

Buzz-Hub: An Ecommerce platform

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FINAL YEAR DESIGN PROJECT REPORT

This Report Presented in Partial Fulfillment of the
Requirements for the Degree of Bachelor of Science in
Computer Science and Engineering

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APPROVAL

This Project titled “**Buzz-Hub: An Ecommerce platform,**” submitted by **Zahir Hossain**, ID: **202-15-14437** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **17-09-2025**.

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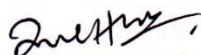
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ABSTRACT

In our country there are good number of e-commercial websites. Now a days people's interest in online shopping is going more and more. But there are some issues about what they are facing during online shopping like misbehavior of sellers, authenticity problem, shipping delay, sometimes fraud case, warranty claim issue, international shopping scope problem, pricing problem etc. Buzz Hub finds the problems and tries to solve all of them. Three main user roles are served by the platform and offline business under an umbrella. For these people will be able to easily access every platform by using it. It will provide other services to the consumer for better and smooth shopping. Buzz Hub is 100% focussed on customer satisfaction. By signing up herewith required details, customers will be able to take services of this. Searching in the search bar customers will be able to find their desired products with best deal. Here is an opportunity to make a purchase using EMI facility. Customers have to pay shipping cost in advance for confirmation purpose. They will be able to enjoy exchange facility if they don't like the product in a certain period and easily claim warranty directly via Buzz-Hub which is under warranty policy. Because of this platform sellers will be able to earn good revenue if their product is good enough. It's going to be a game changer and profitable for consumers and seller.

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Chapter 1

Introduction

1.1 Introduction

We have many hundreds of E-Commerce websites in our country. These platforms are typically used to sell electronic devices, groceries, clothes etc. Each platform caters for different types of products. It's place where people can buy products from individuals or from a company. However, there is no platform which makes them serve the other e-commerce platforms along with consumer benefits. This project is to bring Unique profile and every E-Commerce platform in one platform. That way the consumer can all much easily access everything within a common platform. That's also why sellers can stretch their platform. The most excellent shopping experience is for anybody preferring Buzz hub. You get cash on delivery facility EMI shopping facility and even the best deal with authentic products with good warranty facility (available for selected products only). Product warranty will directly be claimed by consumers to the platform or delivered shop in case of warranty issues, Buzz-hub is responsible.

1.2 Motivation

We have many hundreds of E-Commerce websites in our country. These platforms are typically used to sell electronic devices, groceries, clothes etc. Each platform caters for different types of products. It's place where people can buy products from individuals or from a company. But there is no platform which makes them serve the other e-commerce platforms along with consumer benefits. This project is to bring Unique profile and every E-Commerce platform in one platform. That way the consumer can all much easily access everything within a common platform. That's also why sellers can stretch their platform. The most excellent shopping experience is for anybody preferring Buzz hub. You get cash on delivery facility EMI shopping facility and even the best deal with authentic products with good warranty facility (available for selected products only). Product warranty will directly be claimed by consumers to the platform or delivered shop in case of warranty issues, Buzz-hub is responsible.

1.3 Objectives

I wanted to solve these challenges of smooth and hassle-free shopping. With several key objects, Buzz Hub launches. The central objective is to create a streamlined product management for consumers as well as sellers by automating the product details, selecting products, cost, shipping, warranty claim, facilities and shipping's real time status. Secondly, Buzz Hub strives to be a one stop shop, providing a full suite of services within a single platform. Thirdly, the purpose of the application is to increase customer's trust towards the desired products through the information about the product end user review. Fourthly, it commits to create a community of its clients to share their personal experience, complain and feedback to make this more user friendly. Lastly, it allows pre-order facility depending on clients' needs.

1.4 Methodology

At this moment we work on an updated ecommerce website called "Buzz Hub". The use of HTML, CSS, Bootstrap, Javascript for frontend and ASP.net MVC in backend is emphasized is the proposed methodology. The best and user helpful ecommerce website with the best dealing and services. Our key features are:

User Login and Registration: User slash someone can register with the system using the proper e-mail address with a hard password. When user login successfully then they get a customer ID and confirmation login approval.

Home: Provides A centralization view for customer with quick access to essential features and information of different kind of products.

Product: Here, the many types of product with best discount and also include the different categories. In this site are many new collections also attach.

Product details: All products details are shown to the sequence on the user interface. Many common products are highlighted with best discount price.

Compare: Compare The other online website product and get a customer and product review.

Cart: In This section a order summary and shipping method with the actual cost of our product and meeting of proper quality. Payment methods are also included in this sector and shipping and delivery.

Account: When a customer selects a product then the account profile is verified, and payment methods are shown then remind the profile password and access the actual location and the delivery locations save address.

Order confirmation and gift card: Order Confirmation section is the confirmed the customer's order and gift some lucky customers some special gift card and discount offer.

Others: Public some creative ads and product review video on the social media such as Facebook, Twitter etc. On the other hand deal some other ecommerce website with the best sell and provide the proper report on the management.

1.5 Project Outcome

The expected outcome of Buzz Hub is to become an easy shopping site which already designed for ease and full-featured shopping site to transform the shopping experience of the user. Companies that are currently using Buzz Hub can improve their chances of making more revenue better their customer satisfaction and free up time from doing administrative work. The application is expected to improve the sellers' and consumer interaction. The purchase product will be safe and its status will be report in real time mode (this also requires updates and notifications). Consumers will get notification or new product and discounts in their most preferred shops if they allow. Buzz Hub shall create a positive perception in the e-sells sector As it will help the global community make shopping easier and more fun, to the advantage of the seller as well as consumers.

1.6 Organization of the Report

This report is divided into six chapters, each describing specific aspects of the development, implementation and evaluation of the Buzz Hub platform. In Chapter 1 background motivation, objectives, and expected out comes of the project is provided as a preview. Methodology used during development is outlined, and finally the organization of the report is provided to give the readers a road map for the report. In chapter 2 background research required as part of the project are

described which includes a literature review and review of similar applications. It identifies gaps which are not covered by existing solutions and outlines innovations that Buzz Hub brought to fill the gaps. In chapter 3 I describe in detail the methodology adopted for the design and development of the system. The Tutorial covers requirement analysis, system design specifications (including Data Flow Diagrams, Sequence Diagrams, Entity Relationship Diagrams) tools and the technologies used. The concept of task allocation and project planning are also discussed here. The technical implementation of Buzz Hub, environment setup, system integration and testing can be found in the chapter 4. The testing and evaluation results are presented and discussed including successful accomplishment of system objectives. Chapter 5 concentrates on the engineering challenges that were overcome throughout the project and the standards that were met throughout development. It investigates the societal, environmental and ethical consequences of the system as well as risk management. The last part presents final conclusions and makes contributions of the project. The limitations of the system and future directions to contribute to the future system evolutions to adapt the platform to the users changing needs and market trends are also discussed. This structure facilitates a logical arrangement of the project's objectives, methodology, outcomes and impact and makes it easy for the readers to understand.

Chapter 2

Background

2.1 Introduction

This chapter has adequately laid the groundwork on what one needs to know in order to get a glimpse of what the wind is blowing around in terms of ideas, technologies and methodologies that Buzz Hub is developing. To begin with, the resemblance research studies, applications and methodologies that gave rise to process and operation of the system are examined. The work relies on the information obtained on the platforms and literature to fill in the gaps and to assist in solving the issues in the E-commerce management systems. Additionally, the chapter presents the differentiating features offered by Buzz-Hub that is not present in the current solutions and how the differentiating features can help Buzz-Hub succeed in addressing enhanced user experience by sellers and customers service providers.

2.2 Literature Review

The literature review is the term that denotes a document uniting the most important sources on a topic and argues those critical sources in discussion with each other. It is simply, an overview of the published work in a Charter of study. The book, in short, is a good overview of the state of knowledge up to date, in a way that you can understand what theories or methods are applied and what gaps exist in regard to projects. The literature review is conducted in order to get familiar with research conducted concerning the topic on the chosen project, and to summarize research in the project report. The primary aim of literature review is however to better define the problems and also provide the users with a straightforward solution. After analysing these above Buzz Hub finally attempts to make these things better by adding more needed services and reducing the user experience.

Table 2.1: Summary of Literature Reviewed.

Author (s)	Year	Title	Methodology	Key Findings
Shi et al	2019	Journal of Advanced Computational Intelligence and Intelligent Informatics.	Qualitative Analysis	product summarization, and sentiment analysis.
Gua et al	2023	The Mediating Role of Usability and the Moderating Role of Trust	Survey-based	examined how website design affects customer satisfaction and loyalty.
Singh et al	2024	An analysis of consumer's trusting beliefs towards the use of e-commerce platforms	Qualitative Analysis	impact on the trusting beliefs of consumers, which may further lead to an intention to use e-commerce platforms.
Shi et al	2024	Empowering E-commerce Authoring with Object-Interleaved Instruction Following	Qualitative Analysis	product summarization, and sentiment analysis.
Tailor	2024	Trust in E-Commerce and Its Impact on Digital Marketing Strategies	Survey-based	key factors such as privacy protection, security, transparency, and social proof.
Garett et al	2016	Website Design and User Engagement	Qualitative Analysis	The search terms were kept simple to capture the higher level design.
Hasan	2024	UI/UX Design Impact on E-Commerce Attracting Users	Qualitative Analysis	analyze design elements that enhance user engagement.
Shafana et al	2021	Assessing the E-commerce Websites for Performance using Automated Testing Tools	Qualitative Analysis	testing practitioners and researchers to perform load testing efficiently.

Bremser and Chung	2005	A framework for performance measurement in the e-business environment	Qualitative Analysis	providing a general framework for performance measurement in e-commerce.
Handoyo	2024	Purchasing in the digital age: A meta-analytical perspective on trust, risk, security, and e-WOM in e-commerce	Quantitative Analysis	demonstrate that trust, perceived risk, perceived security, and e-WOM significantly influence consumers'.

2.2.1 Similar Applications

Hktdc.com is the e-commerce platform in Hongkong. All the necessities we require are present. It entails tremendous diversity of products including cash on delivery service provision, various segments of products, international shipping Facility and govt. service facility etc. Here the customer only needs to key the name of the product that they desire. In this case, they will have a gigantic assortment of the product. In this product is identified by category. Moreover, customers who will buy the produce will have an opportunity to carry the warranty with them. There is also that web site, which is accessible outside region, and not to us. Various products also sold here. These may be analyzed as discussed in hktdc.com official site[1], Wikipedia [2] The Figure 2.1 is of Hktdc.com [1] site opening page in order to demonstrate fundamental characteristics, functionality and user interface of the application.

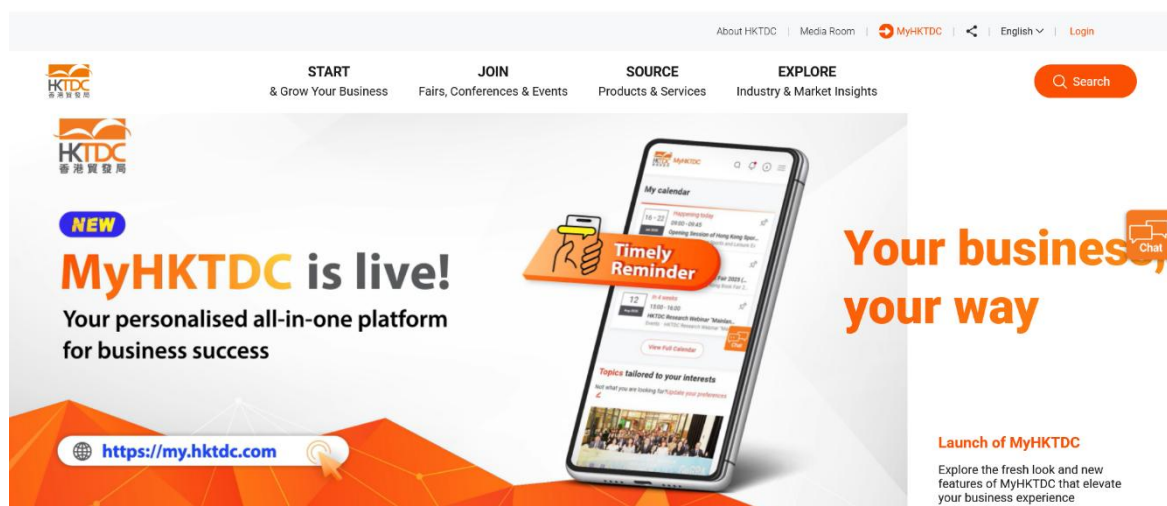


Figure 2.1: Landing page of hktdc.com

Buzz-Hub inspiration: Buzz-Hub is a combination of the strategy of Hktdc.com [1] to deliver an appropriate customers service combined with several innovative features including product discount and quality guarantee.

A well-known e-commerce site in Bangladeshi is Daraz.com.bd. Listed here is a lot of product. But in this case, there is the issue of authenticity of products. It may be noticed in the review section of the product. All fundamental functions have been present there, yet there is no warranty claim section and complaint section in case some consumer has a negative experience with the seller. Negative experience can be shared only in one

way, a product review. It is an industry offering in-country service provisions. No global product buying product. This platform established local shop and other brands. Findings of such analysis were discussed in [3] daraz.com.bd official site and Wikipedia [4].

The Figure 2.2 presents the landing page of Daraz.com [1] web site to demonstrate the minimum features, functionality and UI of the application.

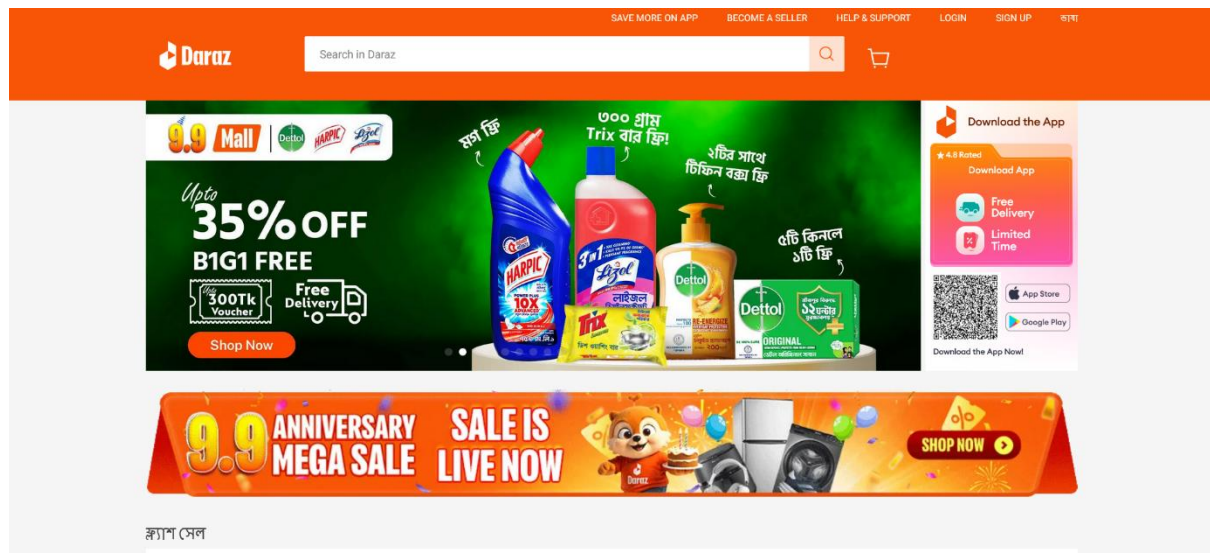


Figure 2.2: Landing page of Daraz.com

The Buzz-Hub inspiration: Buzz-Hub will be based on the idea of Daraz.com [1] to offer the appropriate customers service and introduce certain features that may be considered unique (i.e., the product discount and quality assurance).

Evaly is another Bangladeshi e commerce site. There is much product collection. Know it with it exclusive discount price. However, despite having COD facility, its product offering is not as enriched as it is supposed to be. Nevertheless, it is a favorable e commerce site but not regarded as credible. In this, platform there was a swindle. Today, several measures were undertaken and now it is making attempts to resume its operations. But faith in people is a major issue in this case. Being its seller, it possesses other brand and local stores. This platform can be used in this region only. It has no global service center. It is web, android, Ios. Every analysis has been conducted on evaly.com.bd[5],[6],[7] Ealy android application, Wikipedia[8] and prothom alo[9] news portal.

Figure 2.3 presents the landing page, simple features, functionality and user interface of the Evaly.com [6] site.

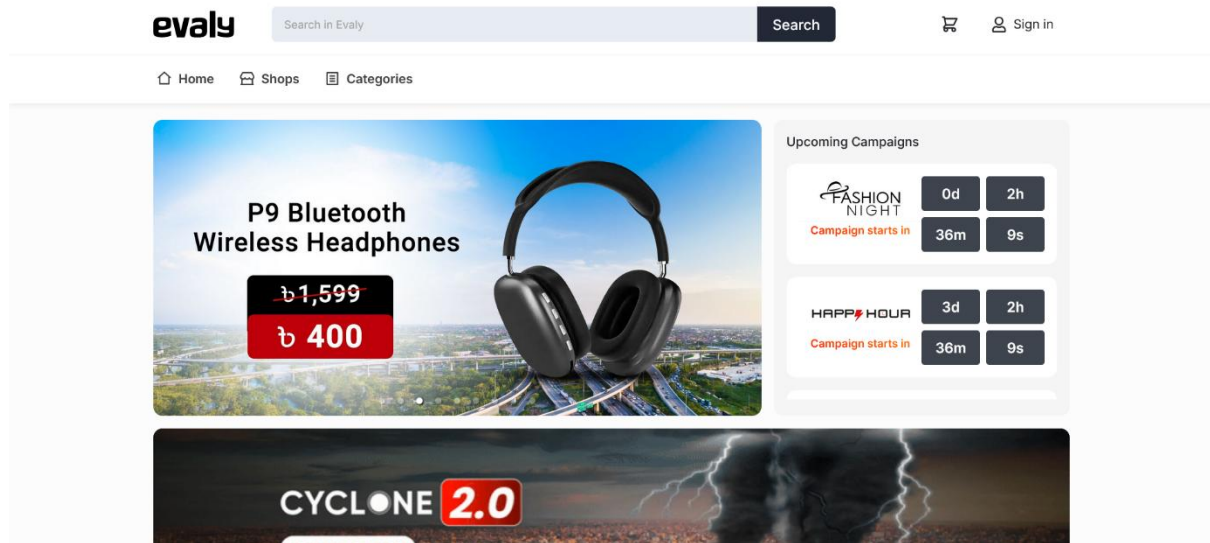


Figure 2.3: Landing page of Evaly.

The idea of Buzz-Hub: Buzz-Hub combines the method of Evaly.com [1] of offering an appropriate customers service along with the added features of product discount and quality assurance.

Flipkart is another e commerce site in india region. A deal, product, user friendly interface and its product collection are established. Nevertheless, plenty of fraud cases are yet to occur in this platform. The claimed seller fraud of flipkart by consumer and victim denied being responsible of this. The problem with flipkart lies in the fact that it is already facing certain trust problems yet, it is a familiar brand in its home country.

It does not accommodate international product and custom made preorder. Their vendor is various kinds of stores, dealers, brands. [10 [11] has been discussed using flipkart official site and Wikipedia; there are already numerous other platforms of e-commerce with an independent merit and a demerit. However, although those serve as the inspiration of Buzz Hub, they do not rely on them alone, choosing to maximize the services to the customers and make them more satisfied due to it.

To demonstrate the fundamental features, functionality and interface of the application, the Figure 2.4 displays the landing page of Flipkart.com [1] web site.

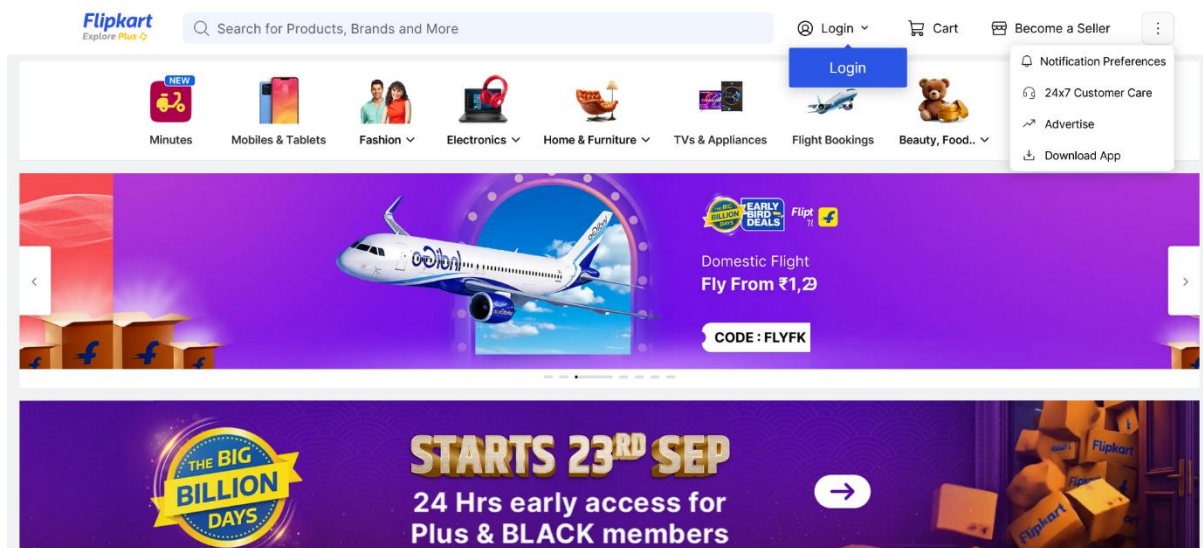


Figure 2.4: Landing page of flipkart.

Inspiration of Buzz Hub: Buzz Hub combines the Buzz Hub uses the methodology of Flipkart.com [1] to offer an appropriate customers service and the addition of special functionality like product discount and quality assurance.

2.3 Gap Analysis

Unlike any other platform, Buzz Hub is a full approach and offers a variety of customer services on the same platform. This application has the great feature of offering all compact problems solutions that anyone can encounter anytime he is in a tour consequently the user does not consider it important to change the screen of various applications that lead to a utmost experience of this application.

Comparison table between the existing application that are already existing in the market is given below. On strengths, weakness, the condition of UI/UX and the presence of the existing applications.

Table 2.2: Comparative analysis with existing applications features

Application Name	Strengths	Weakness	UI/UX	Availability
Hktcdc.com	-Comprehensive services including different types of products, quality and quantity. -Provide some discount (any products).	-Delivery services are not strong. (Home delivery are not allowed).	Modern and user-friendly.	Web. Android. iOS.
Daraaz.com	- Every types of products are available. -Delivery services are very well.	- Products quality are depends on customer's luck. -Quantity are vulnerable.	Modern and user-friendly.	Web. Android. iOS.
Evaly	- Many types and categories of product are available. -Lowest price generate with a longtime process.	- Products delivery is a longtime process. -No return policy for product cancellation.	Modern and user-friendly.	Web. Android. iOS.
Flipcart	- All types of products are in their site. -Flight ticket is also available in here	- friendly discount offer are not available.	Modern and user-friendly.	Web. Android. iOS.

From the Table 2.1, differentiation of project features can be identified.

Buzz Hub will gain some new functionality and the applications objective is to make it accessible to all platforms. Hongkong Trade Development Council or HKTDC, Flipkart, Amazon are globally located firms that are generally found in the outer region. Since the main target audience of Buzz Hub in this area Daraz, Evaly, Chaldal. They are already present here. Daraz has a massive market share in local area, they possess a good user interface and products versatilities. Nevertheless, they are not without problems with consumer and seller. Consumers will not be able to invoke a warranty since they lack any warranty claim section. In order to claim warranties they must communicate with the seller and daraz is not under the obligation of doing the same. That can be overcome by Buzz Hub in this industry due to its warranty claim and

exchange system Evaly is another national e-commerce platform. There is a lot of proper UI on them. But they have trust issue. Buzz Hub is entirely committed to the satisfaction of the consumer. It will provide cheap and customer confidence. In this industry Buzz Hub will beat that. Chal deal is also a domestic e-commerce site although it only sells groceries. Buzz Hub will aim at all products that a person requires. And Buzz Hub will make it its service to all small, establish and non e-commerce shops. Flipkart and HKTDC are global companies but they cannot be found in the area. Buzz Hub will also be used to provide international shopping service in this region. The gap in this stage is the arrangement of trade number and other documents in case of international license. This country does not have e-commerce application that will provide IMEI facility and therefore, Buzz Hub will provide it in its business and even provide the custom made product as part of its service. These are what make Buzz Hub unique and special as compared to the others. And Buzz Hub is determined to provide optimum user experience and evolve itself as per the need by the users.

2.4 Summary

In a nutshell, literature review aims at locating the work in existence and the strengths and weaknesses thereof E-commerce application is quite numerous and can be aligned to the same purpose of Buzz Hub. Buzz Hub is driven by the applications that it is motivated by as it optimizes the services and enhances customer satisfaction. Buzz Hub offers the solution to the issues that one may have at the time of shopping. Buzz Hub establishes the gaps in the current shopping applications and concentrates on the necessity of more integrated solution. In such a way, the literature review indicates the significance of developing an easy to use, comprehensive e-commerce application. Buzz Hub seeks to fill the gaps that exist in order to have a more efficient and enjoyable experience.

Chapter 3

Research Methodology

3.1 Requirement Analysis & Design Specification

3.1.1 Overview

The chapter deals with the methodology of Buzz Hub, the requirement analysis and design specifications in which the systematic nature of the development via highlighting is presented and explained. The first phase as per the Software Development Lifecycle (SDLC) is, analysing the project. That is the part taken care of by the previous chapter introduction and literature review. The next step project design is the UI/UX design or the adopt some engineering process first and create some UML diagrams. It proves useful when we use to implement or code the project next part in simple terms when the whole group has to do the implementation of the project and has to know how the future project will implement and which feature/components will follow and afterwards. Buzz Hub and its functional analysis will be developed with its assistance.

3.1.2 System Design

Currently we are working on a updated ecommerce website called “Buzz Hub”. The use of HTML, CSS, Bootstrap, Javascript for frontend and ASP.NET MVC for backend is emphasized is the proposed methodology. The best and user helpful ecommerce website with the best dealing and services. Our key features are:

- **User Login and Registration:** User/someone can register with the system using the proper e-mail address with a hard password. When user login successfully then they get a customer ID and confirmation login approval.
- **Home:** Provides A centralization view for customer with quick access to essential features and information of different kind of products.
- **Product:** Here, the many types of product with best discount and also include the

different categories. In this site there are many new collections also attach.

- **Product details:** All products details are shown to the sequence on the user interface. Many common products are highlighted with the best discount price.
- **Compare:** Compare The other online website product and get a customer and product review.
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- **Account:** When a customer selects a product then the account profile is verified, and payment methods are shown then remind the profile password and access the actual location and the delivery locations save address.
- **Order confirmation and gift card:** Order Confirmation section is the confirmed the customer's order and gift some lucky customers some special gift card and discount offer.
- **Others:** Public some creative ads and product review video on the social media such as Facebook, Twitter etc. On the other hand, deal some other ecommerce website with the best sell and provide the proper report on the management.

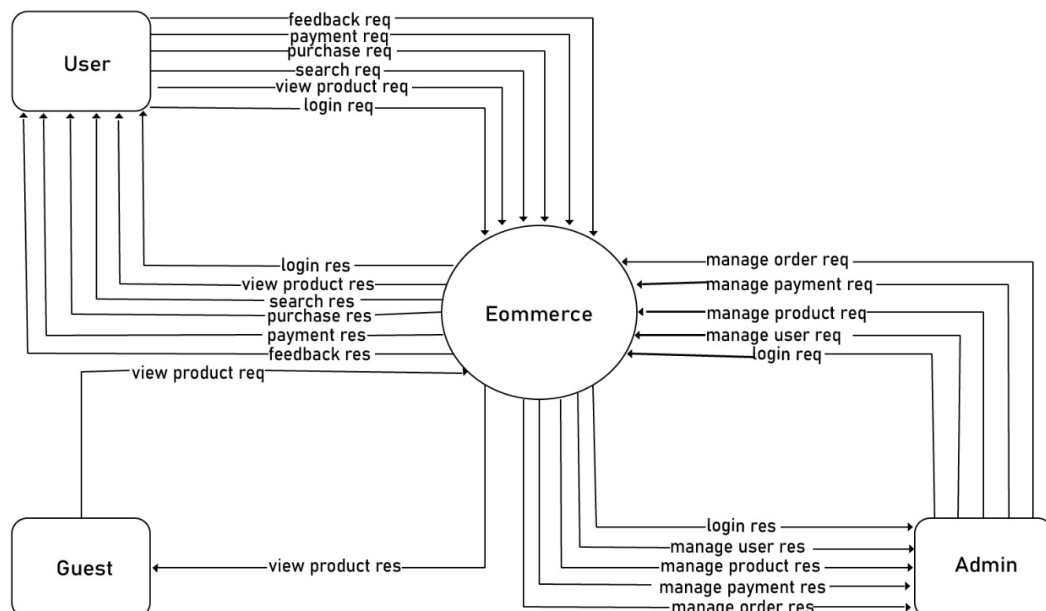


Figure 3.1: System Architecture Diagram of Buzz-Hub.

The important Design considerations are as follows:

Scalability: The modularity enables the addition of new features like support of more user roles or travel services easily.

Security: JWT based authentication, secure payment gateways, provide security of user data and transactions.

Reliability: The concept of using strong frameworks and APIs increases the performance and the reliability of the system.

User-Friendly: The interface/ui design is user centric and is attuned to intuitive navigation and accessibility that helps make the user experience easy.

Under this organized and stratified system design, Buzz Hub is assured to not only function, but to be effective, dependable and to expand with future growth requirements. Visually, this design is summarized in the System Architecture Diagram that is attached, and it also demonstrates how the interplay between client-side systems, server-side systems and external systems build a coherent E-commerce management platform.

3.1.3 Functional and Nonfunctional Requirements

To this end, we will ensure that customers and service providers have a comfortable efficient experience due to a well-defined functional and nonfunctional requirements of our Buzz hub development. These requirements define the basic behavior and characteristics of the system as a point of implementation and assessment of the system.

Here are the requirements:

Business process model: to come up with the Buzz Hub a company process model is mandatory. It will aid in designing user interface. Information regarding the flow in developing period is compulsory. We may also tick where the next thing to do is on this too.

Registration and authentication: User has to enter their valid information in order to register with the site. In our case we require government access in knowing their details. They would provide their identity in the form of passport and NID number. Buzz Hub takes all the responsibility of their information security.

Two-factor authentication: Two factor authentication is a viable solution to data security and an authenticity check. Every single every time the device logs in a user must use his or her registered id and password. As a form of authentication, than an OTP will be sent to their registered mobile phone number and email address.

Product Management: Buzz Hub is aimed at a massive market. Product management is therefore an issue to the project. A project demands an expert group to coordinate all the products details. What product is out of stock it is a necessary to Buzz Hub and what is listing.

Order Management: Buzz Hub does not look at just the domestic market. It possesses a target to have objective to the International market. Very many traffic and order will take its seat here. Thus a knowledgeable and committed order management team is a requirement. It will have a direct impact on user experience.

Search and Navigation: It will list a tremendous amount of products. There should also be a good search and navigation bar. It will assist in locating desire shop, and product based on their requirement.

Pre-order Sector: Buzz Hub provides product pre-order facility. To this a section pre order ability will enable the application. And it will assist to design a tailor-made order.

Link-up with other E-commerce applications properly: Buzz Hub is an application that will also handle other e-commerce web sites. Here access to other websites products and correct link-up is compulsory. Such communication with other platforms is must need here.

Banking approval: Banking approval is required during buzz-Hub is an e-commerce site and it provides EMI shopping facility. Although, Buzz Hub will initially be oriented on domestic market. therefore, initially, it must be acceptable among reputable e banking sites. Similar to Bkash, Nagad, Rocket, Visa, mastercard and credit card. At what point will it transfer to the International market Paypal, Google pay, amazon pay etc.

Correct knowledge on languages: Buzz-Hub utilizes certain language HTML, CSS, Python, Javascript, Php. Here, knowledge on these languages are needed.

Performance: Buzz Hub is a nice project and there is a bright future planning. Huge traffic must face it. Here is where a good performance is required. Response loading time, traffic organization will contribute to its better performance.

Security: Buzz Hub is a venture where consumers have a great deal of personal information thus security is a significant area in this venture. Buzz Hub will provide security update time and assigned a dedicated team that will allocate security purpose.

Usability: Develop a friendly user interface, with well defined calls-to-action and navigation. Perform usability testing to recognize and fix usability problems.

Linkage with Shipping providers: Sundarban is a shipping company and must be linked with Buzz Hubs. The transporters in the booking channels are courier, Pathao, SA Paribahan and Khorndokar Transport. When Buzz Hub will It appears that other companies in the transportation sector such as DHL leap to an international market first before Buzz-Hub.

3.1.4 Data Flow Diagram

Data Flow Diagram (DFD) is a diagrammatic illustration of the flow of data in a system. It shows the flow of data among external entities, processes and data stores. The Buzz Hub DFD divides the system into the key sub-processes by concentrating on the processing of user inputs and the production of the outputs.

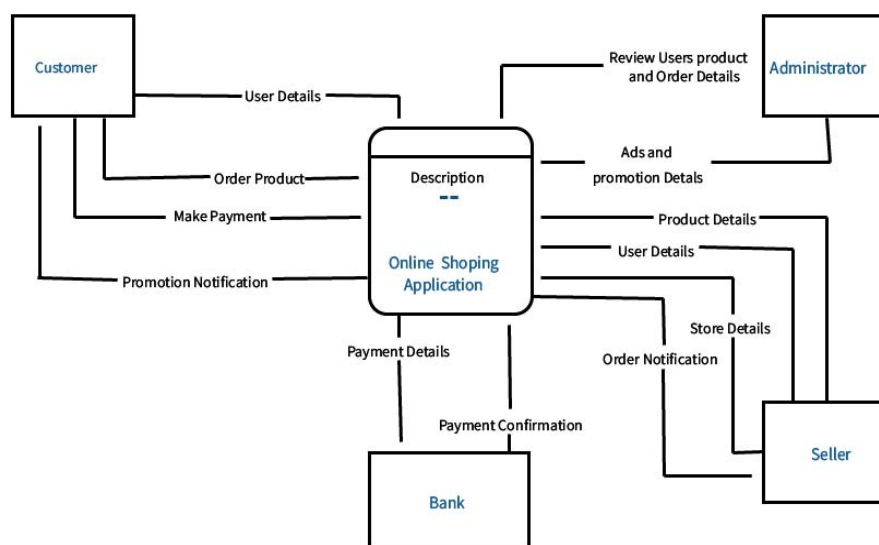


Figure 3.2: Data Flow Diagram of Buzz-Hub.

Such a diagram provides an excellent understanding of what the data stream is within the system and the basis of how it would be properly designed and implemented in detail.

3.1.5 Sequence Diagram

The interaction, time and communication between the system components UML diagram is called as a Sequence Diagram. It concerns sequence of activities and direction of messages between system units, user and outside organizations.

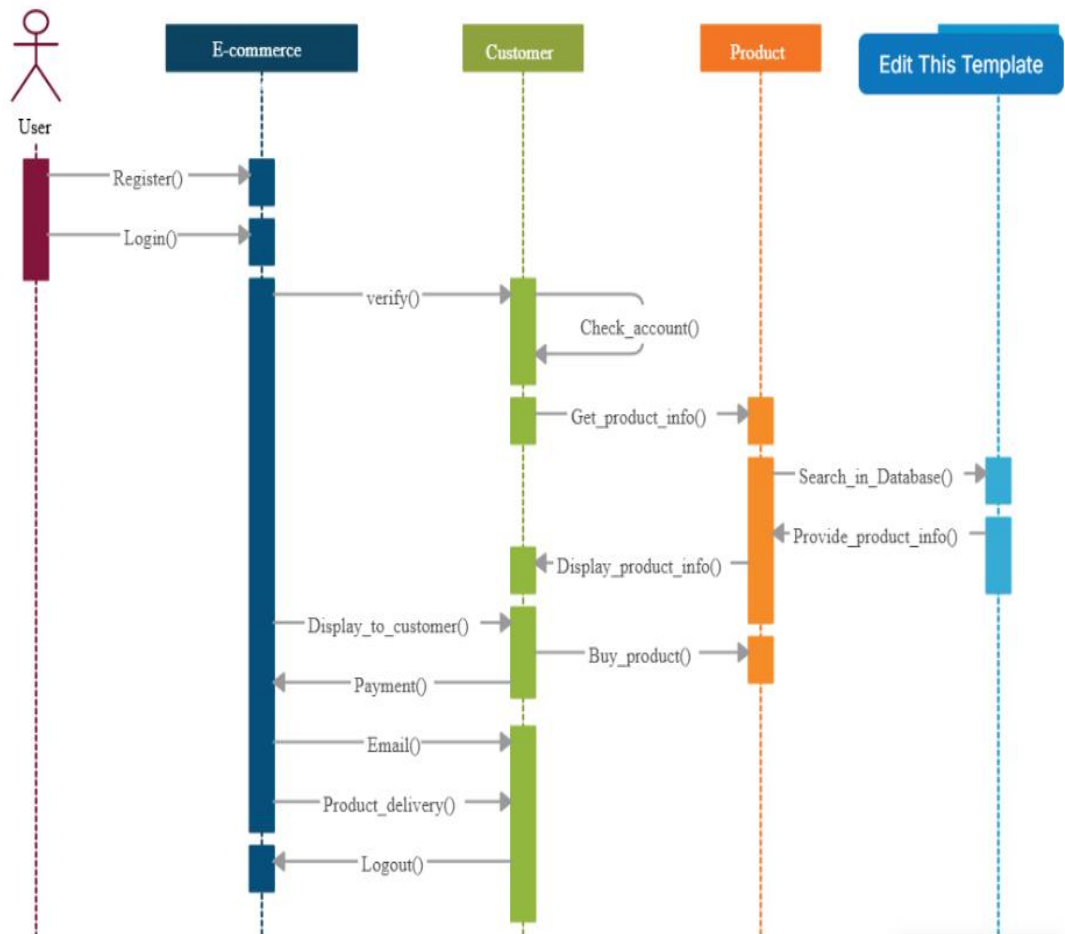


Figure 3.3: Sequence Diagram of in Buzz Hub.

3.1.6 Entity Relationship Diagram

An Entity Relationship Diagram (ER Diagram) is a graph diagram of data model of a system. It presents objects engaged, their characteristics and connections among them.

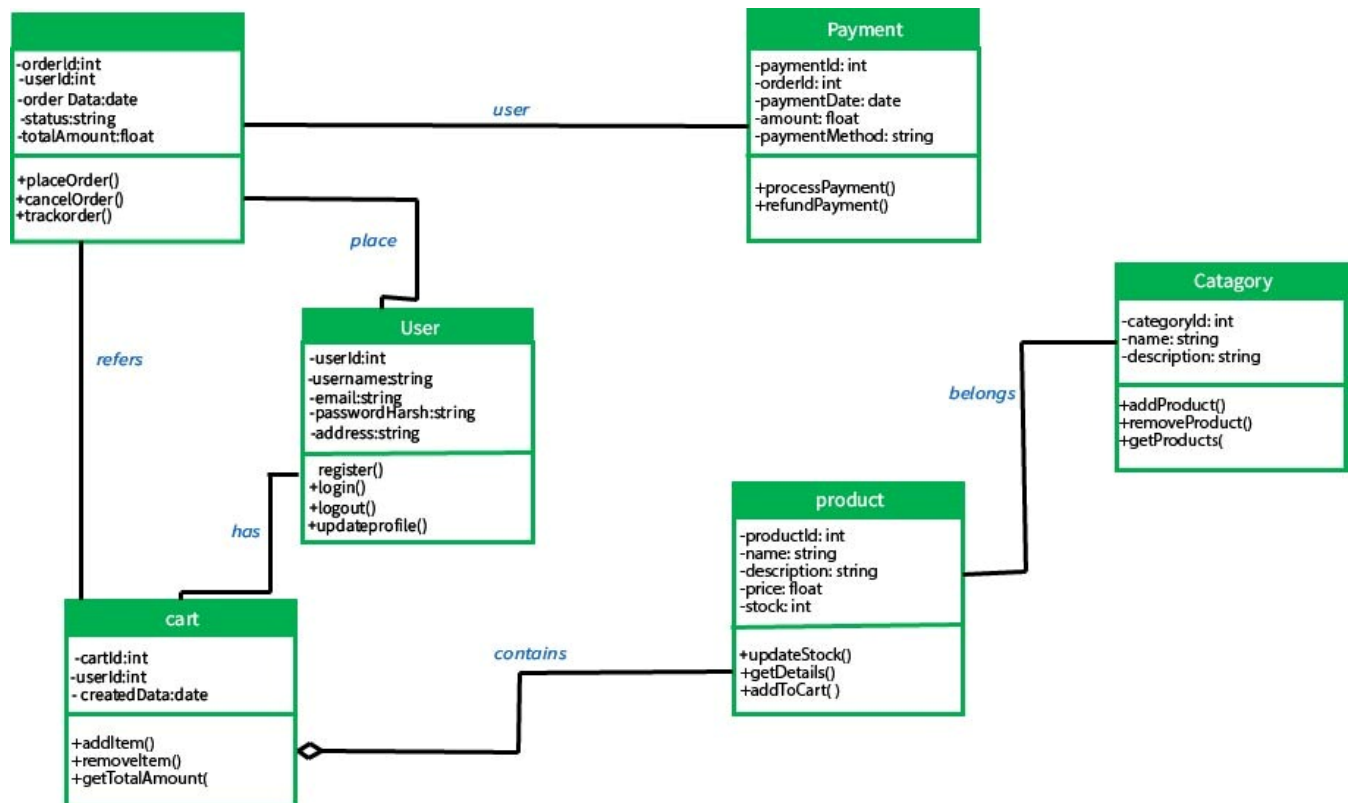


Figure 3.4: E.R. Diagram of Buzz Hub

Buzz Hub inspiration: Buzz Hub is a combination of the strategy of Daraz.com [1] to offer a customers service of proper quality and introduces special features like price discount and quality guarantee.

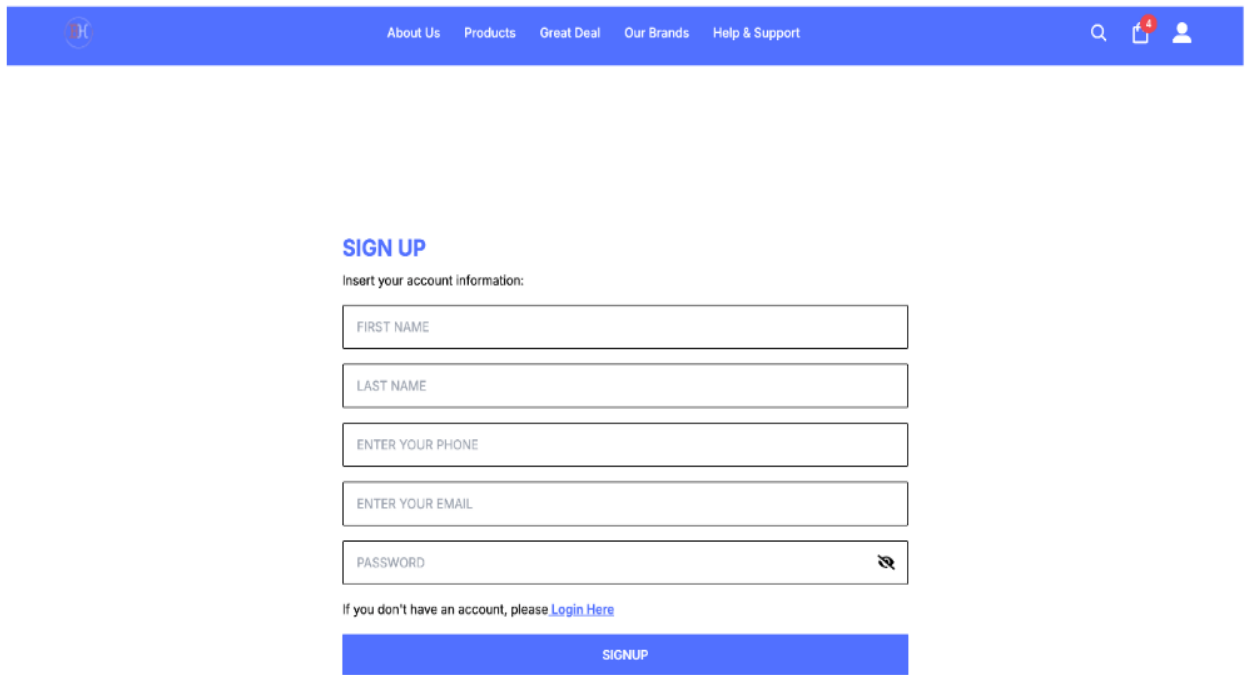
3.1.7 UI Design

The Buzz Hub UI Design operates on the interactive style of the UI design to ensure that Customer acquires familiarity with the UI in the shortest time possible besides Customers, Product Details, Product Purchase and Delivery. It is easy to use, available and receptive design that renders it usefulness in the utilization of various gadgets such as desktop, tablet and cellular phones. The UI design is incorporating the design of dashboard of different user roles. Properly laid out sections can make product purchase, adding cart and order guide. The dashboards of service providers would enable branded

agents and product managers to effectively manage their profile and services/ deliveries. We select colours and designs so as to maintain the visual consistency and to enhance usability. It also injects search products, booking products, payment workflows... everything that that critical aspects that should enable somebody to perform his/her task very easily. It is also based on the current design principles such as Responsive layouts, clear typography and intuitive icons to reinforce the feel.



Figure 3.5: Landing page design - Navbar, Banner



The image shows a 'SIGN UP' page with a blue header. The header contains a logo on the left, navigation links (About Us, Products, Great Deal, Our Brands, Help & Support) in the center, and search, cart, and user icons on the right. The main content area has a 'SIGN UP' title, followed by the instruction 'Insert your account information:'. Below this are five input fields: 'FIRST NAME', 'LAST NAME', 'ENTER YOUR PHONE', 'ENTER YOUR EMAIL', and 'PASSWORD' (with a toggle icon). A link 'Login Here' is provided for users who don't have an account. At the bottom is a blue 'SIGNUP' button.

SIGN UP

Insert your account information:

FIRST NAME

LAST NAME

ENTER YOUR PHONE

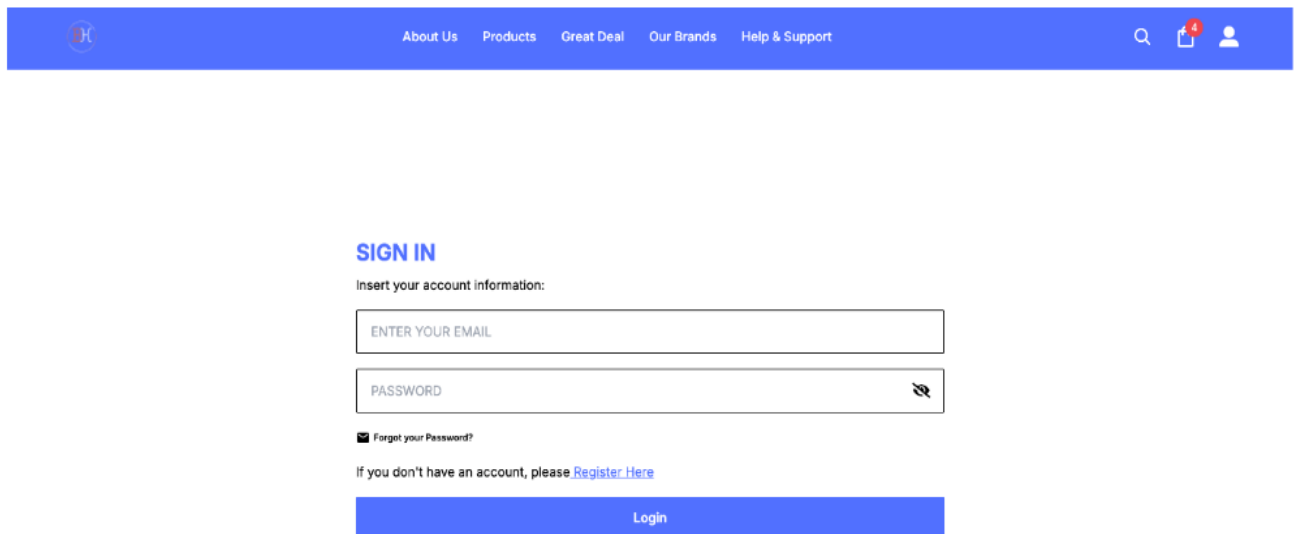
ENTER YOUR EMAIL

PASSWORD

If you don't have an account, please [Login Here](#)

SIGNUP

Figure 3.6: Sign Up page



The image shows a 'SIGN IN' page with a blue header. The header contains a logo on the left, navigation links (About Us, Products, Great Deal, Our Brands, Help & Support) in the center, and search, cart, and user icons on the right. The main content area has a 'SIGN IN' title, followed by the instruction 'Insert your account information:'. Below this are two input fields: 'ENTER YOUR EMAIL' and 'PASSWORD' (with a toggle icon). A link 'Register Here' is provided for users who don't have an account. At the bottom is a blue 'Login' button.

SIGN IN

Insert your account information:

ENTER YOUR EMAIL

PASSWORD

☐ Forget your Password?

If you don't have an account, please [Register Here](#)

Login

Figure 3.7: Sign in/ Log in page.

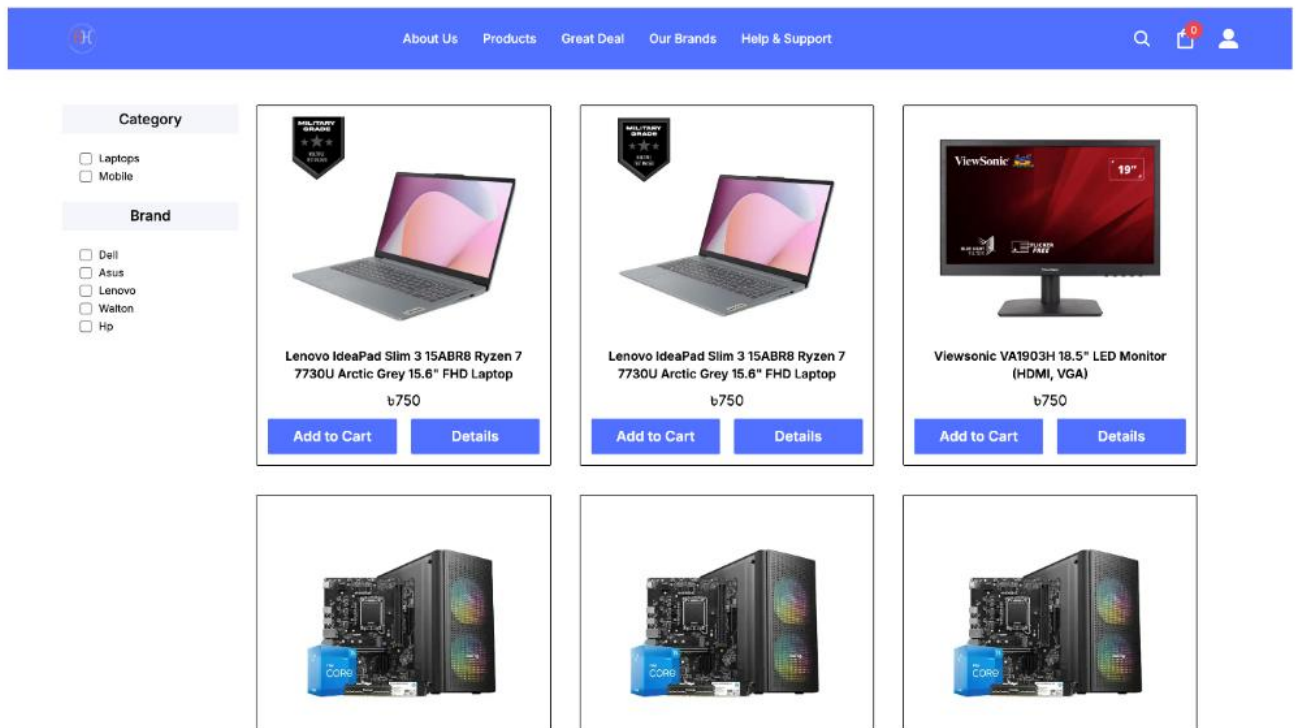


Figure 3.8: Product category details page design

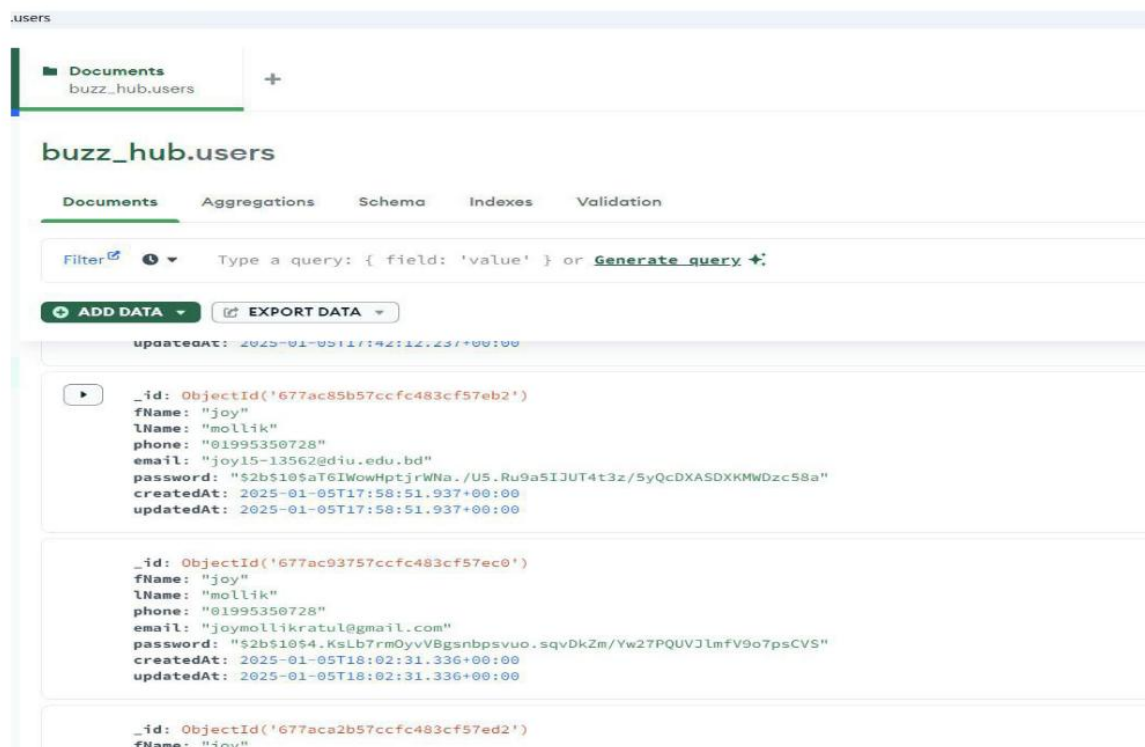


Figure 3.9: Backend login and registration output

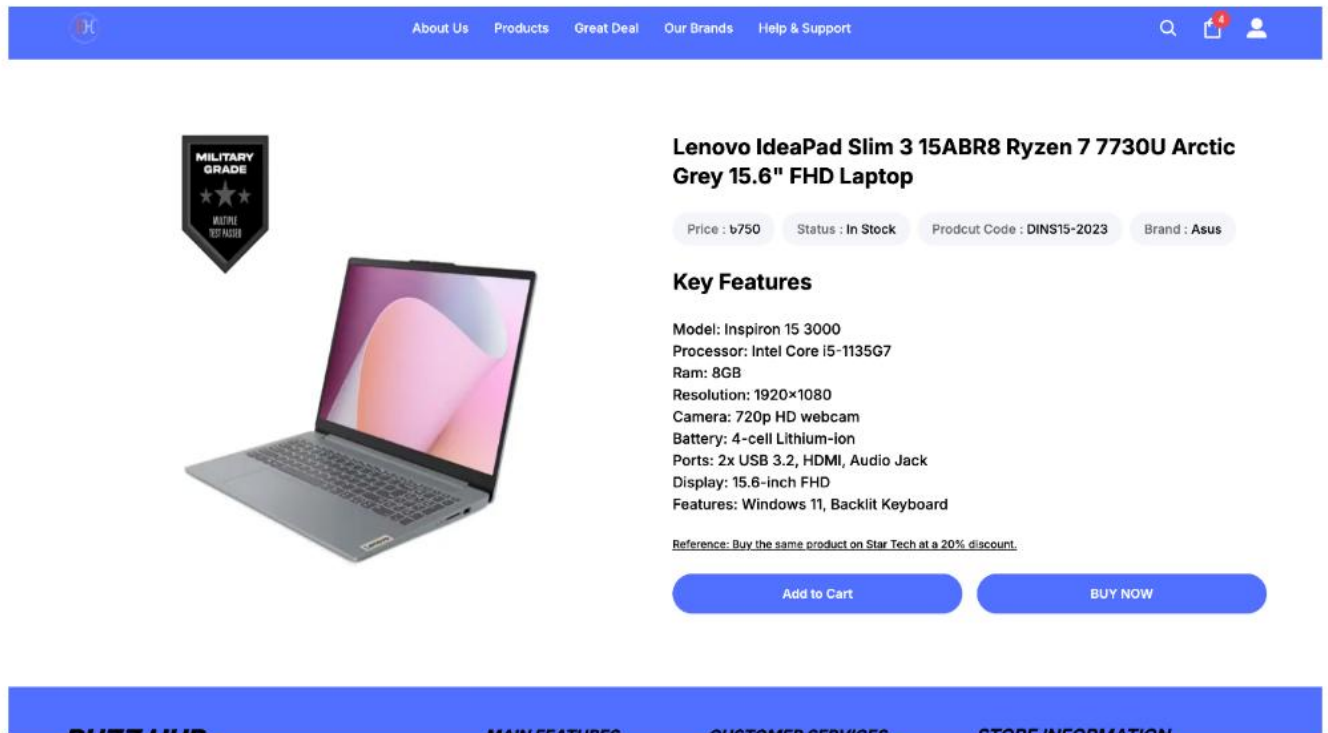


Figure 3.10: Product details page design.

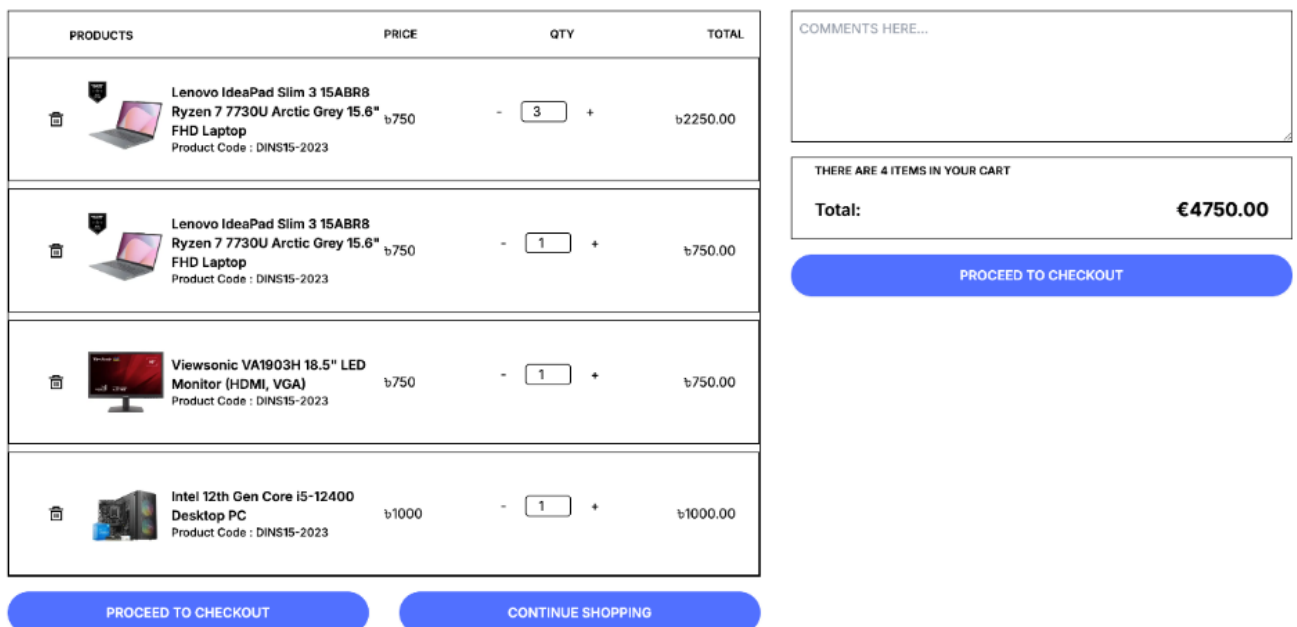


Figure 3.11: Product purchase cart

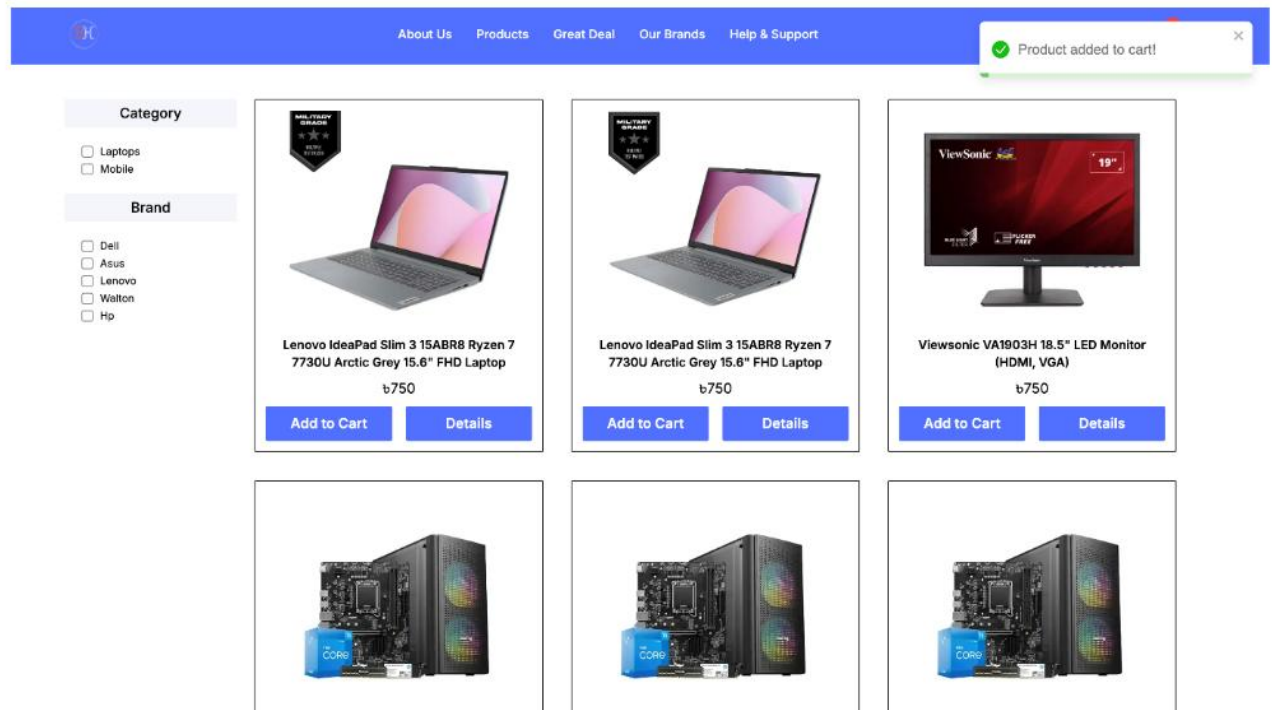


Figure 3.12: Product purchase conformation page design.

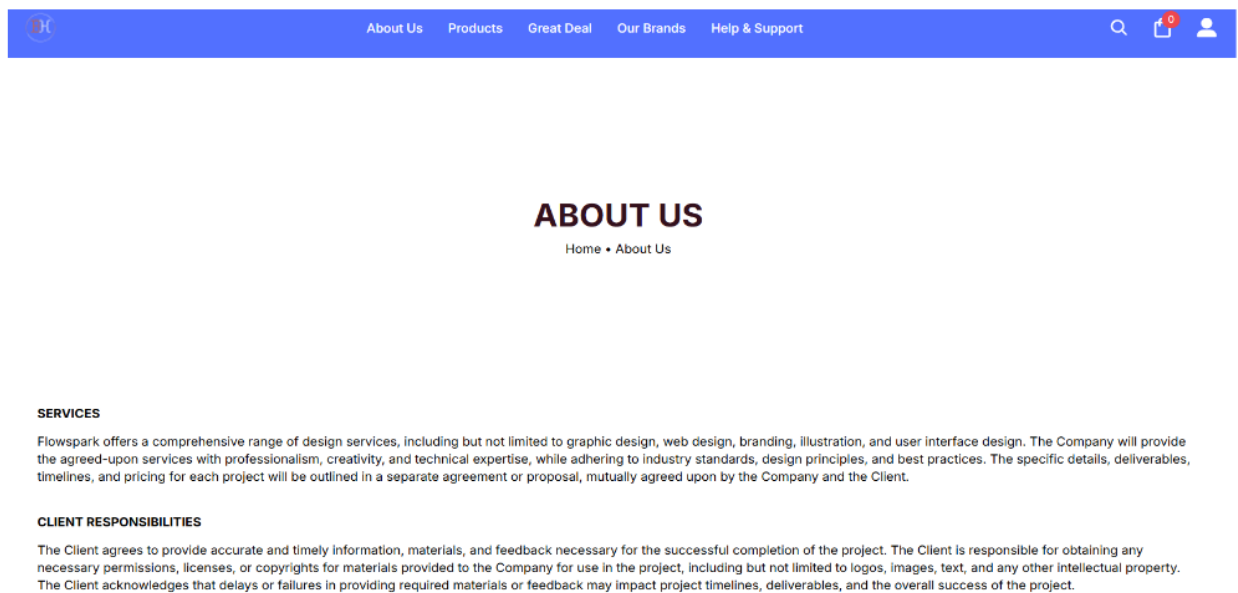


Figure 3.13: About us page design

3.2 Detailed Methodology and Design

Various solutions, technologies and frameworks were looked into in addressing various problems as the construction of an integrated shopping system such as Buzzhub. The tools and design options were chosen on the basis of whether they addressed both the functional and non functional requirements of the system, could scale, can be created easily and their performance. This section deals with other options considered and the particular decisions in the development of the system explained. Alternate Solutions:

1. Frontend Development:

- o Alternatives: Angular, Vue.js.
- o Selected Technology: Next.js.

§ Reason: Next.js provides a component-based design, which allows reusable and modular code. Next.js allows the use of react component power to develop high quality web applications. It is best suited to the construction of scalable and maintainable frontend applications due to its huge library and large developer base.

2. Styling Framework:

- o Alternatives: Bootstrap, Material-UI.
- o Selected Technology: Tailwind CSS.

§ Reason: With tailwindcss we have the ability to design highly customizable designs as well as at a fast prototyping rate with their utility first approach to styling. It is extremely light-weight and therefore loaded quicker and its performance is enhanced in comparison to traditional CSS setups.

3. Backend Development:

- o Alternatives: Django, Ruby on Rails.
- o Selected Technology: Next.js

§ Reason: Next.js is a complete stack. It can also be used easily as a backend work. It is lightweight and has been used as a frontend already and therefore it is easy to use as the backend to handle buzz hub. It fulfils all the purpose of buzz hub and reduces the run time.

4. Database:

- o Alternatives: MySQL, PostgreSQL.
- o Selected Technology: MongoDB.

§ Reason: The document-based architecture offered by MongoDB allows flexibility in the manipulation of various types of data (user profiles, hotel details and booking

information). It is easy to integrate with Next.js and is scaled, which makes it a natural fit in Buzz hub.

5. Payment Gateway:

- o Alternatives: PayPal, Razorpay.
- o Selected Technology: Stripe.

§ Reason: Stripe provides the API support of dealing with secure payments. It has capabilities such as PCI compliance and real time payment processing that match the systems need to have secure financial transactions.

Reason to Select the Specific Design Pattern:

The workflow of application has been fully described in the flowchart of Buzz hub created on the basis of system. The thing with mapping the roles, actions and decision points of a user and consumer in a user flow is, that it is highly visual. I selected this design pattern as it is self explanatory in detailing more complex interactions among multiple entities without confusing all the stakeholders of the system with the functionality that the system supports.

Benefits of This Design Pattern:

- Modularity: The system is easier to use and maintain by each user role since it has a unique flow.
- Scalability: The design is such that it can be expanded later (either with new functions or jobs).
- User-Centric: The flow is also aimed at making user interactions easier and the flow makes the experience of the travelers and service providers smooth. Reduced error: The workflows can be visualized, thus the possible bottlenecks and errors can be detected and resolved at an early stage of the development process.

The chosen set of Next.js, Tailwind CSS, Firebase Authentication, Stripe makes it so that Buzz hub will be strong, scalable, secure and easy to use. The technologies are complementary and inter-operate to provide a smooth shopping management platform that satisfies all the functional needs and also offers the best performance and flexibility. The development process was simplified by adhering to the hierarchical flowchart that will guarantee that the design and implementation phases are aligned. This approach has not only resolved the issues of developing an integrated system of shopping, but also put a formidable foundation towards future upscale and improvements.

3.3 Project Plan

The following Buzz hub project plan is an outline of the systematic approach to the designing and developing, testing, and implementing the system. It is a project plan of the whole project life cycle and to make sure that all the activities are properly synchronized and aligned to project goals. The plan entails the area of the project, allocation of resources, milestones, timelines, strategies to manage risks as well as testing protocol to guarantee an effective delivery.

Scope of the Project

Nevertheless, the range of Buzz hub is, it is a place to shop conveniently, significant (order monitoring), personalize order, compare items and so on. The system allows multi user role including, admin, user, consumer user and can each execute various role based dashboards and functionalities. Moreover, it also incorporates payment processing, authentications and email notifications that is too a full package to provide the best shopping experience.

Resource Allocation

The resources for the project were allocated as follows:

- o Project Manager: Oversee the project and ensure timely delivery.
- o Frontend Developers: Develop the user interface.
- o Backend Developers: Build the server side and database functionalities.
- o QA Engineer: Perform testing and ensure quality.
- o UI/UX Designer: Create mockups and enhance usability.
- Technologies and Tools:
 - o Next.js, Tailwind CSS, MongoDB, Firebase, Stripe .
 - o Tools: Visual Studio Code, Postman, GitHub, Figma.

Risk Management

Risks were analyzed in advance and controlled by following strategies:

1. Technical Risks:

- o Risk: Client / server integration.
- o Mitigation: Preliminary testing and utilization of conventional APIs to lessen integration issues.

2. Resource Risks:

- o Risk: Team members will not be available at the most important moments.
- o Mitigation: Adaptable task placement and intersecting skills.

3. Timeline Risks:

- o Delays in delivery of deadlines.
- o Mitigation: Frequent reviews of progress and back-up plan of key activities.

Testing Protocols

1. Unit Testing: Check that the individual components and modules are working.
2. Integration Testing: Test the communication between the frontend, backend and external system.
3. System Testing: Assess the general functionality and performance of the application.
4. User Acceptance Testing (UAT): Obtaining the feedback of the potential users to diagnose and fix usability problems.

Monitoring and Evaluation

Creation of the project was tracked through such tools as Trello to track tasks and GitHub to track the version. The frequent review meetings kept the I in line with the projects objectives. The performance indicators (KPIs) were developed to measure the project success in terms of system reliability, user satisfaction and wastage of use.

Benefits of the Project Plan

Having this project plan in place, the team could introduce an effective, scalable and user friendly shopping system to marketplace. The planning was helping in an effective manner to utilize resources in an efficient manner, mitigating risks in an efficient fashion and meeting the expectation of the stakeholders of the system. Clear road maps and milestones also were useful in the development process to Buzz-Hub in order to achieve a successful closure.

3.4 Task Allocation

Personal contribution.

Being the only developer of Buzz-Hub system, I did the entire work of developing the project on my own. This involved the design of the system, implementation, testing and deployment. The inclusion of both the front-end and back-end components made sure that the project objectives were achieved successfully without compromising efficiency and quality in the process of the development.

1. Documentation and Requirement Analysis:

- o Requirement gathering and development of the Software Requirements Specification (SRS) document.
- o Tset functional and non-functional requirements.

2. Frontend Development:

- o Build the client app with Next.js..
- o Use React Router as state management and routing.
- o apply Tailwind CSS to create responsive and user-friendliness of the UI.

3. UI/UX Design:

- o Develop user-interface mockups and wireframes.
- o Consist in design between various user roles and

workflows.

4. Testing and Debugging:

- o Perform the frontend component unit testing and debugging.
- o Be cross-browsing and responsive.

5. User Manuals:

- o Frontend application user guides and manuals.
- o Develop system architecture with ER and Data Flow Diagrams.

6. Diagrams and flowcharts.

- o Build the back from Node.js and Express.js.
- o Introduce RESTful APIs to hotel reservation, tour management and guide appointment workflows.

7. Database Management:

- o Publish and administer Mongo DB database.
- o User schemas, booking schemas, hotel schemas, tour and guides schemas.
- o Optimize to maximize performance and reliability of database queries.

8. External Service Integration:

- o Add Firebase Authentication to log in and register a user.
- o install Stripe to make payments.
- o Configure the email notification of SendGrid.

9. Testing and Deployment:

- o Test integration to verify that there is smooth communication between the frontend, the backend and the external systems. between the frontend, the backend and the external systems.
- o Put the application in the cloud and monitor performance.

10. Final Documentation:

- o Compose final project documentation comprising of technical aspects and testing reports.

This table depicts the timeline of the principal activities in each period of the project, from week 12 to week 48.

3.1 Table: Project Timeline

Tasks	Weeks																			
	1	2	3	4	6	8	9	15	20	25	26	32	36	38	40	42	44	46	48	
Requirement Gathering and Analysis																				
System Design and Prototyping																				
Frontend Development																				
Integration and Testing																				
Deployment and Documentation																				

Milestones and Timelines

The development process was divided into the following major milestones each with specific tasks and deliverables:

1. Week 1-6: Requirement Gathering and Analysis:

- o Brainstorm and market analysis to identify the system requirements.
- o develop a comprehensive Software Requirements Specification (SRS) document.
- o Deliverables: Requirement documentation, initial system design.

2. System Design and Prototyping (Week 8-25):

- o Architecture Design system architecture with Data Flow Diagrams, ER diagrams and flowcharts.
 - o Build UI mockups and wireframes of interfaces.
 - o Deliverables: UI mockups, system architecture diagrams.
3. Frontend Development (Week 26-38):
- o Develop the front-end with Next.js and Tailwind CSS.
 - o Interoperate with APIs to support functionality such as add to cart, search and payments.
 - o Deliverables: Operating frontend application.
4. Integration and testing (Week 40-44):
- o Integration of frontend and backend and external systems.
 - o Unit test, integration test and system test.
 - o Deliverables: Integrated application that is tested.
5. Deployment and Documentation (Week 44-48):
- o Implement the system in the cloud.
 - o Final project documentation (user manuals and testing reports).
 - o Deliverables: Live system, full documentation.

3.5 Summary

This chapter described the methodologies applied in the design of a Buzz Hub system, design requirements and implementation plan. I presented the requirements analysis, architectural design with Next.js, MongoDB, Firebase, Stripe, SendGrid. These technologies have been chosen because they can be shaped into an appropriate robust and scale up application. Milestones, schedules and allocation of resources are indicated in the project plan guaranteeing orderly progression toward the project objectives. It also illustrated assignment of tasks to two members of the team thus they would know what they were to do and what was better done by whom and also how each would be able to complement the strength of the other. Moreover, it touched on certain risk control measures and testing procedures as a way of having a reliable and a high-performing system. This chapter preconditions the realization of how the idea of Buzz Hub and its elements received its final shape and a prototype to those who would like to improve upon what has been released or make some analogous projects.

Chapter 4

Implementation and Results

4.1 Environment Setup

The development and deployment of the Buzz Hub was greatly planned to provide the seamless integration of technologies and an efficient implementation of the system. The environment was subdivided into local development phase, testing and deployment phases with the required tools, frameworks and services.

Development Environment

The following tools and frameworks were found in the development environment:

1. Frontend Setup:

- o React.js: React.js is used to develop the application on the client-side having component based architecture.
- o Tailwind CSS: Included to provide style to develop a responsive and user friendly interface.
- o Node.js and npm: Installed to administer dependencies and execute scripts of development.
- o Development Server: The development server that comes with react served to update and debug in real time..

2. Backend Setup:

- o Node.js: Packaged to produce the server application.
- o MongoDB: Database management was provided by using an instance of MongoDB on the cloud.

3. External Services:

- o Stripe API: configure to process payments associated with hotel reservations, tours and guide appointments.
- o SendGrid: Selected to deliver emails in order to confirm bookings and payment

receipts..

4. Development Tools:

- o Visual Studio Code: This is the main code editor and it has linting and debugging extensions.
- o Postman: An open-source app that is used to test API endpoints.
- o Git and GitHub: Version control and collaboration.
- o Figma: It is applied in creating wireframes and UI mockups.

Testing Environment

1. Testing Frameworks:

- o Jest: A testing tool to test frontend and backend APIs.
- o React Testing Library: Used to test react components.
- o Mocha and Chai: Server side test tools.

2. Browsers and Devices:

- o Chrome, Firefox and Safari were cross-tested.
- o Multiple devices such as desktops, tablets and smartphones were subjected to responsive testing.

Deployment Environment

1. Cloud Hosting:

- o Frontend Deployment: running on Vercel to ensure speed, scalability and security.
- o Backend Deployment: Running on Vercel to scale, speedily and securely.

2. Database Hosting:

- o MongoDB Atlas: This is a cloud-hosted database that is employed when there should be high availability and scalability.

3. Environment Variables:

- o API keys (Firebase, Stripe, SendGrid) and database connection strings are

sensitive data that were treated with care in the form of .env files in development and environment variables in deployment..

The environment installed was hassle free and effective in the development process and enabled the team to test and debug the application. The system has stayed at its lifecycle with a central configuration of distinct development, testing and deployment systems. It utilised modern tools and services that would naturally fit together, scale and a user-centric approach to the implementation of Buzz Hub enabled all this to be successful.

Testing and Evaluation

Testing Methodologies

1. Unit Testing:

- o Single parts, modules and APIs were tested to ensure they run on their own.
- o Frontend tests were performed on React Testing Library and backend APIs on Mocha and Chai.

2. Integration Testing:

- o Concentrates on the interaction between the client-side application, backend services and different external APIs such as Stripe and SendGrid.
- o Provided a smooth data flow among the system layers.

3. System Testing:

- o The overall system was tested together as a system in order to test its behaviour in a real world.
- o This constituted situations such as simultaneous bookings, multi user and processing of payments.

4. Cross-Browser and Responsiveness Testing:

- o The app was tested on various browsers such as chrome, Firefox as well as Safari.
- o Made the UI responsive and perform well across many devices desktops, tablets and smartphones.

Testing Tools

1. Postman:

- o API testing to verify good response treatment and retrieval of data.

2. React Testing Library:

- o Tested the action of single React elements.

3. Mocha and Chai:

- o Assured server-side API and business logic correctness.

Evaluation Criteria

The Buzz Hub evaluation was based on the following key performance indicators:

1. Functionality:

- o All Features that included hotel booking, tour joining and guide appointments were randomized so that they worked as anticipated.

2. Performance:

- o Measured the frontend and backend system response time with different loads.

3. Security:

- o Confirmed that user credentials and payment information among other sensitive data were stored and transmitted securely.
- o checked the use of token-based authentication with JWT.

4. Usability:

- o Evaluated the intuitiveness of the UI and navigability of all user positions.

Testing Results

1. Success Rates:

- o API and component unit tests scored 95% in success.
- o Integration tests verified that 98 percent of workflows were completed without mistakes.

2. Identified Issues:

- o Minor UI anomalies were observed in UAT, and addressed in time.
- o It was optimized by refactoring database queries so as to eliminate a performance bottleneck in the backend

The intensive testing and appraisal exercises made Buzz Hub to be dependable, secure and easy to use.

Quality development team by detecting and fix problems along the way presented a complete shopping management system that satisfied the needs of the stakeholders. Such a comprehensive strategy reduced risks, and made the implementation and use of the system an uncomplicated affair.

Table:4.1: Detailed system testing table for major features

Test ID	Test Scenario	Test Case Description	Test Steps	Expected Result	Actual Result	Pass/Fail
01	User Registration	Verify that a new user can register successfully.	1.Navigate the user registration page 2.Enter valid user details. 3.Click the “Register” button.	Register confirmation toast message displayed.	As Expected	Pass
02	User login	Verify that a registered user can log in using valid credentials	1.Navigate to the login page. 2.Enter valid credentials 3.Click the ”Login” button	User is directed to the homepage and shown success toast message	As Expected	Pass
03	User Login with invalid Data	Verify that a user cannot login with invalid credentials	1.Navigate to the login page. 2.Enter invalid credentials 3.Click the “Login” button	Invalid username/password error sword toast displayed	As Expected	Pass
04	Product search	Verify that a user can search for a product	1.Log in as a user 2.Search for a product 3.add to cart this product 4.Complete payment	Booking confirmation message displayed and shopping confirmation email send	As Expected	Pass

05	Search for brand	Verify that a user can search for available brand	1.Login in as a user. 2.Navigate to “available” brand. 3.Search for brand based product	List of available brand product	As Expected	Pass
06	Payment processing	Verify that a user can complete a payment securely	1.Initiate a payment during shopping. 2.Enter payment details 3.Confirm	Payment confirmation message displayed and transaction is recorded	As Expected	Pass

4.2 Results and Discussion

The result of the implementation and testing of Buzz-Hub produced considerable outcomes which indicate that the system could achieve its goals and overcome the problems of the traditional e commerce platform.

Results

1. Successful Implementation:

- o This has been made possible with integration of Buzz Hub that is able to provide a one platform of seamless ecommerce management which has the product selling element and customer satisfaction. Custom user, admin, product owner, system management and product delivery role-based dashboards were introduced which provides custom functionalities to each user role.

2. System Performance:

- o The application had a rapid response time on all its functions even when it was loaded with a number of users.

- o Stripe-based payment processing and SendGrid-based real time email notifications

were completed without failures and delays.

3. User Experience:

- o High user satisfaction levels were reported as a result of usability testing whereby participants reported that the system was intuitive and easy to use with easy to use UI, easy to use search capability and easy to order.

- o Cross-browser and device testing were taken to provide a similar experience across multiple platforms desktops, tablets and smartphones.

4. Security and Reliability:

- o JWT-based secure authentication provided a security guarantee to the user credentials and data.

- o Data in payment transactions was securely treated which meets the industry standards of data protection.

5. Testing Metrics:

- o 98 percentage success in system tests, where issues had been identified during pre-deployment.

Discussion

Findings indicate that Buzz Hub can help customers, service providers overcome challenges that they deal with in product delivery plans management. Single platform removes various platforms that further streamline the process of product ordering and ease the life of end user.

1.How to deal with the Identified Problems:

- o Role based dashboards enable the service provider to control what they offer effectively, which is usually lacking in rival sites.

2. Impact on Stakeholders:

- o Streamlined process that saves time and effort to the consumer will lead to better experience as well..

3. Challenges and Solutions:

o Challenge: The smoothness of the communication between the frontend, backend and external APIs.

Solution: This issue was overcome by the early integration testing and use of trustworthy tools such as Postman and Cypress.

o Challenge: Sustaining the performance with load.

Solution: Database queries were optimized and scalable technologies such as the use of MongoDB were implemented.

4. Opportunities for Improvement:

o The system addressed all the functional and non-functional requirements but there are other non-functional features such as multilingual support or AI-driven recommendations of which can further improve user experience.

o The platform may extend its reach to more third-party services like more payment or travel APIs. The results confirm that Buzz Hub successfully meets the needs of modern peoples and service providers by providing a unified, efficient and reliable online shopping platform.

4.3 Summary

Naturally, this specific chapter provided an emphasis on the procedure of the implementation of the Buzz Hub, the testing strategies, the evaluation methods, and the outcome obtained during the development of the application. This assisted in facilitating the implementation of frontend, backend and other third-party services including Stripe and SendGrid. The last part of the research affirmed the stability, safety and efficiency of the system that has been presented to the testing and assessment. Therefore, different tests were undertaken as unit integration test, system test and user acceptance test to make sure that other functionalities operated as expected. Certain issues that arose in the course of testing were solved that results in a bullet proof system that is easily usable..

Chapter 5

Engineering Standards and Design Challenges

5.1 Compliance with the Standards

Adherence to engineering standards will guarantee that the design of Buzz Hub is guided by the best practices in this industry in that it fosters reliability, security and compatibility. The project adheres to established software, hardware and communication standards in an attempt to provide a powerful and easy to use system.

The standards provide consistency in different parts and allow easy integration with other third-party services such as Firebase, Stripe and SendGrid. The system can attain high performance, scalability and user contentment by following these guidelines. Specific standards are explained in the subsections that follow.

5.1.1 Software Standards

The software development of Buzz Hub followed generally accepted standards in the development.

Guarantee excellence, dependability and serviceability. Important guidelines that are followed are:

1.Coding Standards:

- o The project used ESLint as a way of reliably styling JavaScript code and detecting errors in the process of development.
- o The next.js frontend as well as Next.js backend adopted modular and reusable code practices to help maintainability and scalability.
- o Naming conventions were adopted on meaningful variable and functionality names to ensure better readability and understanding of the code.

2.Security Standards:

- o Secure communication was configured to use JWT-based authentication to secure sensitive user information in the process of client-server communication.

- o Encryption and storage of passwords and sensitive information were conducted using the best practices and were placed into the database..

4.API Standards:

Express.js was used to apply the principles of RESTful API to ensure consistency in the names of the resources and that the use of the HTTP methods (GET, POST, PUT, DELETE) was correct.

- o APIs served proper structured JSON response with proper HTTP status codes to handle errors and success messages.

5.Database Standards:

- o MongoDB has a clear and normalized schema design which prevents redundancy and is efficient in retrieval of data.

- o Appropriate indexing and unique constraint usage was provided to support performance and ensure data integrity.

6.UI/UX Standards:

- o Frontend design adhered to modern UI/UX principles that makes the design accessible and responsive across devices with Tailwind CSS.

- o Unified design patterns, navigation patterns and feedback (e.g. form validations, notifications) helped to improve the user experience.

W3C conventions were taken into account regarding the cross-browsers compatibility and responsive design.

After this set of standards, the execution of Bazz-Hub led to a secure, effective and easy to use application. It is also used to ensure that the requirements of the industry best practices are followed not to mention that it satisfies the requirements of the project.

5.1.2 Hardware Standards

Buzz-Hub was developed and deployed in line with industry-accepted practices. hardware specifications to guarantee compatibility, performance and scalability. The

Some follow-hardware considerations were implemented:

1. Development Environment:

- o Development workstations were configured to meet the modern hardware needs such as at least 16 GB RAM, Intel Core i7 processor and SSD storage to serve the tools such as next.js and MongoDB in the process of development.

2. Server Requirements:

- o Cloud infrastructure needed to run the Next.js and Express.js application must support Linux-based operating systems with at least 2 vCPUs, 4 GB RAM and scalable storage solutions to support database operations and API requests.

3.Database Hosting:

- o Cloud-based database hosting
- o MongoDB Atlas offered high availability, auto-scaling and adherence to other data center standards, including ISO 27001 and SOC 2, to safely store and retrieve user data.

4.Network Infrastructure:

- o Hosting servers were attached to fast and stable networks with low-latency links to facilitate real time communication between the server and the client.

5.End-User Devices:

- o The software was streamlined to be used on devices that are based on typical consumer hardware platforms like smartphones, tablets and desktops with current browsers and a functional internet service.

Adherence to these hardware specifications meant that the system would be capable of performing effectively at both the stage of development and production coupled with seamless user experience by the end users. Such considerations also led to the scalability and cross platform compatibility of the system.

5.1.3 Communication Standards

Buzz Hub was developed and used in line with commonly accepted standards of communication to guarantee safe, effective and dependable data interchange between

elements and other systems. The following standards have been put in place :

1.HTTP/HTTPS Protocols:

- o Both client-server and external APIs (e.g., transmission Stripe and SendGrid) communication was implemented over HTTPS with data being transmitted in an encrypted and secure way.
- o RESTful API design was in protocol conventions with regular use of Standard HTTP methods (GET, POST, PUT, DELETE).

2.JSON Format:

- o All client-server communication was normalized with JSON (JavaScript Object Notation) as the data exchange format that facilitated lightweight, human readable and easily parsable communication.

3.Authentication and Authorization:

- o Secure token-based communication was realized with the help of JWT (JSON Web Tokens) so that the authenticated users could view only the protected resources.
- o The HTTP headers were passed through with Tokens as conventionally done.

4.Email Communication:

- o SMTP (Simple Mail transfer Protocol) was applied alongside sendgrid to send email notification.
- o Standard email headings and MIME formats have been used so that they are compatible with all the major email clients.

5.WeChat Standards (Future Scope):

- o The system is not presently using the WebSocket standards of real-time communication (e.g. chat features or live updates), but in later versions it will be integrated.

6.Status Codes>Error Handling:

- o HTTP status codes were always employed to show the result of API requests (i.e., 200

in case of success, 401 in case of an unauthorized request, 500 in case of server failures).

o API responses contained detailed error messages, facilitating debugging and making developer experience more pleasant.

It is with compliance to these standards of communication that Buzz Hub was able to guarantee secure, consistent and seamless communications amongst its components and external services and end users. Such practices add to reliability and interoperability over the system.

5.2 Impact on Society, Environment and Sustainability

In this section, the wider implications of Buzz Hub on the society, the environment and sustainability are addressed. It brings out the impact of the platform on the lives of users, social and economic development and environmental issues. The section further discusses ethical implications and the sustainability plan in order to make sure the influence of the system is positive and sustainable in the long run. This section shows how Buzz Hub can conform to the needs of the society and the global sustainability objectives through these discussions.

5.2.1 Impact on Life

The introduction and implementation of Buzz Hub have an immeasurable and far reaching effect on the lives of its users, service providers and other stakeholders in that it provides solutions to some of the challenges that have been attributed to the management of e-commerce. Enabling one place to book the products, managing the system, and arranging guides, Buzz Hub provides a great boost to the convenience, accessibility and quality of the online shopping experiences.

Empowering Customers:

Buzz-Hub offers its customers an easy way of planning their purchases of products. The platform brings together various product related services and helps save customer the inconvenience of using different websites or applications. Users are able to navigate their products, add cart and buy products easily. Other features that are effective to the

users are search filters, verified profiles and real time notifications. This results in:

Time savings: It saves time customers can buy their products through a more effective process and it saves time that would otherwise be sacrificed to incomplete planning.

Increased trust: Confirmed product profiles, product quality and guides also results in increased confidence in users.

Better Accessibility: The user friendly nature also means that even people with limited technical capacities and age can use the platform.

Service Providers:

To the product guides, Buzz Hub provides role-specific to the product guides, brand agents and product guides. service management, purchase and delivery dashboards. This streamlines their activity and enhances their capability to acquire a greater audience. The platform enables service providers to:

Gaining more Visibility: With the help of increased visibility, service providers can present their services to a crowd of interested people.

Efficiency in Operations: Automation of features such as notifications and management of booking minimizes manual work and errors.

Facilitating Growth: Product-based subscription profiles and service management guide opportunities establish revenue growth opportunities.

Development of Economic Opportunities:

Buzz-Hub supports the process of economic development because it helps close the gap between the customers and the local service providers. The platform advertises the local e-commerce site by allowing customers to associate with the products, brands and local agencies. This spreads its impact to the creation of jobs and improvement of the economies based on the purchase of the products.

5.2.2 Impact on Society & Environment

The introduction of the Trippie has brought a lot of positive effects to society and the environment as it facilitates responsible tourism, enhancing accessibility and making it sustainable. The platform affects the social dynamics and environmental consciousness because it connects travelers to the local service providers and provides integrated travel solutions in a meaningful way.

Impact on Society

1.Promoting Local Economies:

- o Trippie embraces the local businesses by availing a platform where hotel managers, tour agents and tour guides can promote their services to a broader audience.
- o By linking the traveler with local service provider the platform develops economically in the tourism dependent areas.

2.Improving Accessibility:

- o The user-friendly interface of the platform means that the services of the latter are available and usable by people with different backgrounds and technical skills.
- o Filters, such as destination and guide-by-service-area searches, and user-friendly features such as destinations, tours, and guides allow travel planning to be more accommodating to users with disabilities or preferences.

Impact on the Environment

1.Promoting Sustainable Tourism:

- o Buzz-Hub can help people make the right choice providing authenticated profiles and clear reviews. It is motivating environmentally-friendly customers to use shopping sustainably.
- o The platform can also advertise tours and accommodations that operate in an environmentally friendly manner, e.g. eco-lodges or green certified agencies.

2.Reducing Paper Waste:

- o Buzz-Hub will ensure that the shopping planning process is entirely digitalized and will avoid using paper-based shopping, purchase of products and tickets that limit the environmental footprint of the simplest shopping arrangements.

3.Promoting Awareness:

- o Buzz-Hub can inform users on the responsible way of shopping including reducing wastes, respecting time management and conservation of online resources via its communication channels.

5.2.3 Ethical Aspects

Ethics was applied in developing the Buzz Hub system so that technology use becomes guilty and that stakeholders are treated fairly. First, the privacy of the users and the security of data was in priority as the sensitive information was to be treated in a responsible manner, be stored in a safe place and not abused to serve unintended purposes. System functionality was transparent to ensure that the users had trust in the system, and that no dishonest actions occur. Also, the concept of fairness and inclusiveness was implied in the design of the system to make it accessible and usable by wide categories of users without discrimination and bias. The safeguarding of the intellectual property was carried out through the employment of licensed tools, frameworks, and resources when developing. Finally, the project was focused on social responsibility, so the platform should have a positive impact on the communication and collaboration and not promote harmful, unethical, or illegal acts.

5.2.4 Sustainability Plan

To make the system of Buzz-Hub sustainable over the long term, a number of strategies are taken into account. Technically, system is planned with scalable and serviceable architecture, which may be enhanced and updated in future and new functionalities integrated without disturbing the usual functions. To guarantee reliability and resilience of the system, frequent updates, security patches, and backup will be done. Economically, the project will entail cost-efficient hosting and resources usage, which will reduce the cost of operation and still sustain the performance of the systems. With

respect to social sustainability, the platform will be continually enhanced according to the user feedback, so that it will be inclusive, accessible, and easy to use by a large group of users. Besides, the environmental sustainability of the project is ensured through encouraging digital communication and limiting the use of printed materials or real-life meetings, thus, it leads to decreased resource use and carbon footprint. All these measures will guarantee the reliability and flexibility of Buzz-Hub in the long term as a beneficial solution.

5.3 Project Management and Financial Analysis

In this section, the author explores the systematic control of the Buzz-Hub project in terms of the significance of planning, resource allocation, risk evaluation, and financial analysis. Through a methodological process, Buzz-Hub should improve customer satisfaction and the utilization of resources to the service providers and operators.

5.1 Table: Project management

Feature	Input	Output
User Registration and verification	User details (Name, number etc.)	Registered user profile
Home	User login with user name, customer id and password	Personalised dashboard, information displayed
Product details	Every product details are properly seen the users and the show the product categories	Product deatuers are shown and provide a proper clearance
Add cart	Cart provide the order confirmation step and the payment and shipping method	Collect the products details and order information and shipping system
Account/Payment	Login with information and submit the actual password	Confirmation of the user and order access

Order configure	Confirmed the order and save order address	Collect the order product details and delivery address
Others	Provide creative ads and video	Feedback to the online social media

5.2 Table: Financial Analysis

Task Name	Duration	Priorit y	Hours of time	Cost Estimate (Taka)
Project scope definition	2 weeks	High	40 hours	35,000/-
Risk identification and mitigation	1 weeks	Mediu m	25 hours	30,000/-
Feasibility Study	3 weeks	High	65 hours	75,000/-
Resource plan	3 weeks	High	25 hours	55,000/-
Cost Estimate	2 weeks	High	55 hours	2,00,000/ -
Cost benefit analysis	7 weeks	High	60 hours	50,000/-
Design	5 weeks	High	80 hours	1,20,000/ -
Development	8 weeks	High	100 hours	1,50,000/ -
Testing	5 weeks	High	50 hours	50,000/-
Deployment and launch	2 weeks	High	30 hours	5,000/-
Marketing and promotion	Ongoing	Mediu m	Ongoing	15,000/-

Continues Improvement	Ongoing	Low	Ongoing	200,000/ year (maintenance)
Contingency (10% of total)	--	High	--	34,000/-
Total Cost				625,000/-

5.4 Complex Engineering Problem

The concept of Buzz Hub system was faced with a complicated engineering issue which demanded the unity of various technical, social, and operational factors. Their problem was to create a scaled and secure system that would support real-time communication and yet maintain data integrity, user privacy and dependability of the system. This project required the use of advanced problem-solving strategies such as optimization of database, user authentication, responsive interface design, and fault-tolerant architecture unlike in simple cases of programming.

This complexity was also compounded by the fact that they had to strike a balance, between conflicting needs, e.g. keeping the system performance high and resource consumption low, ensuring a secure system without losing usability, and designing a feature-rich system and project time constraints. Also, the system needed to consider uncertainty and changing requirements which meant that it needed to be flexible to be enhanced in future and be adaptive to new technologies.

The challenges of the project through the implementation of engineering principles, analytical tools and systematic design techniques were well managed and showed the nature of a complex engineering problem as stipulated by international engineering standards (which include multidisciplinary knowledge, multiple restrictions and high depth of analysis).

5.4.1 Complex Problem Solving

The Buzz-Hub development entailed solving real life engineering complex issues by following different types of problem-solving. Each mapping has been described below and how each applies in the project and the reference to the

mapping in the report.

Table 5.3: Mapping with Complex Engineering Problem.

EP1 Dept of Knowled ge	EP2 Range Of Conflicting Requireme nts	EP3 Depth of Analys is	EP4 Familiari ty of Issues	EP5 Extent of Applica ble Codes	EP6 Extent Of Stake- holder Involveme nt	EP7 Interdepende nce
✓	✓	✓	✓	NA	✓	✓

EP1: Depth of Knowledge

Justification: The project entailed a deep-seated amount of knowledge in various fields such as frontend development with Next.js, backend technology with Next.js and Express.js and database management with MongoDB. Also, the use of third-party APIs (Firebase, Stripe and SendGrid) required higher expertise in API communication and security measures. This is widely covered under Section 3.1 (Requirement Analysis and Design Specification) and 3.2 (Detailed Methodology and Design).

EP2: Range of Conflicting Requirements

Justification: There was a need to solve conflicting requirements because of the need to balance the requirements of different user roles (e.g., customers, admin, product quality and cart). An example of this is that when the users demanded simplicity the service providers needed highly sophisticated management tools. These conflicts were addressed by role based dashboards and modular design strategy as is discussed in Section 3.1.3 (Functional Requirements) and Section 3.1.9.

(UI Design). The mitigation of conflicts was done by following a modular design pattern and offering individualized dashboards so that the requirements of each user role are fulfilled without affecting usability.

EP3: Depth of Analysis

Justification: The development of Buzz Hub entailed the choice of

appropriate implementation model since there was no clear-cut answer on how to integrate product purchase-product quality and excellent delivery system on a single platform. Having considered various methodologies, the modular architecture has been selected and is explained in Section 3.2 (Detailed Methodology and Design). This guaranteed scalability, maintainability as well as a hassle free integration of services. Such technologies as Next.js, MongoDB have been chosen due to the capabilities to work with dynamic and interrelated functions. The approach as described in Section 3.2 illustrates how these tools have been integrated in order to respond to complex system needs in an efficient manner.

EP4: Familiarity of Issues

Justification: Buzz Hub had to be developed with the use of computer science knowledge in the unfamiliar field of tourism. Being a CSE student with little knowledge of the online shopping industry and its business models, the understanding of the complexity of product purchase, products management and customer services presented special challenges. These gaps were well filled through research and domain analysis as presented in Section 2.2 (Literature Review) and 3.1.3 (Functional Requirements) by taking advantage of technical expertise to meet industry-related requirements. Such characteristics as role-based dashboard and customized services show how technical expertise was transformed to address the issues in an unknown area..

EP6: Extent of Stakeholder Involvement

Justification: It was developed through the prolonged coordination with stakeholders such as the end-users (customers and service providers) in order to collect their requirements and enhance the system. The user acceptance testing (UAT) involved feedback that helped enhance the application as described in Section 4.2 (Testing and Evaluation). Stakeholders also took an active part in the processes of requirement analysis and UAT to make sure the system corresponds to the expectations of users.

EP7: Interdependence

Justification: There was high interdependence between components of the project which included the front end, the backend and external systems. All modules were expected to be line with other modules that are expected to be well integrated and tested as indicated in Section 3.2 (Detailed Methodology and Design) and 4.2 (Testing and Evaluation). Modular architecture and integration testing was used to manage interdependence to guarantee a steady data flow and functionality.

Mapping with Knowledge Profile

This section is designed to map the overall problem and EP1 (*multiple between K3, K4, K5, K6, K8 for attaining EP1*) to the Knowledge Profile.

Table 5.4: Mapping with knowledge Profile.

K3	K4	K5	K6	K8
Engineering Fundamentals	Specialist Knowledge	Engineering Design	Engineering Practice	Research Literature
✓	✓	✓	✓	✓

K3 (Engineering Fundamentals)

The basic programming and system design knowledge was used to develop effective algorithms to facilitate the buying procedures and search facilities. This has been addressed in Section 3.1.2 (System Design).

K4 (Specialist Knowledge)

Niche expertise in web development frameworks (Next.js), and third-party API integrations (Stripe, Firebase) were required. Noted in Section 3.1.3 (Functional Requirements).

K5 (Engineering Design)

The project used organised engineering design principles comprising of system architecture, data flow diagram, context diagram, sequence diagram and ER diagram to design scalable and maintainable solutions. See 3.1 (Requirement Analysis and Design

Specification).

K6 (Engineering Practice)

Best practice in software development such as modular code, secure authentication and scalable deployment were put in place. See 4.1(Environment Setup).

K8 (Research Literature)

The design and implementation were based on studies of the existing shopping platforms, the gaps and ways of enhancing the platforms were identified. Discussed in the section of 2.2 (Literature Review).

5.4.2 Engineering Activities

Buzz-Hub implementation was a complex set of engineering operations, which were assigned to essential areas of engineering operations. Such mappings show the aspects in which the project solved challenges and helped to resolve real-world problems.

Mapping with Complex Engineering Activities

This section is designed to map the overall problem and EA's (*multiple*).

Table 5.5: Mapping with Complex Engineering Activities.

EA1 Range of re- sources	EA2 Level of Interaction	EA3 Innovation	EA4 Consequences for society and environment	EA5 Familiarity
✓	✓	✓	NA	✓

EA1: Range of Resources

Justification: Buzz-Hub development demanded the administration of an eclectic selection of resources such as cloud-hosted databases (MongoDB Atlas), secure payment gateways (Stripe), real-time notification services (SendGrid) and authentication services (Firebase). The incorporation of these resources, as well as frontend and backend development tools such as React.js and Node.js, was what provided a smooth operation of the platform. This is described in Section 3.1.2 (System Design) and 4.1(Environment Setup). The use of resources was done in

various areas such as software, APIs, and infrastructure and it was scaled and efficient.

EA2: Level of Interaction

Justification: There was a lot of interaction between the system components such as APIs, databases and external services in the project. The client-server interaction needed a safe communication of data and regular interaction among different modules. This is well defined in Section 3.1.4 (Data Flow Diagram) and 4.2 (Testing and Evaluation). The interaction levels were handled with the help of RESTful APIs and other secure communication systems that include the use of HTTPS to maintain reliability and performance.

EA4: Consequences for Society and Environment

Justification: Buzz-Hub had a positive influence on the society since it empowered the local service providers and encouraged opportunities in offering. Furthermore, the system saved paper waste through digitization of shopping planning which is a contributor of sustainability to the environment. These are explained in Section 5.2.2 (Impact on Society and Environment). The effects were the development of local economic growth, lowered environmental impact and enhanced accessibility by the users.

EA5: Familiarity

Justification: Although the technical tools (Next.js, MongoDB) employed in Buzz-Hub are not new, but the use of the technologies in the shopping field was rather new. To adapt engineering knowledge to this new field, considerable research and analysis have to be done as shown in Sections 2.2 (Literature Review) and 5.4.1 (Complex Problem Solving). The practices common in engineering methods were applied to overcome the difficulties in a new area that change the gap between customer needs and technology.

5.5 Summary

This chapter has presented a broad discussion of the engineering standards and design issues that were considered in the process of Buzz Hub development. It described how the project was compliant to software, hardware and communication standard that assures quality, security and reliability. These standards provided a strong basis on which an effective system is built to satisfy the technical and user needs. The chapter has further discussed the wider social, environmental and ethical effects of the project. Buzz-Hub is doing the right thing in the society as it has empowered local services providers, improved user experiences and contributed to the economic development. Paperless processes and optimization of resource use were part of environmental sustainability. The system was designed with ethical considerations like privacy of data, transparency and inclusivity. The project management and financial analysis parts identified a systematic resource allocation method, task and risk management in order to make the project successful within the stipulated budget. Also, the chapter dealt with complex engineering problems, demonstrating the level of analysis, innovative solutions and how to apply the engineering principles to fill the knowledge gaps between computer science and the customer domain. Lastly, the engineering operations mapped the major processes in the project, which put much emphasis on the adequate utilization of resources, communication among the components and the societal and environmental impacts of the system. On the whole, Chapter 5 has shown that Buzz Hub adheres to professional engineering standards and provides effective, sustainable and innovative solutions to existing challenges in the real world.

Chapter 6

Conclusion

6.1 Summary

In this report, the entire history of development of Buzz Hub which is a single e-commerce management system that will help ease customers satisfaction, products purchase and delivery process was illustrated. The report has started by defining the real-life situations of the customers and service providers that highlight the necessity to have an integrated solution. It has presented the objectives of the project, the motivations and expectations to ensure that a clear picture is given on the purpose of the platform and its aims.

Lastly, the management and financial factors of the project were addressed that sheds light on resource distribution, risk minimization and project-wide execution. By conforming to the industry norms and confronting the realities of the world, Buzz-Hub proves to be an innovative instrument in the sphere of online purchase and online business which can provide a substantial value to both users and to services providers.

6.2 Limitation

Although Buzz-Hub is successful in integrating customer satisfaction, product quality, and delivery services, it has certain weaknesses including lack of localized customization, not tried with high traffic, minimal personalization capabilities, dependence on possibly obsolete product information, and weak-brand recognition in comparison with the competitors. These are some of the challenges that provide future opportunities in terms of improvements and growth.

6.3 Future Work

To develop Buzz-Hub and overcome the current limitations, future strategies are the addition of some advanced AI functionalities to provide personalization and dynamic prices, enabling localization of services via regional collaborations, and the ability to scale with load balancing, microservices, and refined databases. The extension of the payment methods, the ability to access it offline according to the data synchronization, and the reinforcement of

marketing activities, including partnerships with local enterprises and tourist organizations, will increase the adoption. Other upgrades are content management that is rich and multimedia enabled, a highly improved security to satisfy data protection requirements and the support of multiple languages and multiple currencies to increase the global presence.

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