



**BEACONHOUSE NATIONAL UNIVERSITY**

**PRJ-F23/331**

## **CRAFTY CANVAS**

**An online marketplace for buying and selling of  
Artworks**

**INTERNAL SUPERVISOR**

**MS. HUDA SARFARAZ**

**GROUP MEMBERS**

<b>FAARHA RAZA</b>	<b>F2020-604</b>
<b>FIZZA JAVAID</b>	<b>F2020-614</b>
<b>HAMZA AZAM</b>	<b>F2020-705</b>

**SCHOOL OF COMPUTER & INFORMATION TECHNOLOGY**

Project Title	Crafty Canvas	
Project ID	PRJ-F23/331	
Faarha Raza	F2020-604	Project Supervisors Ms. Huda Sarfraz (Internal)  Group Members
Fizza Javaid	F2020-614	
Hamza Azam	F2020-705	

Academic Session	<b>2023-24 (Sept 2023 to June 2024)</b>
Credit Hours	<b>6</b>

**PROJECT APPROVAL**

This Project is approved in partial fulfillment of the requirements of BSc (Hons.) in Software Engineering degree conducted by the School of Computer and IT, Beaconhouse National University, Lahore.

---

**Ms. Huda Sarfraz**  
**Internal Supervisor**

---

**Dr. Khawaja Shafaat Ahmed Bazaz**  
**Dean School of Computer and IT**  
**Date: 14 June 2024**

## **Acknowledgement**

We wish to express our profound gratitude to all those who supported us throughout our Final Year Project. We are particularly indebted to our project supervisor, Ms. Huda Sarfraz, for her unwavering support, patience, and insightful guidance.

We also extend our thanks to the faculty and staff of the School of Computer and IT at Beaconhouse National University for fostering a conducive environment for learning and research. Special recognition is due to Ms. Shazia Rizwan for her invaluable advice and support. We are also deeply grateful to our fellow students and project team members for their collaboration and moral support.

Lastly, we offer our sincere appreciation to our families and friends for their steadfast encouragement throughout this journey. Your faith in us has been a vital source of strength and motivation.

Thank you all for your invaluable support and contributions.

Faarha Raza

Hamza Azam

Fizza Javaid

## Table of contents

<b>1. Introduction to the Project</b>	<b>6</b>
1.1 Existing situation and motivation for the project	7
1.2 Literature review	7
1. Supporting Artists During Challenging Times	7
2. Art-related E-commerce and Global Platforms for Pakistani Users	7
1.3 Literature review	9
<b>2. Requirement Analysis</b>	<b>11</b>
2.1 Requirement Gathering and fact finding	11
2.1.1 Use case analysis	13
i. User roles	13
2.1.2 Key user stories	13
2.1.3 Use case diagram	15
2.2 Functional requirements	16
2.2 Non-functional requirement	20
a. Architecture (including class diagrams)	22
b. Key sequence diagrams	23
c. Website Screenshots	25
d. Data design	29
<b>4. Implementation</b>	<b>37</b>
a. Test cases	40
b. Key implementation details (include code snippets and screen shots)	42
<b>5. Conclusion</b>	<b>44</b>

# 1. Introduction to the Project

In the contemporary digital landscape, the intersection of art and technology has paved the way for innovative platforms that facilitate the creation, exhibition, and appreciation of artwork. The project at hand embodies this ethos by undertaking the development of an online art gallery platform aimed at fostering a vibrant ecosystem for artists, collectors, and art enthusiasts to connect, showcase, and explore a diverse range of artistic creations.

Art has always been a fundamental aspect of human expression, serving as a medium through which individuals communicate their thoughts, emotions, and perceptions of the world around them. With the advent of digital platforms and the democratization of technology, the boundaries of traditional art exhibitions have expanded, enabling artists to reach global audiences and engage with diverse communities in unprecedented ways.

The primary objective of this project is to leverage the power of technology to create an immersive and interactive online platform that facilitates the discovery and dissemination of art in all its forms. Through the integration of cutting-edge features such as virtual galleries, augmented reality exhibitions, and personalized recommendations, the platform seeks to revolutionize the way art is experienced and consumed in the digital age.

Furthermore, the project aims to address the evolving needs and challenges faced by artists and art enthusiasts in the modern era. By providing a user-friendly interface, robust backend infrastructure, and comprehensive tools for artwork selling, buying and promotion, the platform endeavors to empower artists to showcase their creations, connect with potential buyers, and establish a sustainable career in the competitive art market.

Moreover, the project places a strong emphasis on community building and collaboration, recognizing the importance of fostering meaningful connections and fostering a supportive environment for artists and art lovers alike. Through features such as online forums, live events, and collaborative projects, the platform aims to cultivate a dynamic and inclusive community that celebrates creativity, diversity, and artistic expression.

## 1.1 Existing situation and motivation for the project

Pakistani artists often find themselves drawn to social media platforms like Instagram and Facebook because they offer a wide range of tools and platforms for displaying and selling their artwork. These platforms are essential for artists to gain recognition and success. It's important to remember that while these platforms are popular, they don't always match the purpose of art salons. This means there are lots of challenges and restrictions for artists who want to use them for their art.

Another problem that Pakistani artists face on social media is payment and transaction handling. Artists have to go through a lot of complicated steps to get paid, like sharing their bank info or sending buyers to different payment platforms. Since there are no integrated payment solutions, it can be really annoying and sometimes even stop buyers from making their purchases.

Basically, Instagram and Facebook are great places for artists to show their art pieces and reach out to more people, but they don't really cater to the needs of artists who need to sell art quickly. They often use third-party platforms for communication and have trouble handling payments safely, all while dealing with the constant struggle to protect their creative work in a world where copyright infringement is rampant. Some artists or buyer are not so comfortable in sharing their WhatsApp number and use it as a communication medium, so an in-built chat system will remove these limitations. As the world changes, it's important for artists to look for new platforms and ways to solve these issues, which will make it easier for them to make art and pursue their business goals.

## 1.2 Literature review

The COVID-19 pandemic has impacted the Global art market significantly as it left artists facing unusual challenges. British artist Matthew Burrows started an initiative, Artist Support Pledge, which has shown the importance of providing artists with platforms to sell their work and generate income during difficult times [1]. This highlights a need for a web app tailored to Pakistani artists. This web app could help them by serving as a means for selling their art online, connecting with a global audience, and creating customized artwork for clients, eventually addressing the unique challenges faced by artists in Pakistan.

### 1. Supporting Artists During Challenging Times

The Artist Support Pledge, initiated by Matthew Burrows, served as a model for supporting artists in difficult times. It has provided artists a platform, who were suddenly out of work due to the pandemic, without charging any fees from artists for showcasing and selling their artwork[1]. This emphasizes how important it is to support artists in challenging circumstances. This idea could potentially be implemented by providing a specialized web

app for Pakistani artists, enabling them to make money using their artistic skills while reaching a wider audience.

## 2. Art-related E-commerce and Global Platforms for Pakistani Users

Online marketplaces like Shopify, Etsy, Artmo, and Artsy have transformed how artists sell their artwork and engage with a worldwide audience. These platforms have increased artists' audiences and opened up new revenue opportunities for them [5]. However Pakistani users face restrictions in using global payment services available on these platforms like PayPal, which limit their ability to perform international transactions. Additionally, the cost of shipping items to and from Pakistan across various parts of the world might be relatively high, affecting the overall pricing structure and competitiveness of products on the platform. These limitations can restrict choices for both the platform and the sellers in terms of cost-effective and reliable shipping services. A platform that identifies and addresses these particular challenges for Pakistani buyers and sellers is necessary.

**2.1. Etsy:** This is one of the most popular online marketplaces for selling handmade, vintage, and unique goods. It connects artists with the largest online audiences and art enthusiasts, across the globe [4]. Etsy, however, has restrictions on account creation from certain regions, including Pakistan. This limitation prevents individuals based in Pakistan from directly creating accounts on the platform and performing any kind of buying and selling. Even if Pakistani users manage to access Etsy using accounts created by individuals living abroad, they might face difficulties with payment methods and transactions. Certain payment gateways or financial regulations might not support transactions from Pakistan, causing hurdles in buying or selling items on the platform.

**2.2. Artsy:** This is a leading international marketplace, that provides a wide range of fine art from all around the world. The large average transaction distance of orders and the wide range of artists, galleries, and users show its wide range of popularity [2]. Artsy doesn't explicitly restrict users based on their geographical location from creating user accounts but it lacks the support for transactions from Pakistan on various payment gateways integrated into the Artsy platform. It provides credit card checkout, including most major international providers such as American Express, Visa, and Mastercard. It also allows bank transfers such as Partners with US bank accounts may now accept checkout via ACH and SEPA payments [8]. Shipping artwork internationally can be complicated and costly. Pakistani sellers face difficulties in finding reliable and affordable shipping services for delivering artwork to international buyers. On Artsy sellers and buyers in Pakistan face issues related to currency conversion and unfavourable exchange rates when conducting transactions, affecting the overall cost and value of the product.

## 3. “The Rising E-Commerce Industry of Pakistan: An Appraisal”

With its rising entrepreneurial culture and stabilizing digital footprint, Pakistan's future in e-commerce reflects promising prospects with exponential growth. According to data

released by Statista, a German company specialising in market and consumer data, Pakistan's e-commerce market is projected to generate US\$7.666 billion revenue in 2022. With an annual growth rate of 6.09 percent between 2022 and 2025, the projected market volume would be US\$ 9.1 billion by 2025. The promotion and regulation of e-commerce will be more significant in terms of providing employment opportunities for 130 million over the next 30 years. [6]

Pakistan's start up ecosystem has been in financial turmoil as major players like Careem, Swvl, Truck-It-In, and VavaCars have laid off employees, rolled back services and even suspended operations altogether. [7]

The top five rounds in April-June were conducted by ecommerce start up Dastgyr (\$37m), fintech Abhi Finance (\$17m), healthtech Medznmore (\$11.5m), fintech Sadapay (\$10.7m) and transportation startup Bykea (\$10m). The sector with the highest flows in the April-June quarter was ecommerce. As many as five ecommerce deals with a total funding of \$42.6m took place in the last three months. Other top sectors included fintech (\$27.8m in three deals), healthtech (\$13.3m in two deals) and transportation and logistics (\$14.5m in six deals). [7]

In Pakistan there should be an enabling environment to provide e-commerce growth to the higher level. A huge opportunity of e-commerce is for youth and especially female entrepreneurs who want to do their online business from home. E-commerce can contribute majorly to improving livelihoods of the people and in building competitive enterprises as well as increasing the shares in global trade. Like other developing countries, Pakistan may lag in the e-commerce world if it does not technologically catch up. [6]

Additionally, we talked to the students of School of Visual Arts and Designing and asked them what platforms they are currently using for purchasing and selling their arts. Majority answered that they are using social media platforms. Then we asked them if there are any problems that they face while using social media platforms. They said it is quite difficult for them to list among the top sellers because they do not get that much recognition and reach through social media. Their opinion was that there should be a medium through which small and local Pakistani artists can also gain recognition among the other artists. We also told them to fill the survey, the responses will be discussed later in the document.



### 1.3 Literature review

Based on further research, there is a significant need for an online artwork selling platform dedicated to Pakistani local artists. The art industry in Pakistan faces numerous challenges, including limited exposure, lack of market access, and financial instability for many artists. A centralized online platform would address these issues by providing a space where artists can showcase and sell their work directly to a global audience, thereby increasing their visibility and potential for income.

The cultural heritage of Pakistan is rich and diverse, with a deep tradition of art and craftsmanship. However, the traditional methods of selling art—through galleries or local markets—often limit artists' reach and earnings. In a digital age, an online marketplace can bridge the gap between artists and art enthusiasts, both locally and internationally. This would not only help artists sustain their livelihoods but also preserve and promote Pakistan's cultural legacy.

Moreover, the economic landscape in Pakistan makes it challenging for artists to find buyers who appreciate and can afford their work. An online platform can democratize the art market by making it accessible to a broader audience. It also supports the younger generation of artists who are more tech-savvy and open to using digital platforms for their work. This can lead to a more vibrant and dynamic art community.

The environmental impact of traditional art sales methods should also be considered. By reducing the need for physical galleries and art fairs, an online platform can decrease the carbon footprint associated with these events. Additionally, the digitalization of art sales can reduce the need for physical storage spaces and transportation, contributing to a more sustainable practice.

Furthermore, our research indicates a growing global trend towards supporting local and independent artists through online platforms. By aligning with this trend, Pakistani artists can tap into international markets and trends, increasing their sales opportunities and professional growth. Such a platform would also foster a sense of community among artists, providing them with resources, networking opportunities, and the potential for collaborative projects.

In conclusion, an online artwork selling website for Pakistani local artists is not only a necessary tool for economic and professional development but also a means to sustain and promote the rich artistic heritage of the country. This initiative would provide a sustainable, eco-friendly, and globally accessible platform that benefits artists and art lovers alike.

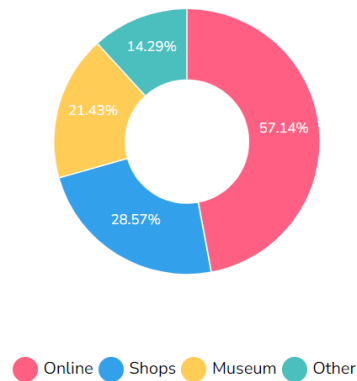
## 2. Requirement Analysis

### 2.1 Requirement Gathering and fact finding

We did the requirement gathering by performing an online survey in which we asked questions from people with multiple age groups and got their opinions on our project.

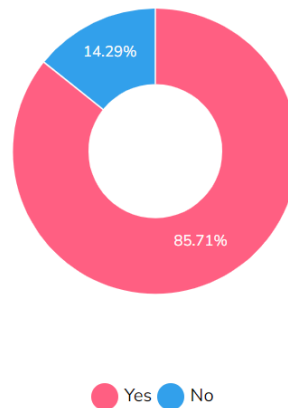
Following are questions and the graph that display the percentage of each answer:

- 1) Do you prefer buying artworks online, by visiting galleries or by visiting shops?



*Fig. 1*

- 2) Do you think there is a communication gap between the artists and clients, when buying the artwork online?



*Fig. 2*

- 3) Have you ever experienced spam or fraud sellers while buying art work online through any websites or social media platforms?

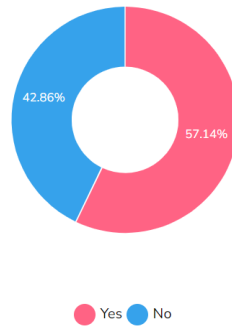


Fig. 3

4) Do you have to pay taxes while buying art online?

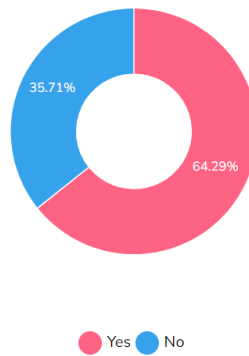


Fig. 4

5) In your opinion, what would be the best platform for selling and buying artworks?

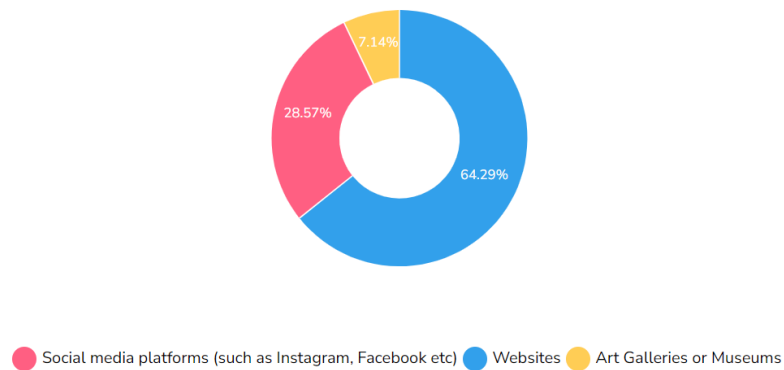
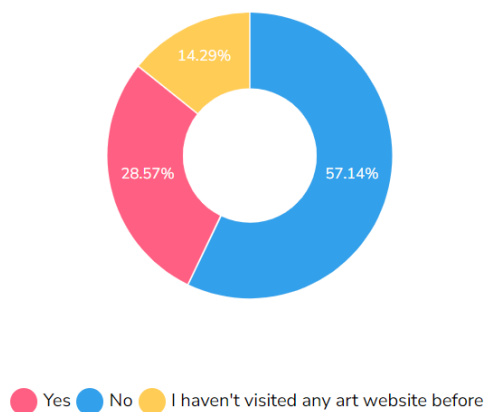
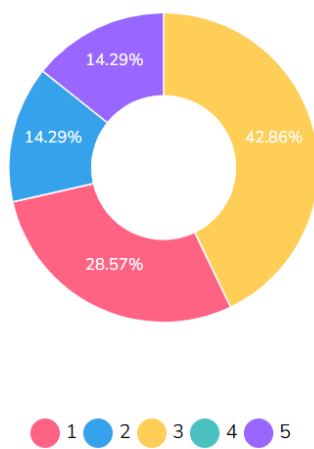


Fig. 5

6) Have you ever experienced any customization option in the existing Art websites?

*Fig. 6*

- 7) On a scale of 1-5 (1 being the most beneficial), tell will a website for selling and buying artworks, which will build the communication gap between the artists and the customers, be beneficial?

*Fig. 7*

### 2.1.1 Use case analysis

#### i. User roles

There are basically two users in this project an artists and the seller.

- **Sellers:** Users who list and sell products on the provided platform.
- **Buyers:** Users who search for and purchase products on the platform.

### 2.1.2 Key user stories

- **User Story for a Client (Customer):**

As a customer, I want to use the platform to find and buy products that suit my needs and preferences.

*Adding Products to Cart and Making Purchases:*

I should have the option to "Add to Cart" for products I wish to purchase.

I can view my cart, update quantities, and remove items if needed.

When I am ready to purchase, I should be able to proceed to checkout, where I can enter my delivery address, choose a payment method, and hit the "Confirm Order" button to make an instant purchase.

- **User Story for an Artist (Seller):**

As an artist, I want to use the platform to showcase and sell my products, manage orders, and interact with customers.

*Adding and Managing Products:*

I should be able to add new products to my shop by providing details such as name, description, category, tags, original price, discount price, stock, and images.

I can view a list of all my products, update product details, and remove products if needed.

### 2.1.3 Use case diagram



Fig. 8 Use Case Diagram

## 2.2 Functional requirements

- **FR1: User Registration**

- **Description:** The system shall allow user registration and authentication functionality, enabling users to create accounts using their email or social media profiles, with password reset options.
- **Actor:** Artists and Clients (User)
- **Precondition:** The user is not registered in the system.
- **Postcondition:** The user is registered in the system and directed to the login screen.
- **Details:**
  - 1) Users can provide a valid email address and password.
  - 2) The system validates the email format and ensures it is unique.
  - 3) User account information is securely stored in the database.

- **FR2: Edit Profile**

- **Description:** The system shall have user profile management features, allowing users to edit and update their profiles, including personal information, profile pictures, and other details.
- **Actor:** Artists and Clients (User)
- **Precondition:** The user is logged into the system.
- **Postcondition:** User profile information is updated.
- **Details:**
  - 1) Users can edit and update their personal information, including name, address, and contact information.
  - 2) Users can change their profile pictures.
  - 3) Users can update other profile details, such as a bio, preferences, and display settings.

- **FR3: Product Listings**

- **Description:** The system shall facilitate product listings, permitting artists to add artworks with titles, descriptions, prices, and multiple images.
- **Actor:** Artists
- **Precondition:** The artist is registered in the system.
- **Postcondition:** Artwork listings are created and visible to users.
- **Details:**
  - 1) Artists can create listings for artworks with titles and descriptions.
  - 2) Artists can specify prices for their artworks.
  - 3) Images of the artwork can be uploaded.

- **FR4: Artwork Search**

- **Description:** The system shall allow users to search and filter artworks, facilitating easy discovery through keywords, categories, and artist names, with refined search options.
- **Actor:** Buyers
- **Precondition:** The user is logged into the system.
- **Postcondition:** Users have discovered relevant artworks through search and filters.
- **Details:**
  - 1) Users can search for artworks using keywords, categories, and artist names.
  - 2) Users can apply refined search filters to narrow down results.

- **FR5: Real-time Chat**

- o **Description:** The system shall include real-time chat functionality, facilitating instant communication between clients and artists for customization requests, price negotiations, and progress tracking.
- o **Actor:** Users (Clients and Artists)
- o **Precondition:** Users are logged into the system.
- o **Postcondition:** Users can engage in real-time chat conversations.
- o **Details:**
  - 1) Users can engage in real-time chat with other users.
  - 2) Chat supports text, images, and possibly video messages.

- **FR6: Artwork Base Price Setting**

- o **Description:** The system shall allow artists to set a base price for their artworks when creating listings.
- o **Actor:** Artists
- o **Precondition:** The artist is registered in the system.
- o **Postcondition:** The base price for the artwork is set and visible to potential buyers.
- o **Details:**
  - 1) Artists can specify a base price when creating artwork listings.
  - 2) The base price serves as the starting point for price negotiations with potential buyers.

- **FR7: Artwork Customization**

- o **Description:** The system shall support customization of artworks, allowing clients to request specific modifications or personalized elements on selected artworks before making a purchase.
- o **Actor:** Users (Clients and Artists)
- o **Precondition:** The user is logged into the system, and the selected artwork is available for customization.
- o **Postcondition:** The requested artwork customization details are communicated to the artist, and the client is notified of the customization process.
- o **Details:**
  - 1) Clients can select an artwork available for customization.
  - 2) The system shall provide a customization interface where clients can specify their customization requirements (e.g., color changes, size adjustments).
  - 3) Clients can add specific instructions or comments related to the customization.
  - 4) The customization details are securely stored and associated with the selected artwork.
  - 5) Artists receive notifications about customization requests and can review the client's specifications.
  - 6) Artists can communicate with clients to discuss customization details or seek clarification.
  - 7) Once the customization is agreed upon, artists update the artwork accordingly, and clients are notified of the completion.
  - 8) Clients can review the customized artwork and proceed with the purchase if satisfied.

- **FR8: Secure Payment Processing**

- o **Description:** The system shall integrate secure payment processing, with trusted payment gateways like Jazz Cash or Easy Paisa.
- o **Actor:** Users (Clients)



- o **Precondition:** Users are ready to make a purchase.
- o **Postcondition:** Payment is securely processed.
- o **Details:**
  - 1) The system integrates trusted payment gateways.
  - 2) Various payment methods, such as credit cards or mobile wallets, are supported.

- **FR9: Order Management**

- o **Description:** The system shall provide the above mentioned order management capabilities, allowing users to access their order history and artists to monitor commissioned orders, updating clients on progress.
- o **Actor:** Users (Clients and Artists)
- o **Precondition:** Users have made or received orders.
- o **Postcondition:** Users can track the progress and status of their orders.
- o **Details:**
  - 1) Users can view their order history.
  - 2) Artists can monitor the status of commissioned orders.
  - 3) Clients receive updates on the progress of their orders.

- **FR10: Return and Refund Requests**

- o **Description:** The system shall facilitate return and refund requests, allowing clients to initiate requests for damaged or misrepresented artworks, with a record of such requests.
- o **Actor:** Users (Clients)
- o **Precondition:** Clients receive damaged or misrepresented artworks.
- o **Postcondition:** Users can initiate return and refund requests.
- o **Details:**
  - 1) Clients can initiate return and refund requests.
  - 2) Records of such requests are maintained for reference.

- **FR11: User Notifications**

- o **Description:** The system shall send user notifications, including email and in-app alerts for events like new messages, bid updates, and order status changes.
- o **Actor:** Users (Clients and Artists)
- o **Precondition:** Relevant events occur (e.g., new messages, bid updates).
- o **Postcondition:** Users receive notifications for relevant events.
- o **Details:**
  - 1) Users receive notifications for various events through email and in-app alerts.

- **FR12: Artwork Reviews**

- o **Description:** The system shall enable artwork reviews, with clients able to leave reviews and ratings for purchased artworks, visible on artist profiles and listings.
- o **Actor:** Users (Clients)
- o **Precondition:** Users have purchased artworks.
- o **Postcondition:** Artwork reviews and ratings are displayed.
- o **Details:**
  - 1) Clients can leave reviews and ratings for purchased artworks.
  - 2) These reviews and ratings are visible on artist profiles and artwork listings.

- **FR13: User Feedback and Improvement**

- **Description:** The system shall encourage user feedback and continuous improvement, collecting user/artists suggestions to meet evolving users and artist's needs.
- **Actor:** Users
- **Precondition:** Users want to provide feedback and suggestions.
- **Postcondition:** User feedback is collected and considered for system improvement.
- **Details:**
  - 1) Users can provide feedback and suggestions for system improvement.

- **FR14: Help Centre and User Support**

- **Description:** The system shall provide a help center and user support, offering assistance, answers to common questions, and prompt issue resolution. In case of any issue, user can directly contact the admin through a contact information provided on the website such as email or phone number.
- **Actor:** Users
- **Precondition:** Users require assistance or have questions.
- **Postcondition:** Users receive assistance and issue resolution.
- **Details:**
  - 1) The system offers a help centre with answers to common questions.
  - 2) User support is available for prompt issue resolution.

- **FR15: User Profile Editing and Updates**

- **Description:** The system shall facilitate user profile editing and updates, enabling users to modify personal information, profile pictures, and other details.
- **Actor:** Users
- **Precondition:** Users want to update their profiles.
- **Postcondition:** User profile information is updated.
- **Details:**
  - 1) Users can edit and update their personal information.
  - 2) Users can change their profile pictures and other profile details.

- **FR16: Listing Details**

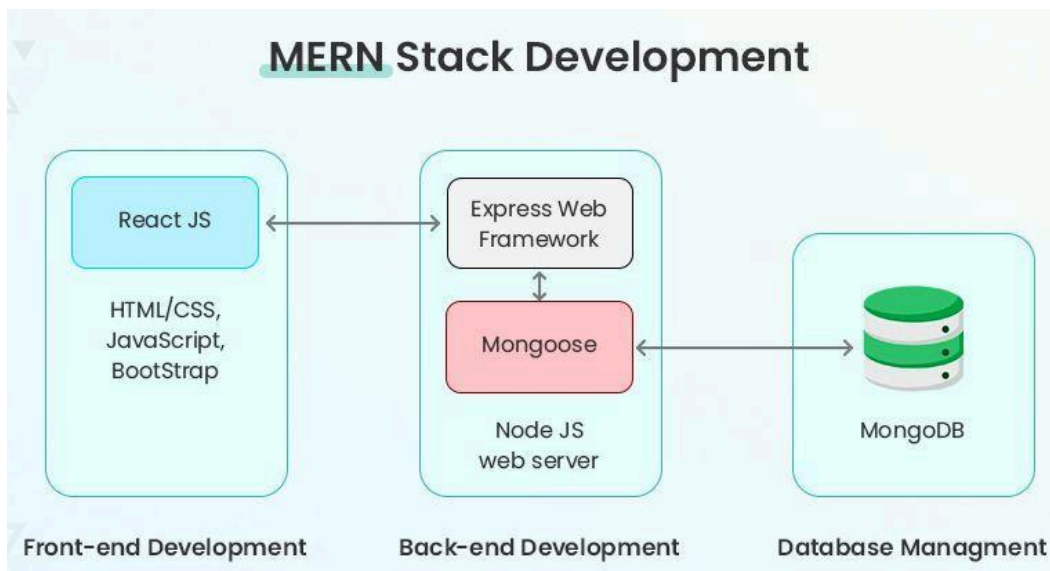
- **Description:** The system shall include listing details, displaying information such as the date of creation and the number of views to provide transparency about artwork history and popularity.
- **Actor:** Users
- **Precondition:** Users view artwork listings.
- **Postcondition:** Users have access to additional information about artworks.
- **Details:**
  - 1) Listing details include the date of creation and the number of views for transparency.

## **2.2 Non-functional requirement**

1. The application should load pages within 3 seconds to provide a smooth browsing experience for users.
2. The application should protect customer data during payments.
3. The application should be able to handle an increase in traffic and sales by scaling horizontally or vertically as needed.
4. The application should be easily accessible and usable on mobile devices through responsive design.
5. The application should allow users to easily find products they are looking for with an efficient search algorithm.
6. The application should provide intuitive navigation to make it simple for users to browse and purchase products.
7. The application should ensure that all user data and transactions are securely protected.
8. The application should be designed to handle high traffic and concurrent users without performance degradation.
9. The application should efficiently manage high volumes of orders and inventory updates.
10. All website data should be secured and can only be accessed by the authenticated user currently logged in. No two users of different login statuses can access each other's data.
11. The user's web browser shall never display a user's password. It shall always be echoed with special characters representing typed characters.
12. Users should be able to understand the user interface of the website easily without any manual or video tutorial. The application should implement easy-to-use schemes that guide users by their appearance.
13. The system should provide storage of all databases on redundant servers with automatic switchover.
14. The reliability of the overall program depends on the reliability of the individual components.
15. The system should maintain continuous backups of the database to reflect the most recent changes.

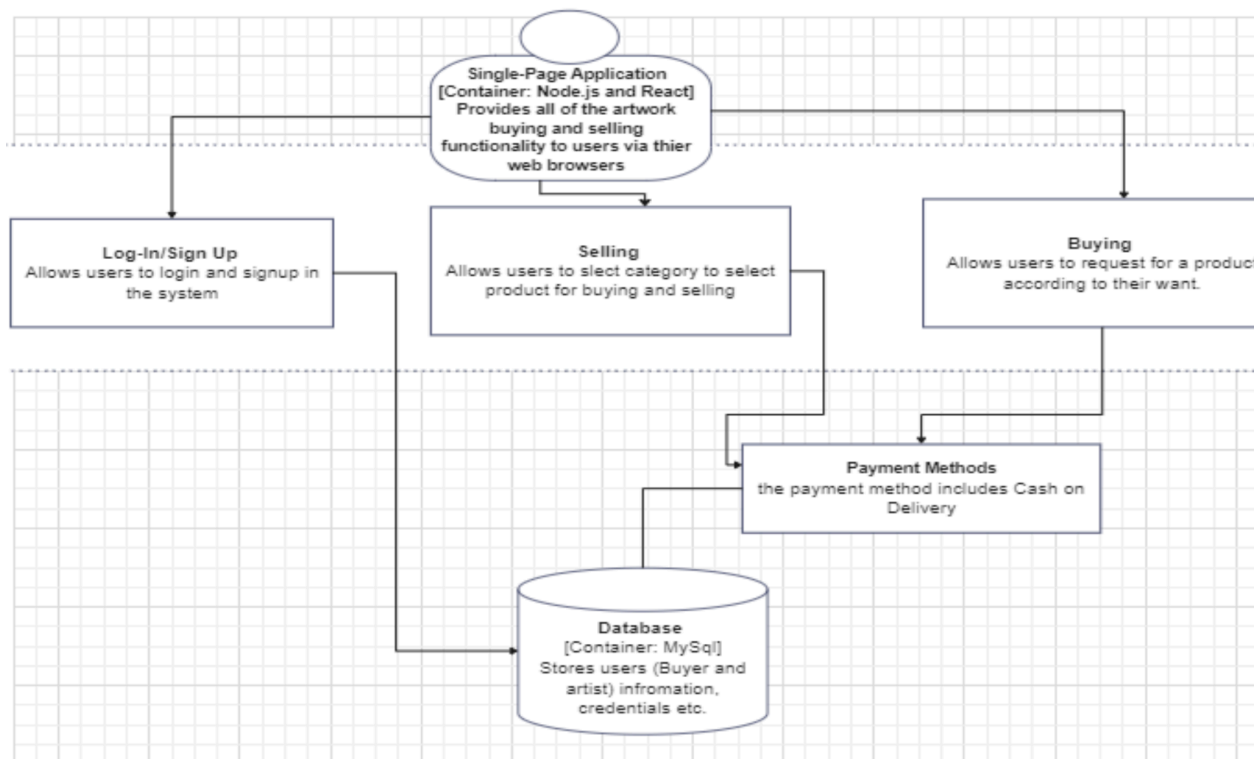
### 3. Design

The MERN stack is a collection of technologies used to develop websites: MongoDB (a database), Express.js (manages server requests), React.js (builds user interfaces), and Node.js (executes JavaScript on the server). These technologies work together to simplify web development. As the MERN stack aligns with current industry standards, utilizing it provides an opportunity to gain knowledge that is relevant and valuable in the field.



*Fig. 9 Mern Stack*

### a. Architecture (including class diagrams)

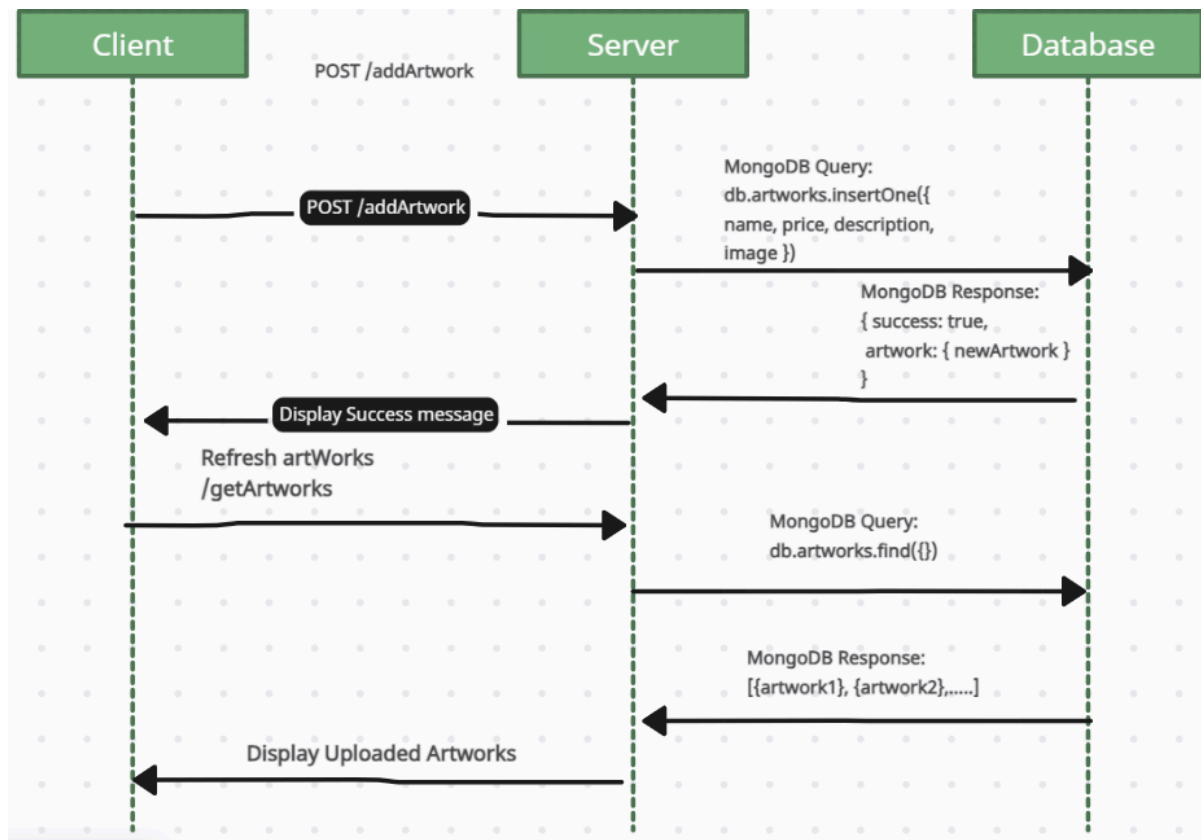


*Fig. 10 High Level Architecture Diagram*

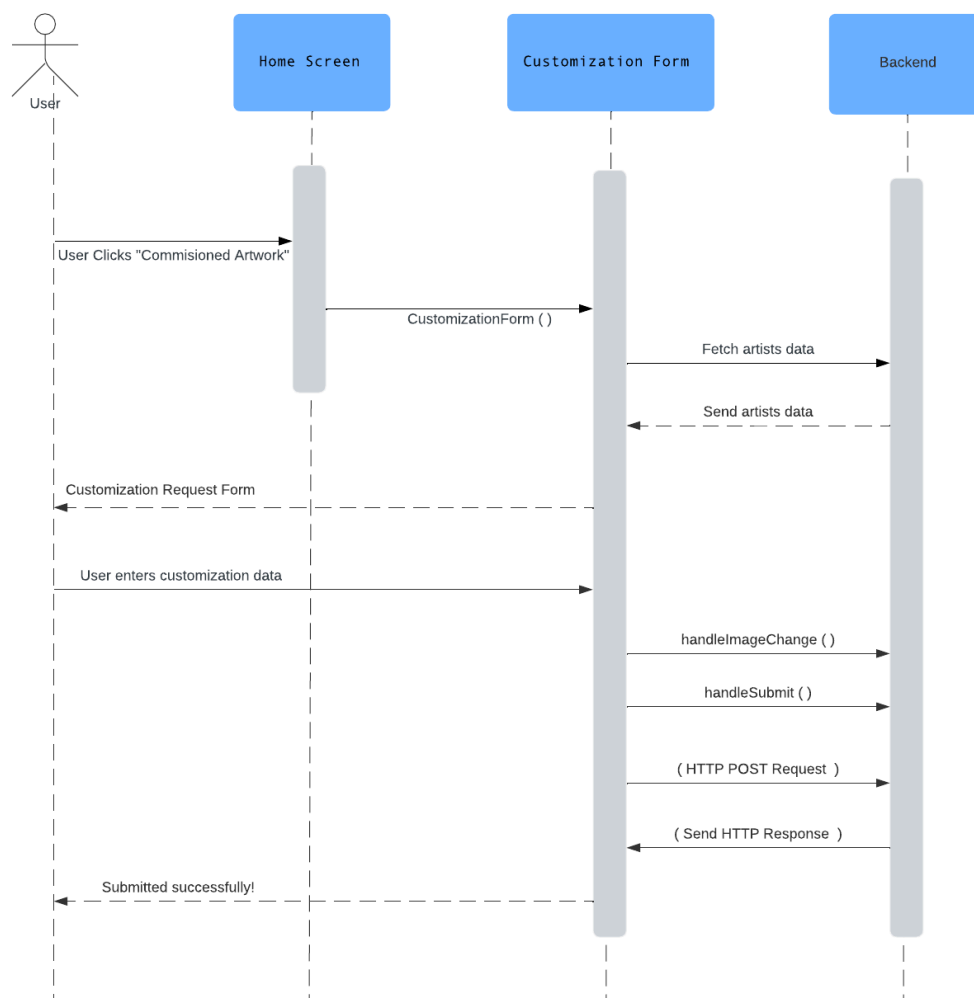
## b. Key sequence diagrams

These are the sequence diagrams that we made in our fyp part 1. Some of the sequence diagrams are yet to be done.

### Listing new artwork



*Fig. 11 Sequence Diagram*

**Commissioned artwork***Fig. 12 Sequence Diagram*

### c. Website Screenshots

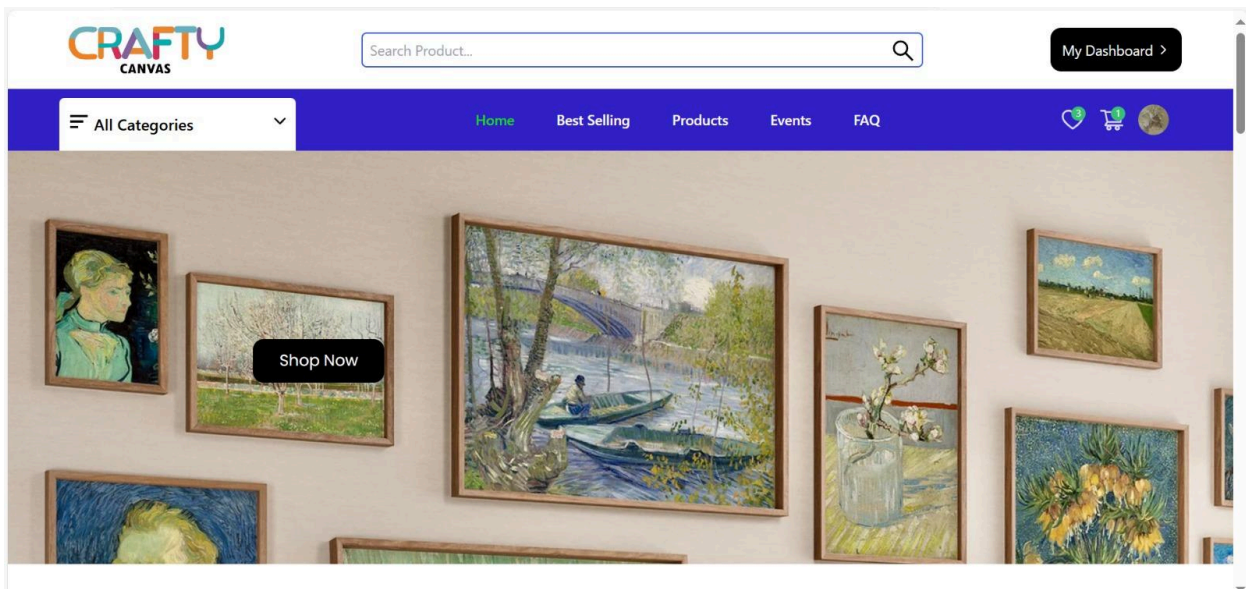


Fig. 13 This is the Home page of the webapp

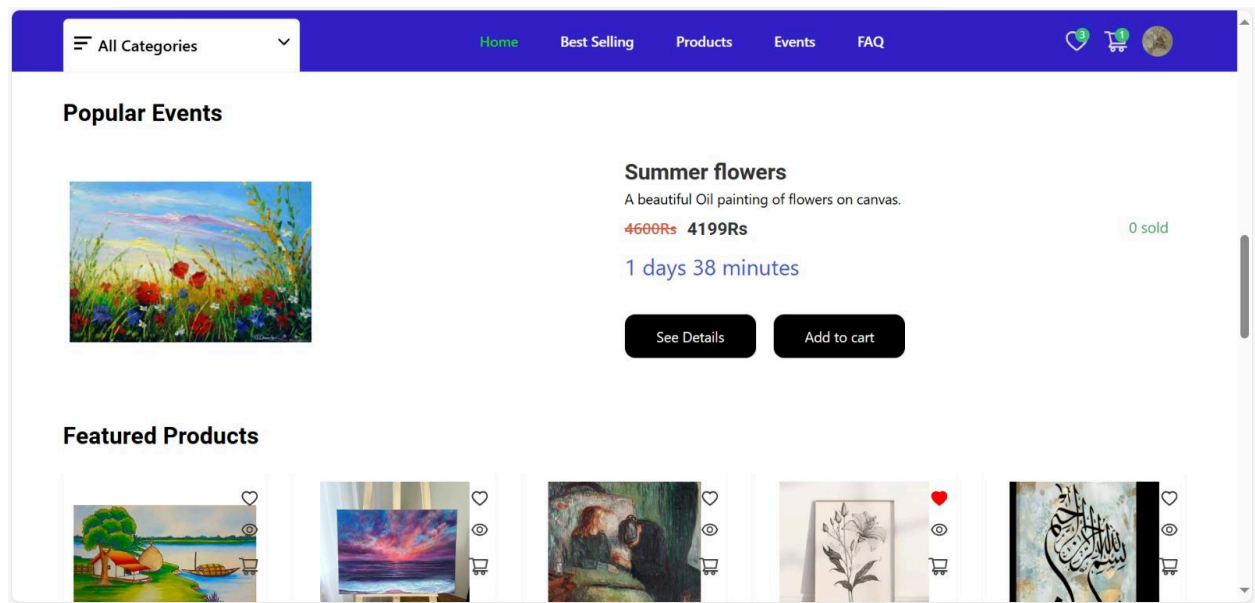


Fig. 14 This is the events page



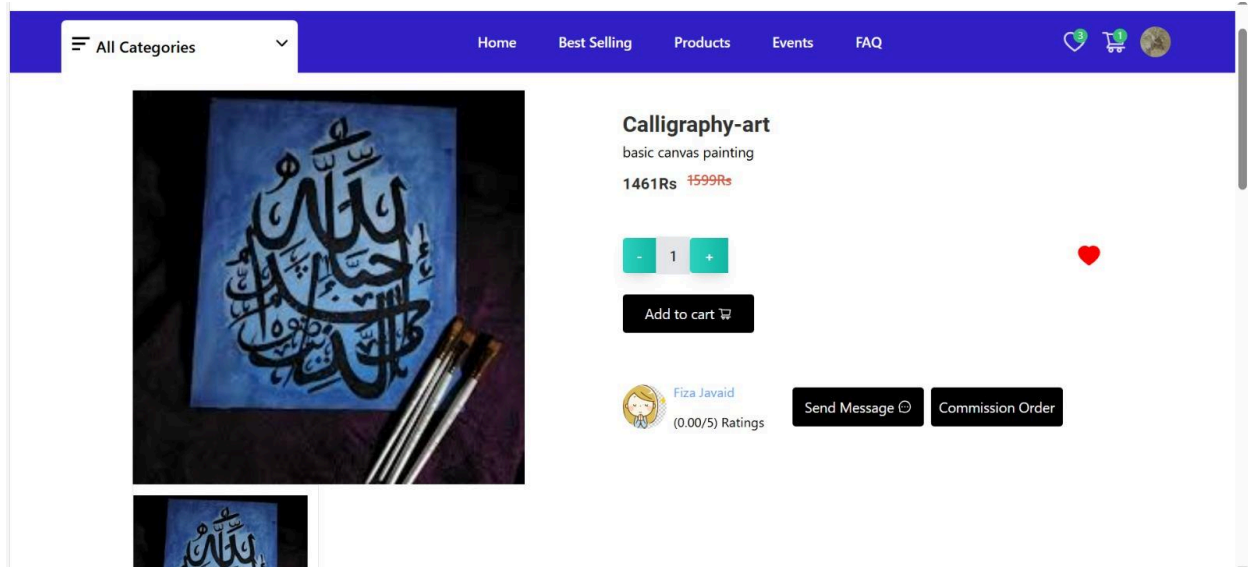


Fig. 15 This is the product details page.

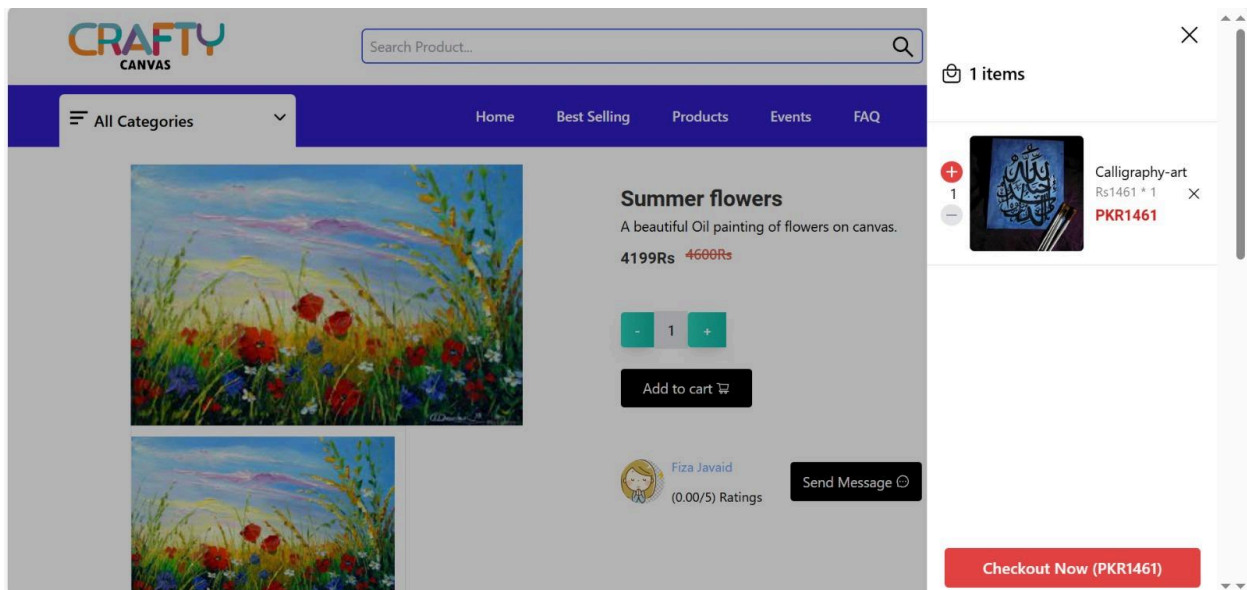


Fig. 16 This is the add to cart page.

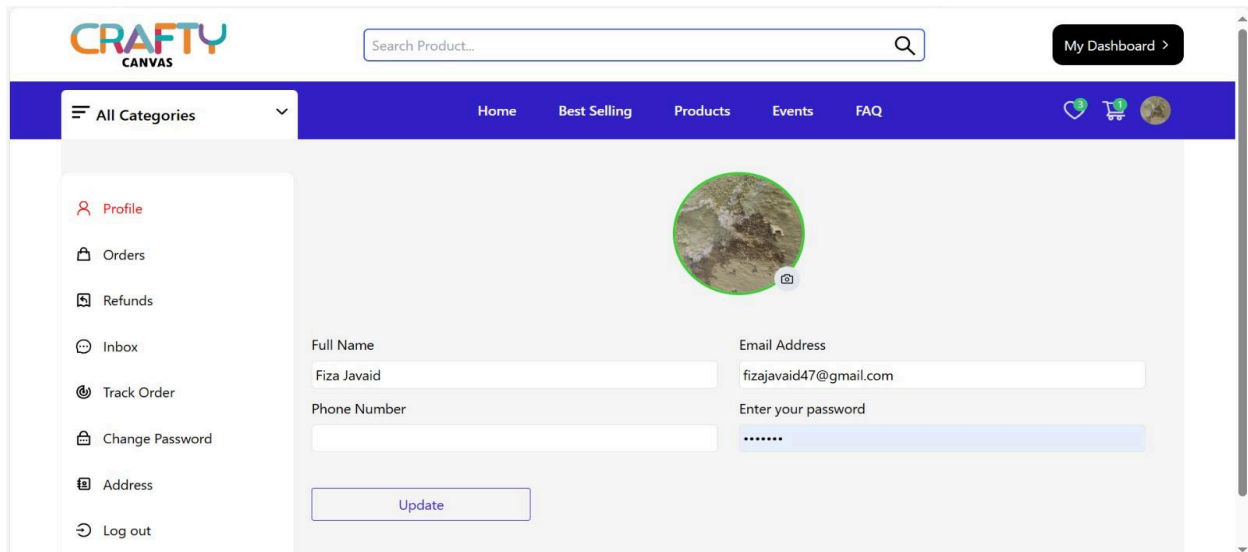


Fig. 17 This is the profile page of the buyer.

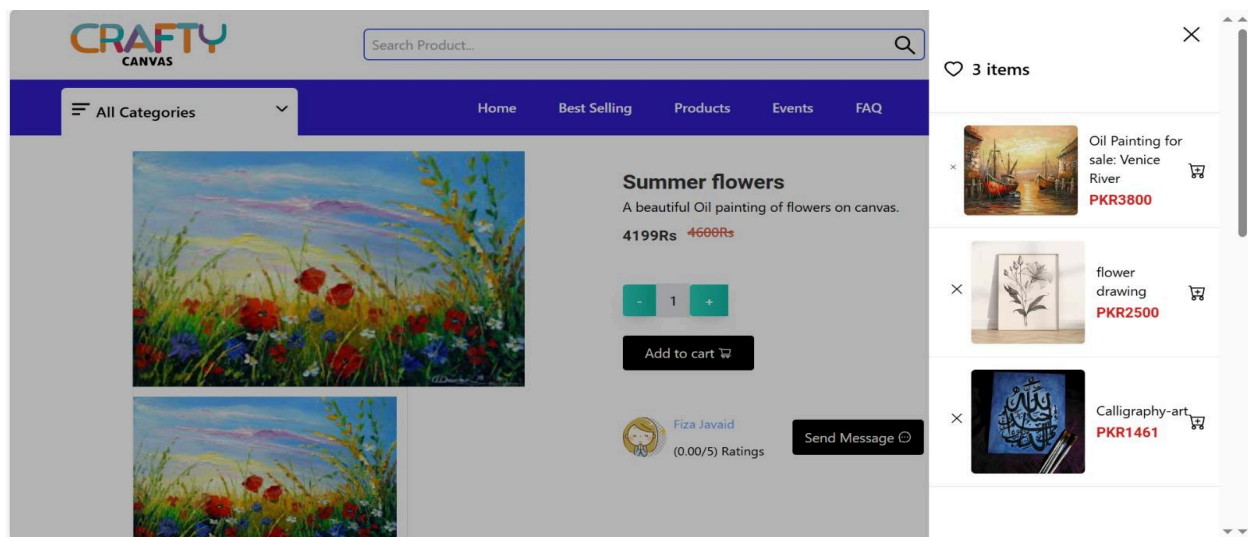


Fig. 18 This is the 'Add to favorites' side drawer.

Product Id	Name	Price	S...	Sold out	Preview	Delete
663fb57a569b69e...	Oil Painting for sale: Venice River	PKR 3800	2	0		
6645a4677308b0d...	Calligraphy-art	PKR 1461	1	0		
664f80e21b94a56...	Oil Painting	PKR 3000	3	0		
664f94b41b94a56...	flower drawing	PKR 2500	2	0		
66573a71099e2f2...	Sky painting	PKR 2398	3	0		
6659355ba818f4c...	Landscape drawing	PKR 2399	3	0		

Fig. 19 This is the Artist dashboard page.

**Commissioned request from**

Name: \* Fiza

Email: \* fiza@gmail.com

Contact no: \* 03194509412

Artwork is for: \* my studio

Approximate size: (32x32) \* 26x26

Frame option: ☒ Framed ☐ Unframed

Time required: 3 days

I am looking to invest: (in PKR) \* 2500

Commission Order

Fig. 20 This is the commissioned request from.

#### d. Data design

```
const userSchema = new mongoose.Schema({
  name:{
    type: String,
    required: [true, "Please enter your name!"],
  },
  email:{
    type: String,
    required: [true, "Please enter your email!"],
  },
  password:{
    type: String,
    required: [true, "Please enter your password"],
    minLength: [4, "Password should be greater than 4 characters"],
    select: false,
  },
  phoneNumber:{
    type: Number,
  },
  addresses:[
    {
      country: {
        type: String,
      },
      city:{
        type: String,
      },
      address1:{
        type: String,
      },
      address2:{
        type: String,
      },
    },
  ],
})
```

```
        zipCode:{
          type: Number,
        },
        addressType:{
          type: String,
        },
      }
    ],
    role:{
      type: String,
      default: "user",
    },
    avatar:{
      public_id: {
        type: String,
        required: true,
      },
      url: {
        type: String,
        required: true,
      },
    },
    createdAt:{
      type: Date,
      default: Date.now(),
    },
    resetPasswordToken: String,
    resetPasswordTime: Date,
  });
```

The user Schema stores the login and signup details of the users.

```
const withdrawSchema = new mongoose.Schema({
  seller: {
    type: Object,
    required: true,
  },
  amount: {
    type: Number,
    required: true,
  },
  status: {
    type: String,
    default: "Processing",
  },
  createdAt: {
    type: Date,
    default: Date.now(),
  },
  updatedAt: {
    type: Date,
  }
});
```

The withdraw details are stored in this schema.

```
const shopSchema = new mongoose.Schema({
  name: {
    type: String,
    required: [true, "Please enter your shop name!"],
  },
  email: {
    type: String,
    required: [true, "Please enter your shop email address"],
  },
  password: {
    type: String,
    required: [true, "Please enter your password"],
    minLength: [6, "Password should be greater than 6 characters"],
    select: false,
  },
  description: {
    type: String,
  },
  address: {
    type: String,
    required: true,
  },
  phoneNumber: {
    type: Number,
    required: true,
  },
  role: {
    type: String,
    default: "Seller",
  },
});
```

```
avatar: {
  public_id: {
    type: String,
    required: true,
  },
  url: {
    type: String,
    required: true,
  },
},
zipCode: {
  type: Number,
  required: true,
},
withdrawMethod: {
  type: Object,
},
availableBalance: {
  type: Number,
  default: 0,
},
transactions: [
  {
    amount: {
      type: Number,
      required: true,
    },
    status: {
      type: String,
      default: "Processing",
    },
    createdAt: {
      type: Date,
      default: Date.now(),
    },
  },
]
```

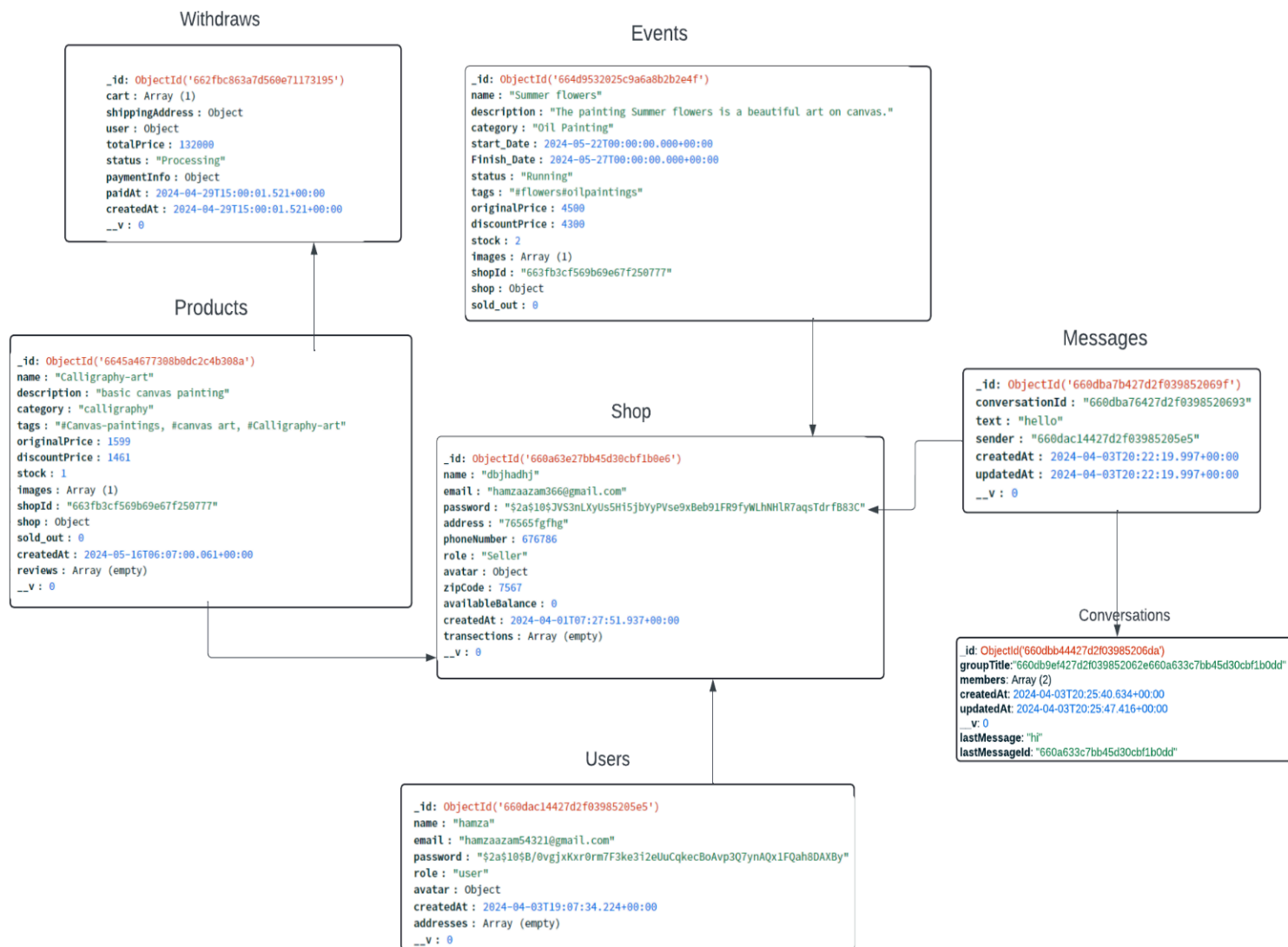


The shop details are being stored in this schema.

```
const productSchema = new mongoose.Schema({
  name: {
    type: String,
    required: [true, "Please enter your product name!"],
  },
  description: {
    type: String,
    required: [true, "Please enter your product description!"],
  },
  category: {
    type: String,
    required: [true, "Please enter your product category!"],
  },
  tags: {
    type: String,
  },
  originalPrice: {
    type: Number,
  },
  discountPrice: {
    type: Number,
    required: [true, "Please enter your product price!"],
  },
  stock: {
    type: Number,
    required: [true, "Please enter your product stock!"],
  },
  images: [
    {
      public_id: {
        type: String,
        required: true,
      },
      url: {
        type: String,
        required: true,
      },
    },
  ],
});
```

```
reviews: [
  {
    user: {
      type: Object,
    },
    rating: {
      type: Number,
    },
    comment: {
      type: String,
    },
    productId: {
      type: String,
    },
    createdAt: {
      type: Date,
      default: Date.now(),
    }
  },
],
ratings: {
  type: Number,
},
shopId: {
  type: String,
  required: true,
},
shop: {
  type: Object,
  required: true,
},
sold_out: {
  type: Number,
  default: 0,
},
createdAt: {
  type: Date,
  default: Date.now(),
},
});
```

The products are being stored in this schema



## 4. Implementation

The implementation phase of our project is a meticulously planned endeavor that encompasses the integration of a diverse array of technologies, each playing a pivotal role in realizing our vision of an innovative art selling website. At the heart of our backend infrastructure lies Node.js, a powerful JavaScript runtime environment renowned for its scalability and efficiency in handling server-side operations. Complementing Node.js is Express.js, a versatile web application framework that streamlines the development process by providing a robust set of features and middleware for building RESTful APIs and handling HTTP requests with ease.

In the realm of data management, MongoDB emerges as our database of choice, offering a flexible and scalable NoSQL solution perfectly suited for handling the dynamic nature of art-related data. Facilitating our interactions with MongoDB is Mongoose, an indispensable Object Data Modeling (ODM) library that empowers us to define schemas, model application data, and seamlessly communicate with our database, ensuring data integrity and performance.

Transitioning to the frontend, React takes center stage as the cornerstone of our user interface development strategy. Renowned for its component-based architecture and virtual DOM rendering, React enables us to craft dynamic and responsive user interfaces with unparalleled efficiency. Augmented by React Router, our frontend navigation system seamlessly manages application routes, enabling smooth transitions between different views and enhancing the overall user experience.

To facilitate communication between the frontend and backend, we rely on axios, a versatile HTTP client that simplifies the process of making asynchronous requests and handling responses. Leveraging axios, our application can seamlessly retrieve and manipulate data from the server, ensuring real-time updates and interactions for users across the platform.

By meticulously orchestrating the integration of these technologies, our implementation strategy aims to deliver a sophisticated and feature-rich art selling platform that exceeds the expectations of our users. With a focus on scalability, performance, and user experience, we are committed to harnessing the full potential of these technologies to create a seamless and immersive online marketplace for artists and art enthusiasts alike.

The implementation phase of our project is a meticulously planned endeavor that encompasses the integration of a diverse array of technologies, each playing a pivotal role in realizing our vision of an innovative art selling website. At the heart of our backend infrastructure lies Node.js, a powerful JavaScript runtime environment renowned for its scalability and efficiency in handling server-side operations. Complementing Node.js is Express.js, a versatile web application framework that streamlines the development process by providing a robust set of features and middleware for building RESTful APIs and handling HTTP requests with ease.

In the realm of data management, MongoDB emerges as our database of choice, offering a flexible and scalable NoSQL solution perfectly suited for handling the dynamic nature of art-related data. Facilitating our interactions with MongoDB is Mongoose, an indispensable Object Data Modeling (ODM) library that empowers us to define schemas, model application data, and seamlessly communicate with our database, ensuring data integrity and performance.

Transitioning to the frontend, React takes center stage as the cornerstone of our user interface development strategy. Renowned for its component-based architecture and virtual DOM rendering, React enables us to craft dynamic and responsive user interfaces with unparalleled efficiency. Augmented by React Router, our frontend navigation system seamlessly manages application routes, enabling smooth transitions between different views and enhancing the overall user experience.

To facilitate communication between the frontend and backend, we rely on axios, a versatile HTTP client that simplifies the process of making asynchronous requests and handling responses. Leveraging axios, our application can seamlessly retrieve and manipulate data from the server, ensuring real-time updates and interactions for users across the platform.

By meticulously orchestrating the integration of these technologies, our implementation strategy aims to deliver a sophisticated and feature-rich art selling platform that exceeds the expectations of our users. With a focus on scalability, performance, and user experience, we are committed to harnessing the full potential of these technologies to create a seamless and immersive online marketplace for artists and art enthusiasts alike.

## **Technologies**

### **Backend:**

- **Node.js:** A JavaScript runtime for executing server-side code.
- **Express.js:** A web application framework for Node.js, simplifying the process of building robust web applications.
- **MongoDB:** A NoSQL database used for storing data. Interactions with MongoDB are often facilitated by an Object Data Modelling (ODM) library.

#### **Database:**

- **Mongoose:** An ODM library for MongoDB and Node.js. It provides a schema-based solution to model application data and interact with MongoDB.

#### **Frontend:**

- **React:** A JavaScript library for building user interfaces. It allows the creation of reusable UI components.
- **React Router:** A library for handling navigation in React applications, enabling the creation of a single-page application with multiple views.
- **axios:** A promise-based HTTP client used for making asynchronous requests. In this case, it's used to communicate with the server.

#### **a. Test cases**

- **Test Case 1: User Registration**
  - **Test Scenario:** A new user registers in the system.

- **Preconditions:** The user is not registered in the system.
- **Test Steps:**
  - 1) Open the art marketplace app.
  - 2) Tap on the "Register" button.
  - 3) Enter a valid, unique email address and a strong password.
  - 4) Confirm the password.
  - 5) Tap the "Register" button.
- **Expected Result:**
  - 1) The user is registered, and they are directed to the login screen.
  - 2) An email confirmation is sent to the user's registered email address.
- **Alternate Flow 1:** If the email address is already registered:
  - 1) In step 3, enter an email address that is already registered in the system.
- **Expected Result:**
  - 2) The system displays an error message indicating that the email is already in use.
  - 3) The user is prompted to use a different email.

#### ● **Test Case 5: Artwork Search and Filter**

- **Test Scenario:** A user searches for artworks using keywords and filters.
- **Preconditions:** The user is logged into the system.
- **Test Steps:**
  - 1) Go to the search and filter section.
  - 2) Enter keywords, select categories, and specify an artist name.
  - 3) Apply refined search filters.
- **Expected Result:** The user can discover relevant artworks through search and filters.
- **Alternate Flow:** If no results match the search criteria:
  - 1) In step 2, enter the keywords to search the item that does not exist.
- **Expected Result:**
  - 1) The system will display the most similar artworks related to the search and filters.

#### ● **Test Case 6: Real-time Chat**

- **Test Scenario:** Users engage in a real-time chat conversation.
- **Preconditions:** Users are logged into the system.
- **Test Steps:**
  - 1) Select a user to start a chat conversation with.
  - 2) Send text, images, or video messages.
- **Expected Result:** Users can engage in a real-time chat conversation.
- **Alternate Flow:** If there are connectivity issues during the chat:
  - 1) During conversation, user face connectivity issues.
- **Expected Result:**
  - 1) The system should notify users about the connectivity issue and attempt to restore the connection.

#### ● **Test Case 8: Secure Payment Processing**

- **Test Scenario:** A client makes a secure payment for an artwork.
- **Preconditions:** Users are ready to make a purchase.
- **Test Steps:**

- 1) Select an artwork to purchase.
  - 2) Choose a payment method (e.g., Cash on delivery).
  - 3) Enter payment information.
- **Expected Result:** Payment is securely processed.
  - **Alternate Flow:** If the payment method is declined or encounters an issue:
  - **Expected Result:** The system should notify the user about the payment issue and provide guidance on resolving it.

**b. Key implementation details (include code snippets and screen shots)**

```
import React, { useEffect, useState } from "react";
import { AiOutlinePlusCircle } from "react-icons/ai";
import { useDispatch, useSelector } from "react-redux";
import { useNavigate } from "react-router-dom";
import { createProduct } from "../../redux/actions/product";
import { categoriesData } from "../../static/data";
import { toast } from "react-toastify";

const CreateProduct = () => {
  const { seller } = useSelector((state) => state.seller);
  const { success, error } = useSelector((state) => state.products);
  const navigate = useNavigate();
  const dispatch = useDispatch();

  const [images, setImages] = useState([]);
  const [name, setName] = useState("");
  const [description, setDescription] = useState("");
  const [category, setCategory] = useState("");
  const [tags, setTags] = useState("");
  const [originalPrice, setOriginalPrice] = useState();
  const [discountPrice, setDiscountPrice] = useState();
  const [stock, setStock] = useState();

  useEffect(() => {
    if (error) {
      toast.error(error);
    }
    if (success) {
      toast.success("Product created successfully!");
      navigate("/dashboard");
      window.location.reload();
    }
  }, [dispatch, error, success]);

  const handleImageChange = (e) => {
    const files = Array.from(e.target.files);

    setImages([]);

    files.forEach((file) => {
      const reader = new FileReader();

```



This function is to Create a Product.

```
import { React, useState } from "react";
import { AiOutlineEye, AiOutlineEyeInvisible } from "react-icons/ai";
import styles from "../../styles/styles";
import { Link, useNavigate } from "react-router-dom";
import axios from "axios";
import { server } from "../../server";
import { toast } from "react-toastify";
import { RxAvatar } from "react-icons/rx";

const ShopCreate = () => {
  const [email, setEmail] = useState("");
  const [name, setName] = useState("");
  const [phoneNumber, setPhoneNumber] = useState("");
  const [address, setAddress] = useState("");
  const [zipCode, setZipCode] = useState("");
  const [avatar, setAvatar] = useState("");
  const [password, setPassword] = useState("");
  const [visible, setVisible] = useState(false);

  const handleSubmit = async (e) => {
    e.preventDefault();

    axios
      .post(`${server}/shop/create-shop`, {
        name,
        email,
        password,
        avatar,
        zipCode,
        address,
        phoneNumber,
      })
      .then((res) => {
        toast.success(res.data.message);
        setName("");
        setEmail("");
        setPassword("");
        setAvatar("");
        setZipCode("");
        setAddress("");
        setPhoneNumber("");
      })
      .catch((error) => {
        toast.error(error.response.data.message);
      });
  };
};
```

This function is to create a shop for selling products.

## 5. Conclusion

Crafty Canvas is a transformative platform designed to elevate the visibility and marketability of Pakistani artists on a global scale. Throughout the development of this project, several key objectives were achieved, resulting in a comprehensive and user-centric digital marketplace.

The platform successfully provides an intuitive and efficient way for artists to showcase their artworks. By simplifying the process of listing and managing art pieces, artists can focus more on their creative processes while reaching a broader audience. The ability to handle commissions directly on the platform further enhances the artists' capabilities to manage custom projects efficiently.

Buyers benefit from an extensive catalog of unique and diverse artworks, coupled with seamless navigation and search functionalities that enhance the overall user experience. The integration of a secure payment system ensures that all transactions are processed safely, building trust and reliability between artists and buyers.

Additionally, Crafty Canvas includes robust communication tools, allowing real-time interaction between artists and buyers. This feature not only facilitates the negotiation and commissioning of custom artworks but also helps build a community around the platform, fostering relationships and continuous engagement.

The platform's analytics tools provide valuable insights to artists, enabling them to track their sales performance and understand their audience better. These insights can guide artists in refining their offerings and marketing strategies, ultimately leading to increased sales and exposure.

In summary, Crafty Canvas bridges the gap between Pakistani artists and the global art market. It offers a sophisticated, yet user-friendly environment that caters to the needs of both artists and buyers. The platform enhances the visibility of local talent, supports efficient project management, and ensures secure transactions, thus contributing to the growth and recognition of Pakistani artists worldwide. The successful implementation of Crafty Canvas underscores its potential as a pivotal tool in the art industry, empowering artists and enriching the cultural landscape.