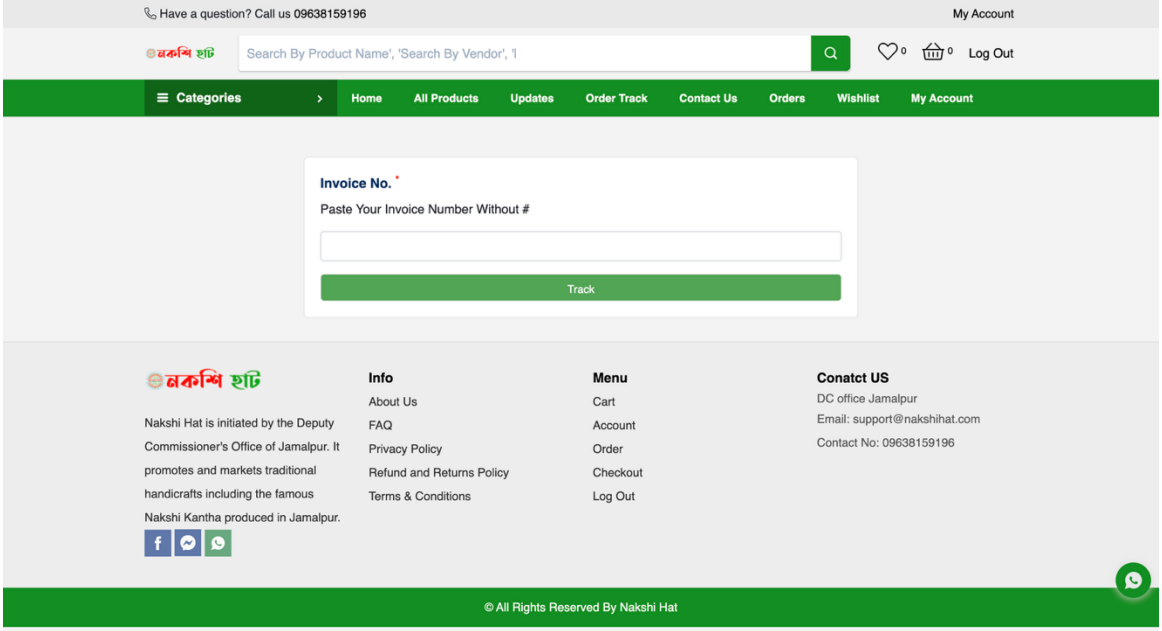
Integrated Payment Gateway

The platform features real-time payment integration supporting digital wallets like bKash and Nagad, alongside bank-based options.



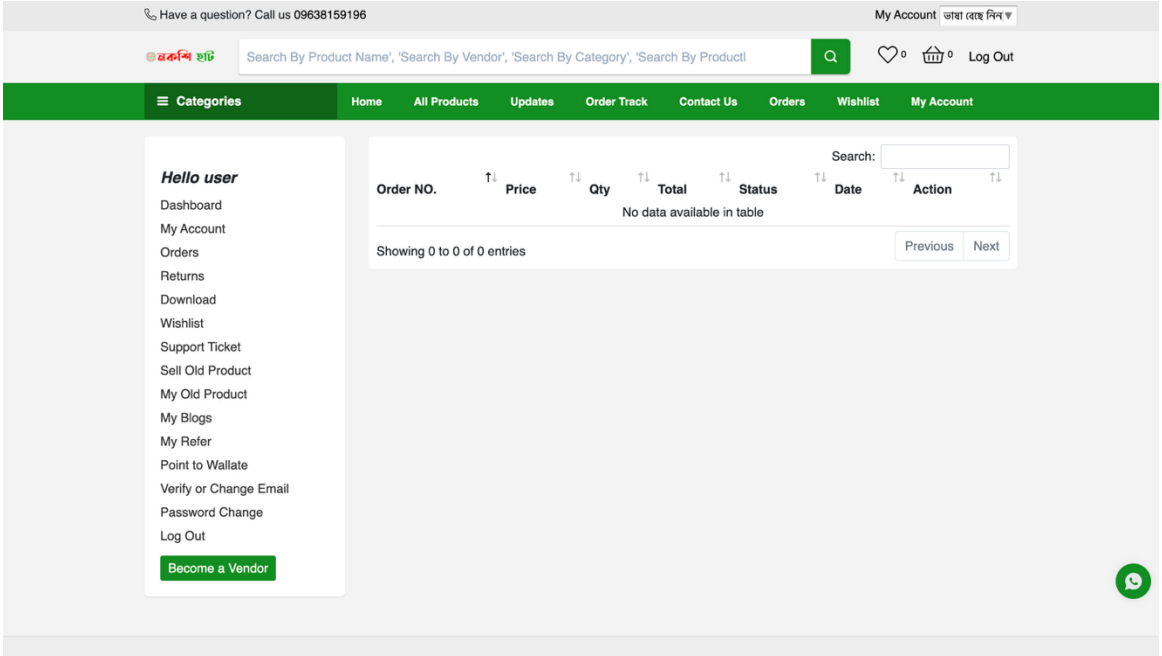
Order Status Monitoring

Customers can check the live progress of their orders post-purchase, from processing to delivery.



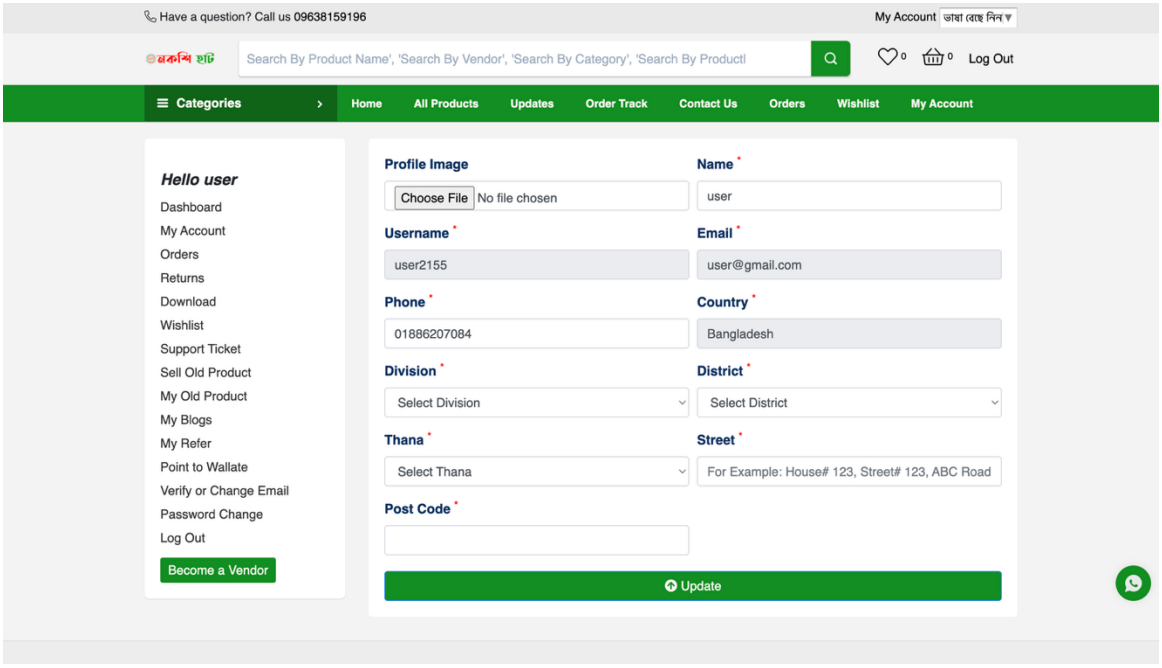
Customer Dashboard Overview

A comprehensive summary of customer account activity including current and historical orders, saved items, and billing addresses.



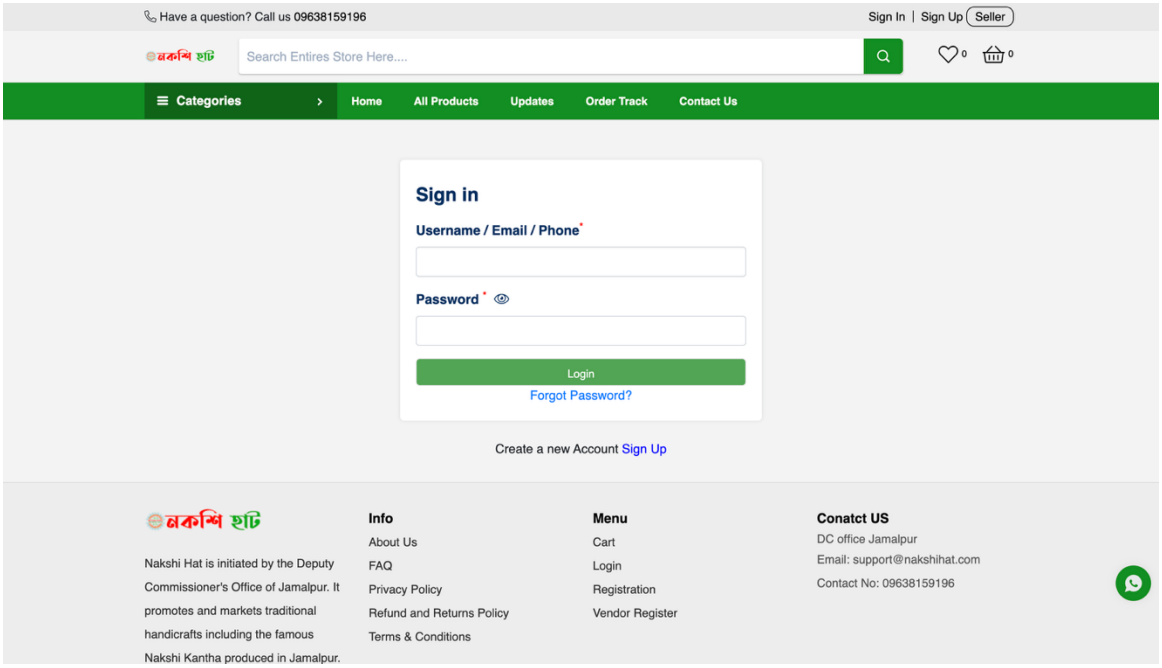
Profile Management

Users may update personal information such as name, contact number, and password for continued platform access.



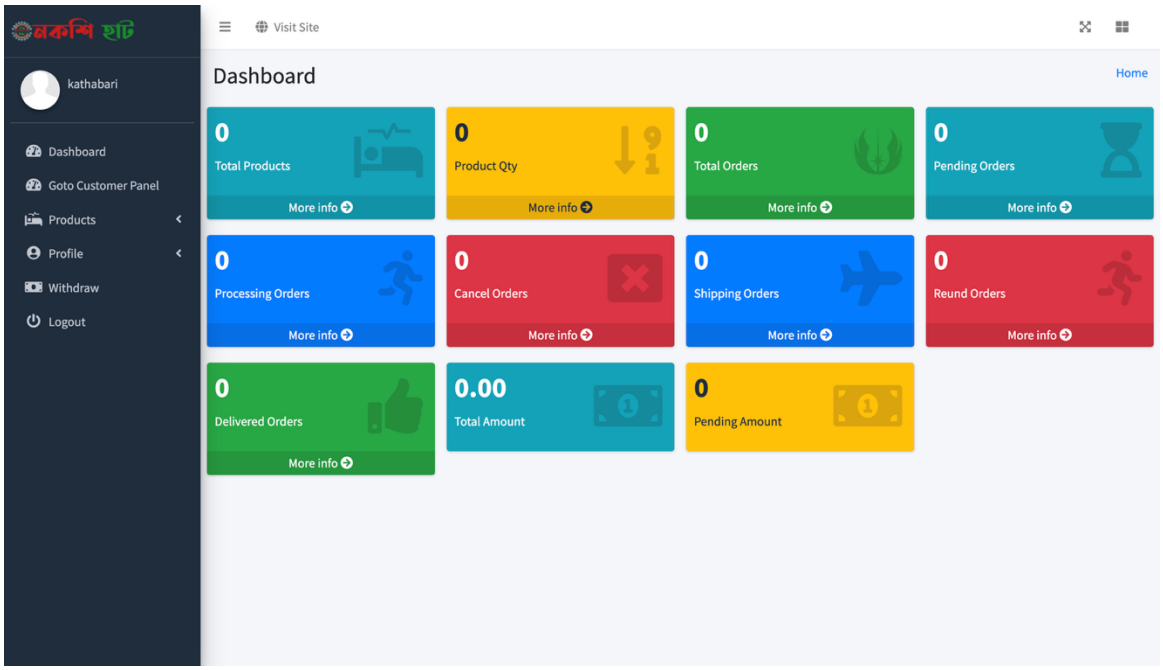
Vendor Login

Approved vendors access their business interface through a secure login portal tailored for their operational needs.



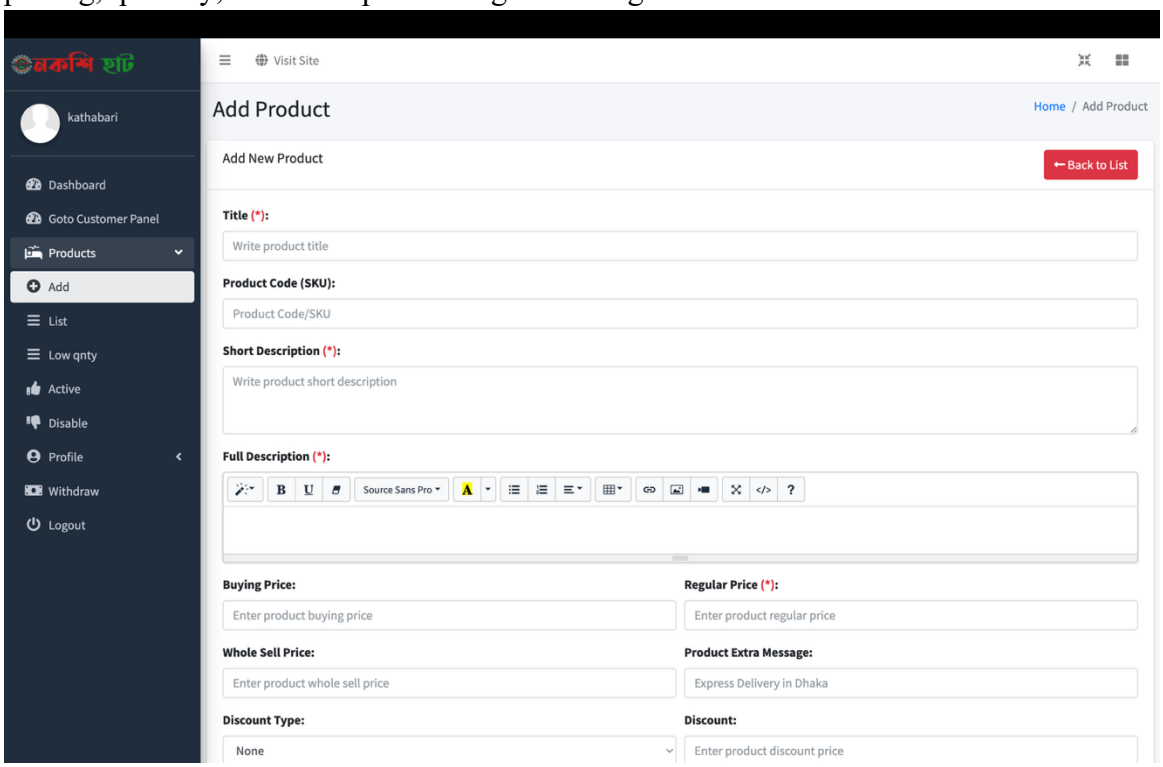
Vendor Dashboard

Artisans are presented with a summarized view of their performance metrics including total sales, current orders, and pending withdrawals.



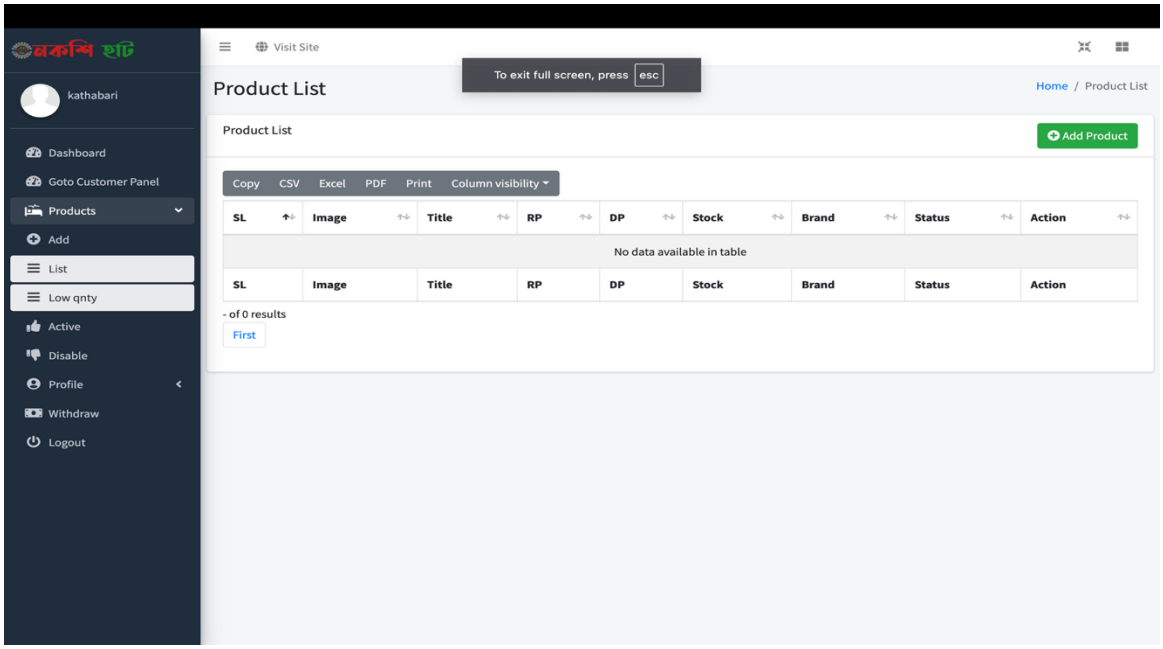
Product Entry Portal

Sellers can upload new items to their storefront by filling in details such as product name, pricing, quantity, and description along with images.



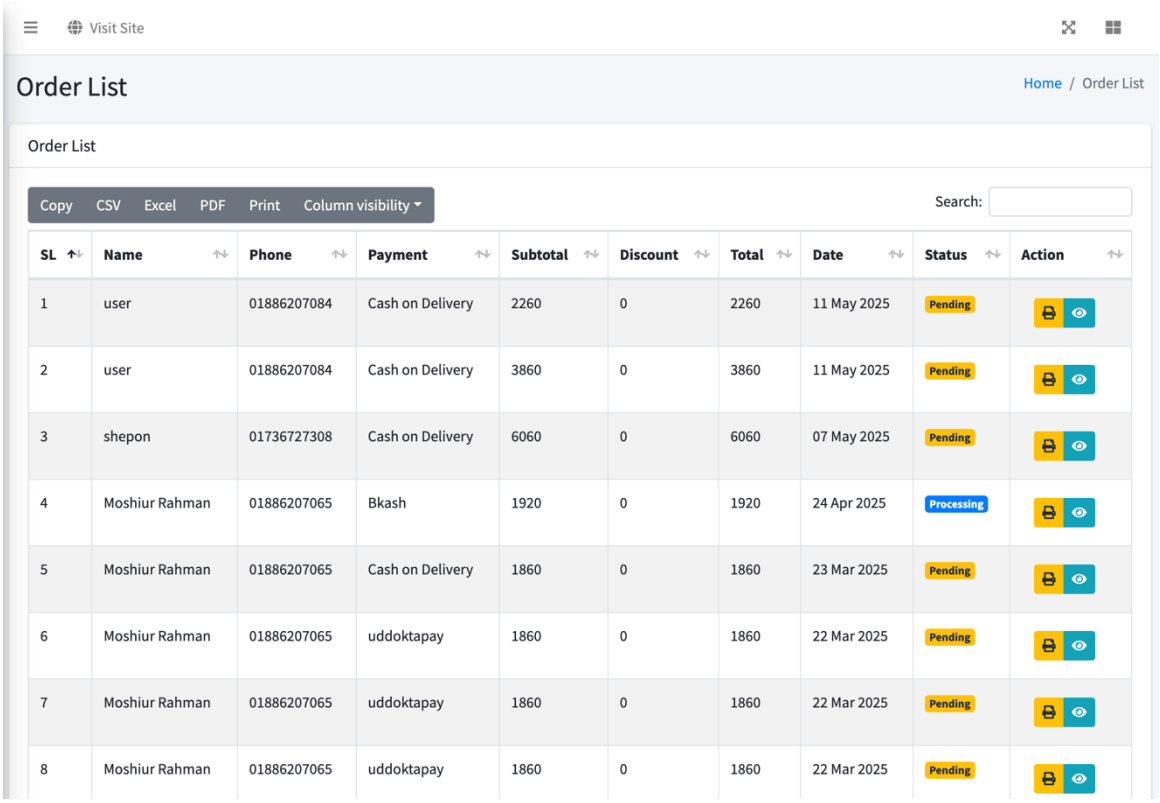
Product List Management

An editable list of all listed products where artisans can make live updates or remove outdated items.



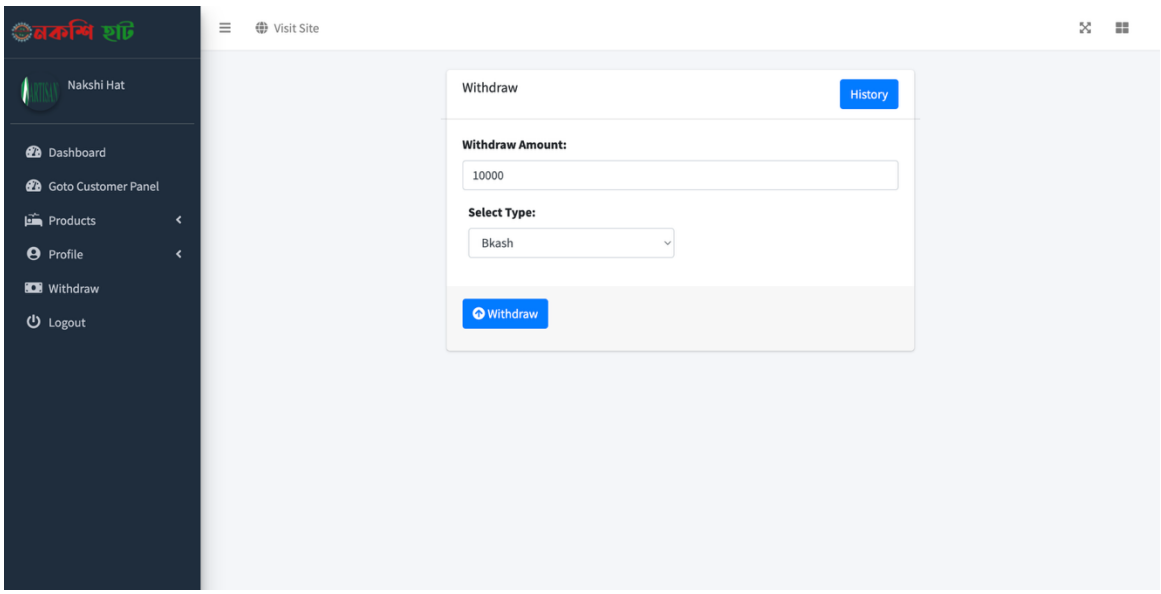
Vendor Order Manager

A dedicated view that allows sellers to acknowledge, prepare, and update customer order statuses.



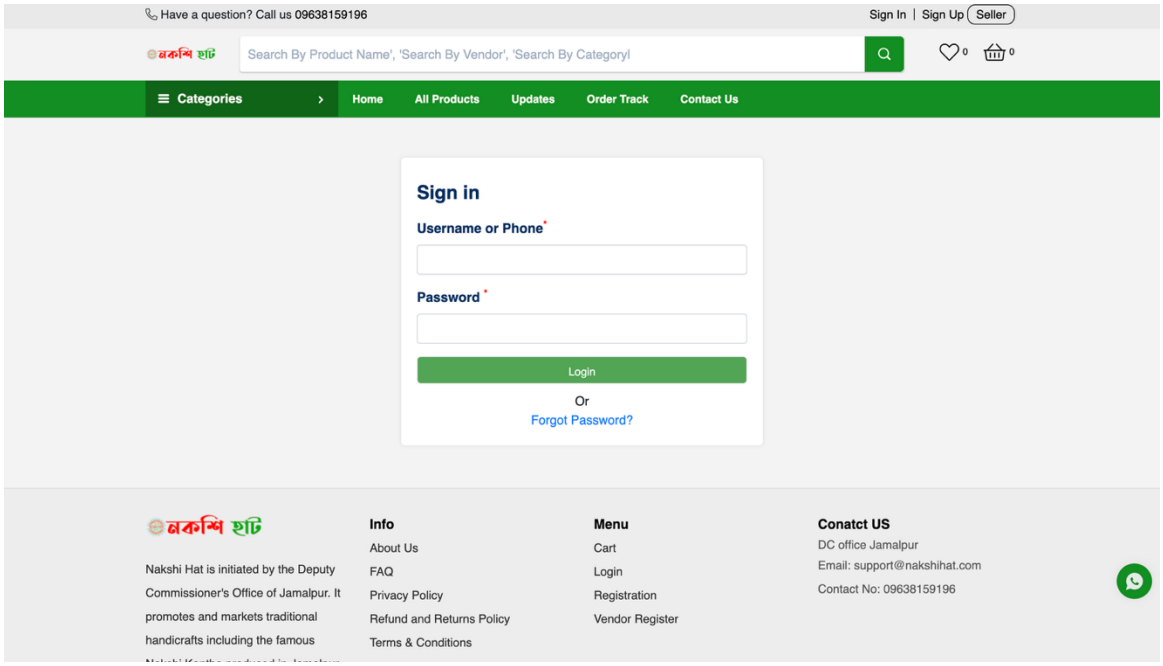
Withdrawal Interface

Approved vendors can initiate withdrawal requests for their earnings through mobile banking or linked accounts.



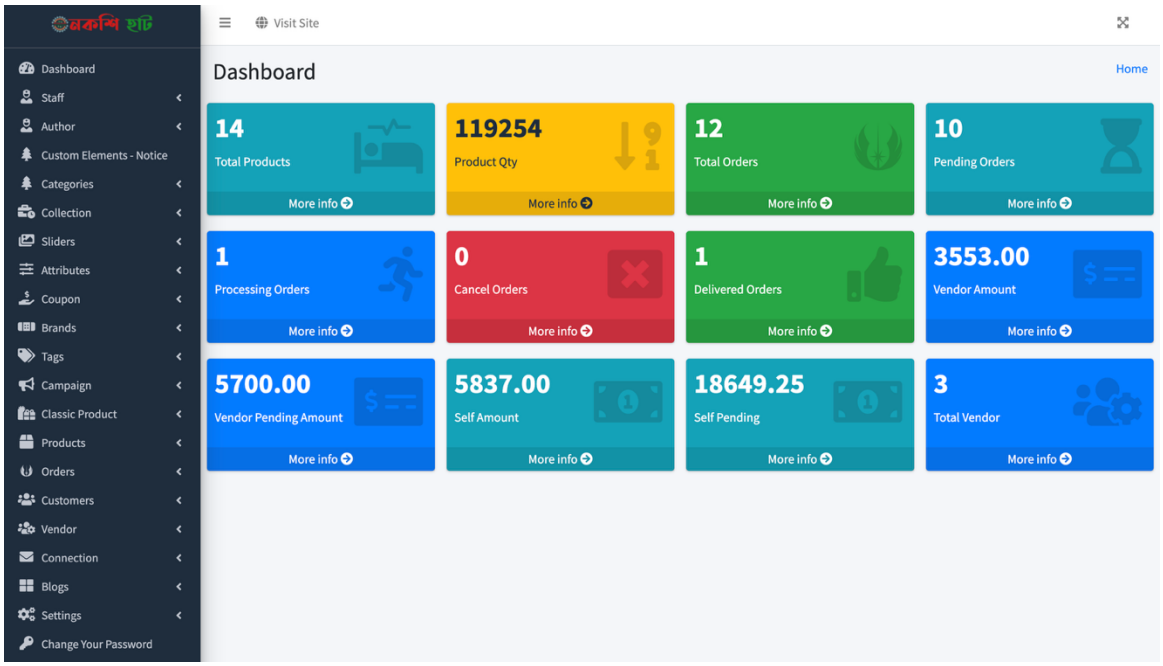
Admin Entry Gateway

Platform administrators access a private control panel via a secure login mechanism.



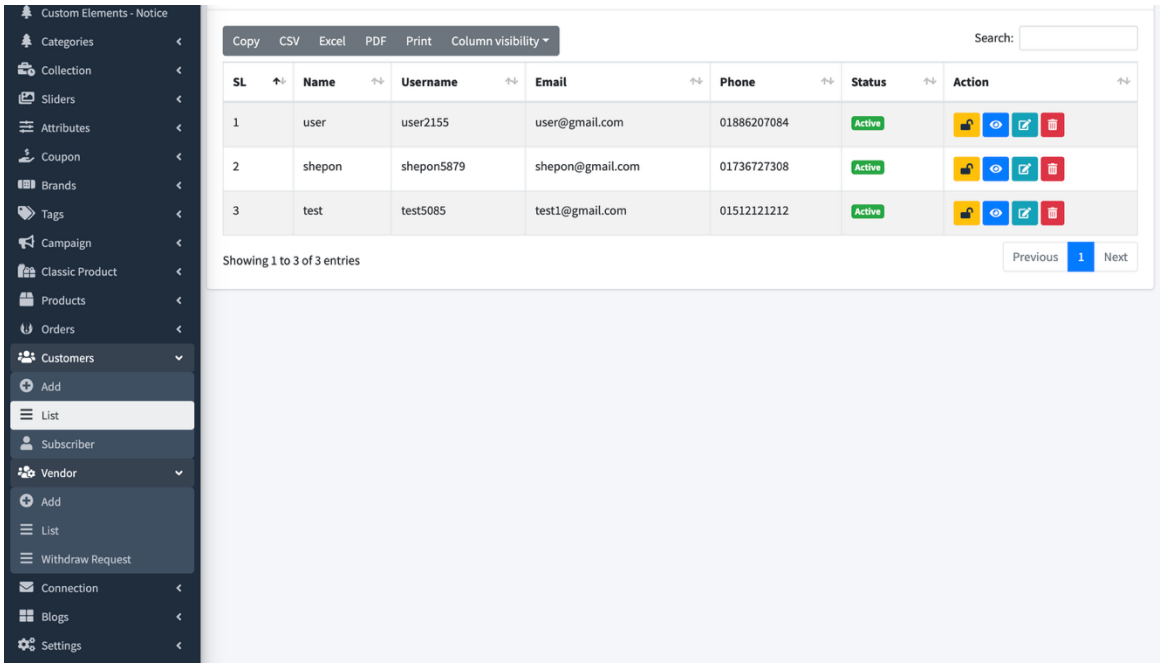
System Dashboard

An administrative control center offering insights into platform activity such as registered users, live vendors, product listings, and total orders.



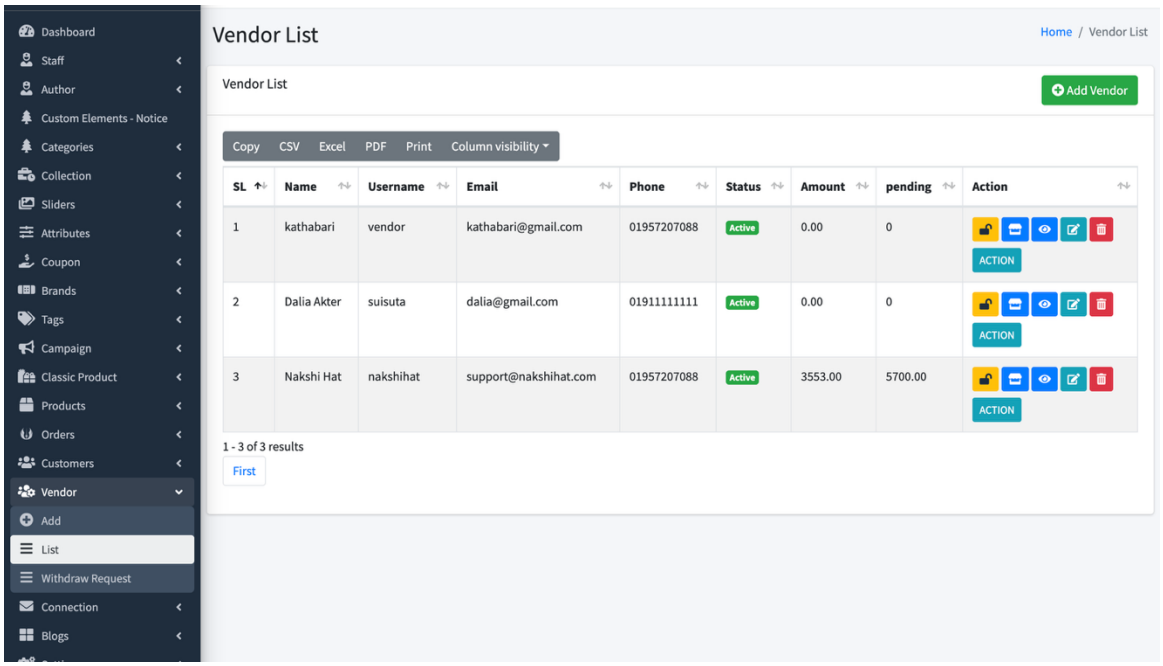
User Oversight Module

The admin can view, filter, and manage user accounts granting access, deactivating users, or modifying credentials.



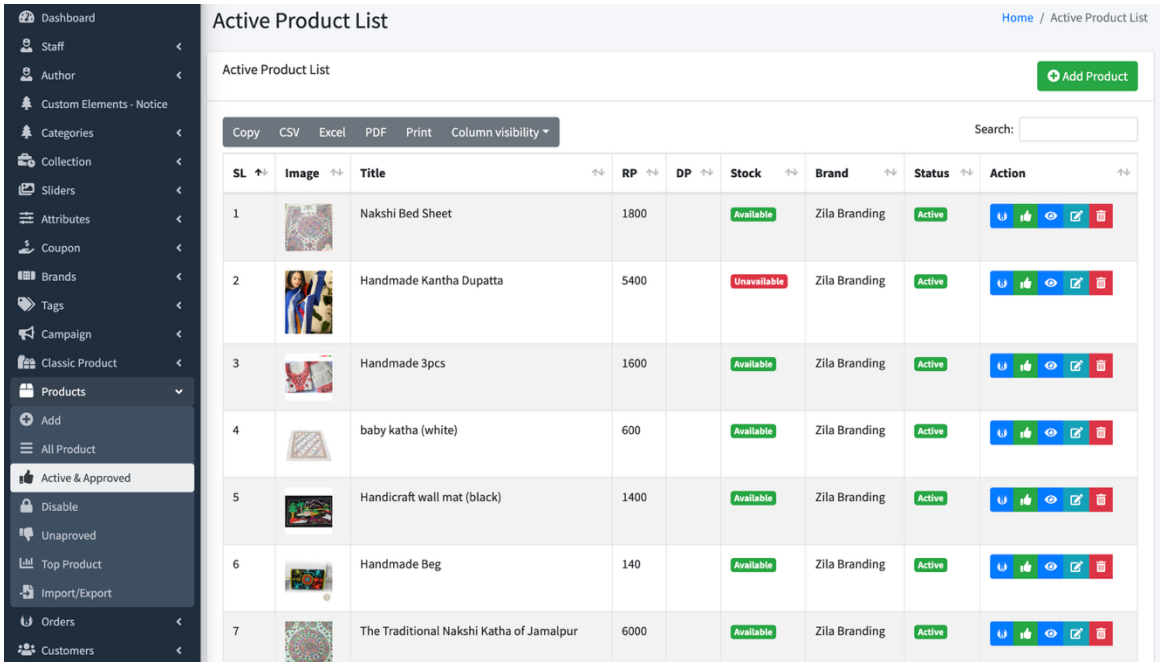
Vendor Review Console

Pending vendor registrations appear in this section for approval or rejection, allowing vetting before store activation.



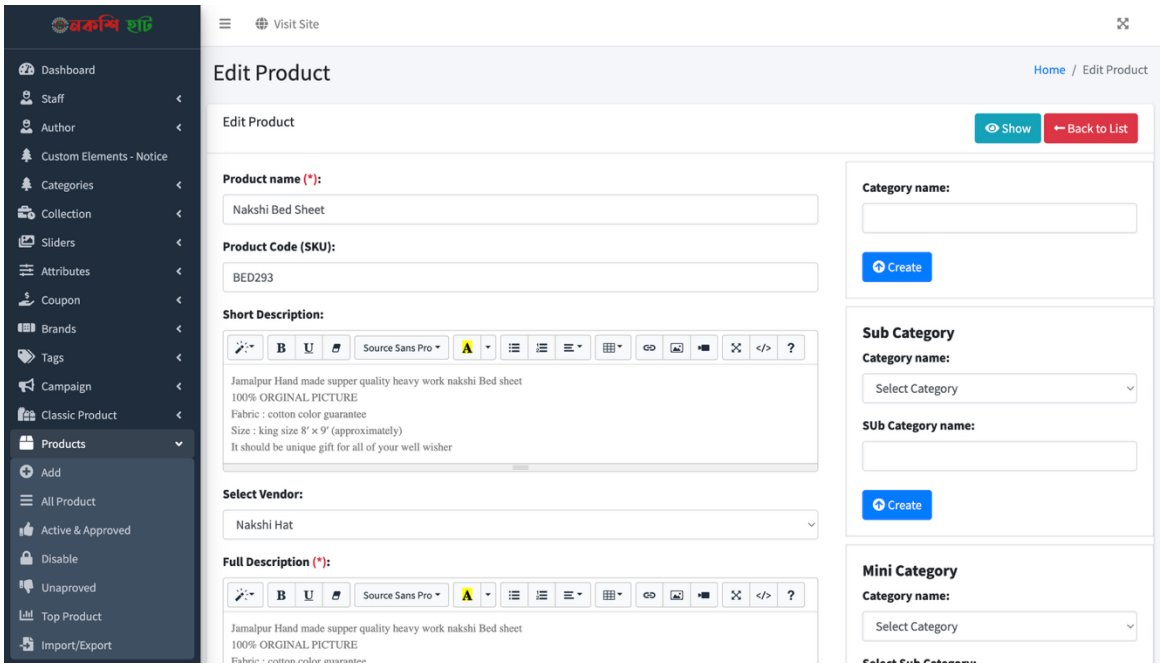
Product Moderation System

All vendor-submitted products are first reviewed in this queue where the admin may approve, reject, or request changes.



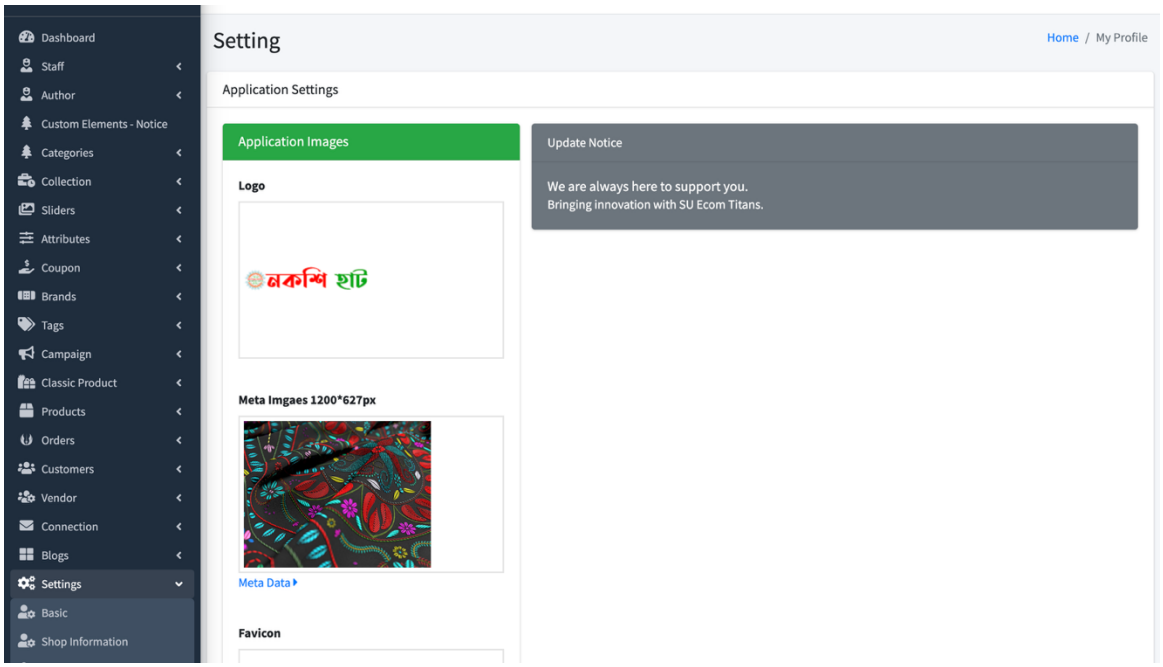
Category Organizer

The admin can define, rename, or delete product categories which directly influence storefront navigation.



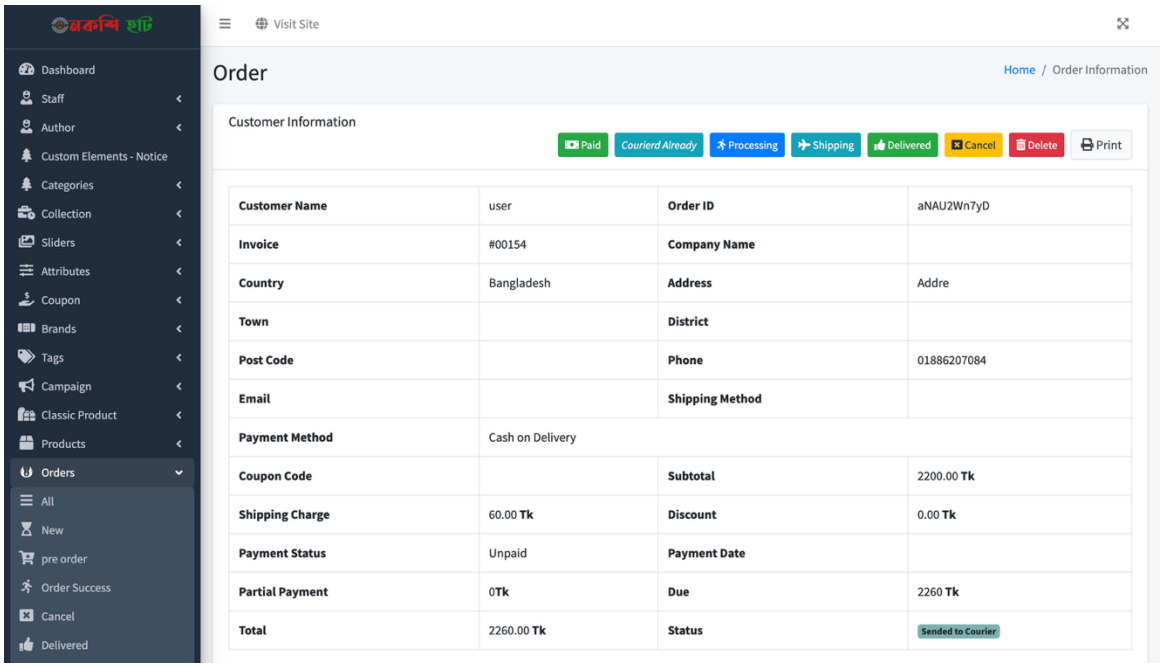
Platform Configuration Panel

This includes options to change site-wide settings like logo, contact email, shipping terms, tax rates, and payment gateway keys.



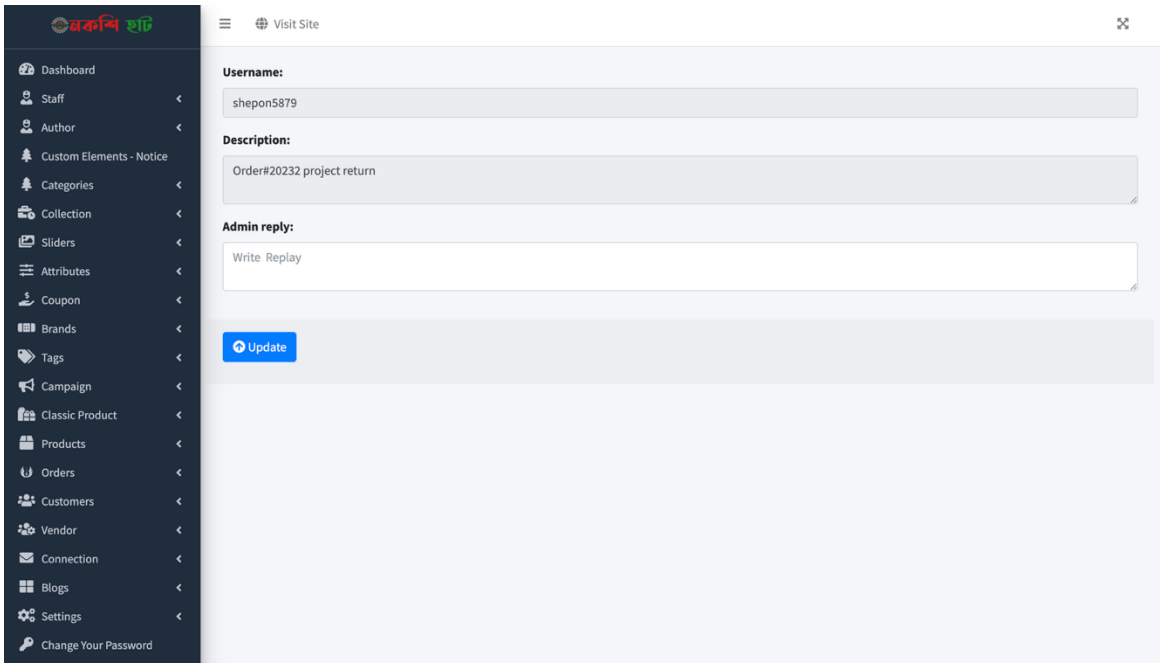
Order Oversight Hub

Complete visibility into orders placed across the platform, with the ability to modify, track, or resolve issues directly.



Customer Support Management

Messages sent by users via the contact form appear here for timely response and issue resolution.



CHAPTER 7

CONCLUSION & FUTURE WORK

7.1 Conclusion

The Nakshi Hat platform was designed to support women artisans in the villages to sell their handmade goodies directly to buyers. With its power of cutting out middlemen, the platform allows artisans to provide fair prices for their works, increasing their revenue and driving better financial independence. Furthermore, it makes sure handicraft, for instance embroidery work like Nakshi Katha, does not die and receives the recognition it deserves in all parts of the world. Product management, order tracking and local payment systems like bKash, ensure accessibility for even users who have low digital literacy.

The main objective of this initiative was support digital literacy and market linkages for rural artisans, and the platform has proved to be a strong means of expanding business opportunities for these women, where they can earn a decent living. With the platform's intuitive features artists can use to manage their business, the platform is easy to use.

7.2 Future Work

Nakshi Hat has been a remarkable addition, but there are still a number of ways in which it can be improved and enhanced. Next steps should involve increasing the platform's visibility using digital marketing tools such as social media and influencer campaigns in order to grow its customer base and artisan base. Furthermore, by launching international payment systems and multilingual support, the platform will have better access to the global customer base, and help artisans grow their businesses.

And, in addition, there are ongoing training sessions to improve the artisans' digital knowledge, thus more fully utilizing the potential of the platform for the purpose of business growth. Logistics and delivery systems likewise require enhancement to facilitate prompt and dependable deliveries, particularly to distant regions. Finally, you can all also have real-time tracking systems for the customers on the customer app, and for the artisans on the artisan app. This will make for a great customer experience, and help with additional trust in the platform.

Lastly, the platform's scalability needs to be taken care of to support the growing number of users and product listings. It is also possible to streamline the platform infrastructure and better manage the database (ensuring that performance continues to run smoothly as the platform scales). Solving these challenges ensures Nakshi Hat's ability to provide autonomy to rural artists and uphold traditional crafts in the global market.

REFERENCES

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