WEBSTOREAPP

Content Pages

[CHAPTER ONE INTRODUCTION 1](#_Toc122789345)

[1.1 Background of Study 1](#_Toc122789346)

[1.2 Statement of the Problem 1](#_Toc122789347)

[1.3 Aim and Objectives of the Study 2](#_Toc122789348)

[1.4 Scope of the Project 2](#_Toc122789349)

[1.5 Limitation of the Study 2](#_Toc122789350)

[1.6 Significance of the Study 2](#_Toc122789351)

[1.7 Project Organization 2](#_Toc122789352)

[CHAPTER TWO LITERATURE REVIEW 3](#_Toc122789353)

[2.1 Introduction 3](#_Toc122789355)

[2.2 Programming Languages Used 3](#_Toc122789356)

[2.2.1 React Native 3](#_Toc122789357)

[2.2.1.1 Advantages of React Native 3](#_Toc122789358)

[2.2.2 Strapi 4](#_Toc122789359)

[2.2.2.1 Why Use Strapi? 5](#_Toc122789360)

[2.2.3 Django 5](#_Toc122789361)

[2.3 Related Literature 8](#_Toc122789362)

[**2.3.1** Definition of E-commerce 9](#_Toc122789363)

[**2.3.2** History of Ecommerce 10](#_Toc122789364)

[**2.3.3** Different types of E-commerce 11](#_Toc122789365)

[**2.3.4** E-commerce Usage in Developed vs. Developing Countries 12](#_Toc122789366)

[CHAPTER THREE PROPOSED METHODLOGY 15](#_Toc122789367)

[3.1 Introduction 15](#_Toc122789369)

[3.2 Number of modules of e-commerce application 15](#_Toc122789370)

[3.3 Analysis Models 15](#_Toc122789371)

[3.3.1 Use Case Diagram 15](#_Toc122789372)

[3.3.2 Data Flow Diagram 16](#_Toc122789373)

[3.3.3 Sequence Diagram 16](#_Toc122789374)

[3.3.4 Entity-Relationship Diagram 17](#_Toc122789375)

[3.3.5 Architecture Diagram 18](#_Toc122789376)

[3.4 Programming languages used 19](#_Toc122789377)

# CHAPTER ONE INTRODUCTION

## Background of Study

Internet has contacted our lives from such a large number of points. One of the critical zones of day by day lives where it is profoundly influenced is matter of fact. Online business is where Information Technology (IT) and business exercises are merging into one another. It is a plan of action, or fragment of a bigger plan of action, that empowers a firm or individual to direct business over an electronic system, ordinarily the web (SAHA, 2018).

In this virtual time, a relevant online business procedure is the way to long haul sustenance for any business. Today, pretty much each and every errand is done through on the web and shopping is no exemption. Having a web based business site is no more a way to accomplish upper hand. It is a vital basic for business, while customers are now flourishing on the web (SAHA, 2018).

Internet based business is quick making progress as an acknowledged and utilized business worldview. More entrepreneurs executing web based business usefulness and online exchange framework into their sites. So it isn't difficult to state that into couple of decades web will be the typical for shopping any sort of item or administrations (SAHA, 2018).

The goal of this project is to expand a modern dynamic e-commerce internet software as online or digital store on the net. Where one of a kind varieties of product may be offered from the consolation of domestic through the internet.

## Statement of the Problem

As per an ongoing report by User Study and Experience Research Hub (Userhub) there is no single internet business webpage accessible in Nigeria that is completely consistent with universally settled web measures. The gathering of specialists who led the examination, which was centered around the commonness of Accessibility Errors, Accessibility Alerts, and Contrast Errors, and HTML and CSS approval. This test has been done on 174 dynamic internet business destinations recorded with the web-based business Association of Bangladesh (e-CAB). The specialists utilized W3C prescribed instruments and arbitrarily chosen 3 pages of every site for the testing reason on above issues.

The consequences of the examination demonstrated that, in Nigeria there were no single internet business locales with zero blunders and alerts. The normal commonness of openness blunders was 60.57, HTML mistakes 49.52, and CSS mistakes 27.16 (SAHA, 2018). This kind of related news inspired me to do the venture.

## Aim and Objectives of the Study

Is to develop a modern responsive ecommerce web application using react native & Django with strapi for customizable backend services.

The objectives are:

1. An engaging and easy to use UI with good UX using React Native.
2. The logic will be handled and the data will be stored using Django & Strapi.
3. Evaluating and verifying the app.

## Scope of the Project

This will be a multi shop ecommerce app allowing user to upload multiple products with their corresponding inventory and price.

## Limitation of the Study

This will be only on a local host as the web application is design for an undergraduate program.

## Significance of the Study

The platform or web app stands to bring a responsive and user experience interface design for user to facilitate easy use of the platform.

## Project Organization

The project is made up of three chapters. Chapter one summarizes the introductory study on ecommerce applications, including the background of study, statement of the problem, aim and objectives, significance of the study, scope of the study and limitation of the study. Chapter Two is the review of related literature. Chapter three is proposed methodology.

# CHAPTER TWO LITERATURE REVIEW



## Introduction

A look at what the programming language and database used the project are and a review of related literature.

## Programming Languages Used

### Angular

Angular is an open-source, [JavaScript](https://www.simplilearn.com/tutorials/javascript-tutorial/introduction-to-javascript) framework written in [TypeScript](https://www.simplilearn.com/tutorials/typescript-tutorial/typescript-interview-questions). Google maintains it, and its primary purpose is to develop single-page applications. As a framework, Angular has clear advantages while also providing a standard structure for developers to work with. It enables users to create large applications in a maintainable manner (Deshpande, 2022).

#### Why Do You Need a Framework?

Frameworks in general boost web development efficiency and performance by providing a consistent structure so that [developers](https://www.simplilearn.com/how-to-become-complete-web-development-professional-article) don’t have to keep rebuilding code from scratch. Frameworks are time savers that offer developers a host of extra features that can be added to software without requiring extra effort (Deshpande, 2022).

#### Why Angular?

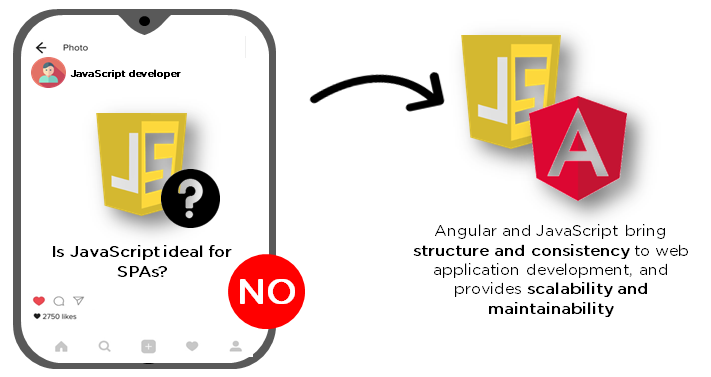


Figure 2.1: Angular (Deshpande, 2022)

[JavaScript](https://www.simplilearn.com/reasons-to-learn-javascript-article) is the most commonly used client-side scripting language. It is written into [HTML](https://www.simplilearn.com/tutorials/html-tutorial/what-is-html) documents to enable interactions with web pages in many unique ways. As a relatively easy-to-learn language with pervasive support, it is well-suited to develop modern applications (Deshpande, 2022).

But is JavaScript ideal for developing single-page applications that require modularity, testability, and developer productivity? Perhaps not (Deshpande, 2022).

These days, we have a variety of frameworks and libraries designed to provide alternative solutions. With respect to [front-end web development,](https://www.simplilearn.com/how-to-become-a-front-end-developer-article) Angular addresses many, if not all, of the issues developers face when using JavaScript on its own (Deshpande, 2022).

#### What are the Different Angular Versions:

“Angular” is the catch-all term for the various framework versions out there. Angular was developed in 2009, and as a result, there have been many iterations (Deshpande, 2022).

First, there was the original Angular, called Angular 1 and eventually known as [AngularJS](https://www.simplilearn.com/angularjs-vs-angular-2-vs-angular-4-differences-article). Then came Angulars 2, 3, 4, 5, until finally, the current version, Angular 11, released on 11/11/2020. Each subsequent Angular version improves on its predecessor, fixing bugs, addressing issues, and accommodating increasing complexity of current platforms (Deshpande, 2022).

If you want to design apps better suited for mobile devices, and/or more complex apps, you had best to upgrade to its current version (Deshpande, 2022).

#### Features of Angular

##### Document Object Model

DOM (Document Object Model) treats an [XML](https://www.simplilearn.com/tutorials/programming-tutorial/what-is-xml) or HTML document as a tree structure in which each node represents a part of the document (Deshpande, 2022).

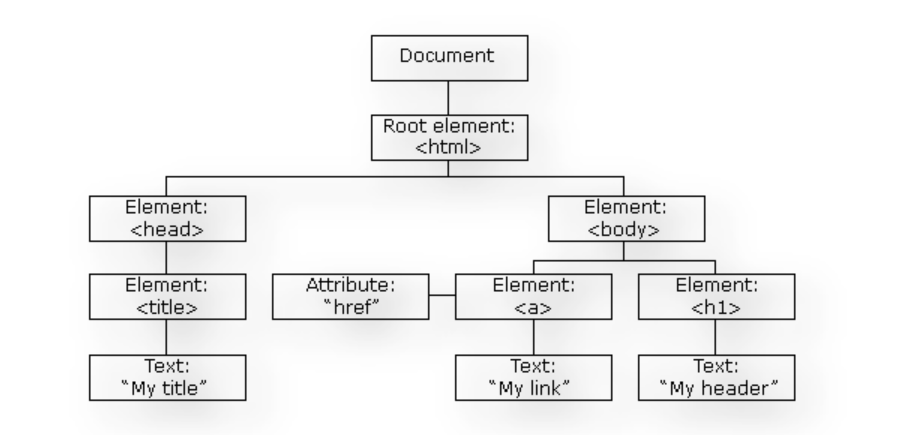


Figure 2.2: Document Object Model (Deshpande, 2022)

Angular uses regular DOM. Consider that ten updates are made on the same HTML page. Instead of updating the ones that were already updated, Angular will update the entire tree structure of [HTML tags](https://www.simplilearn.com/tutorials/html-tutorial/html-tags) (Deshpande, 2022).

##### TypeScript

TypeScript defines a set of types to JavaScript, which helps users write JavaScript code that is easier to understand. All of the TypeScript code compiles with JavaScript and can run smoothly on any platform. TypeScript is not compulsory for developing an Angular application. However, it is highly recommended as it offers better syntactic structure—while making the codebase easier to understand and maintain (Deshpande, 2022).



Figure 2.3: Typescript (Deshpande, 2022)

You can install TypeScript as an NPM package with the following command: npm install -g typescript (Deshpande, 2022).

##### Data Binding

[Data binding](https://www.simplilearn.com/tutorials/angular-tutorial/angular-data-binding) is a process that enables users to manipulate web page elements through a web browser. It employs dynamic HTML and does not require complex scripting or [programming](https://www.simplilearn.com/how-to-learn-programming-article). Data binding is used in web pages that include interactive components, such as calculators, tutorials, forums, and games. It also enables a better incremental display of a web page when pages contain a large amount of data (Deshpande, 2022).

Angular uses the two-way binding. The model state reflects any changes made in the corresponding UI elements. Conversely, the UI state reflects any changes in the model state. This feature enables the framework to connect the DOM to the model data through the controller (Deshpande, 2022).

##### Testing



Figure 2.4: Jasmine (Deshpande, 2022)

Angular uses the [Jasmine testing framework](https://en.wikipedia.org/wiki/Jasmine_(JavaScript_testing_framework)). The Jasmine framework provides multiple functionalities to write different kinds of test cases. Karma is the task-runner for the tests that uses a configuration file to set the start-up, reporters, and testing framework (Deshpande, 2022).

Now that you’re familiar with Angular’s basic features, you need to understand its architecture if you want to work with Angular daily. You can also expand your Angular knowledge by taking the [Angular Certification Training Course](https://www.simplilearn.com/angular-certification-training-course?source=GhPreviewCTAText) and learning concepts such as TypeScript, Bootstrap Grid System, dependency injections, SPA, forms, pipes, promises, observables, and Angular class testing (Deshpande, 2022).

#### Angular Architecture

Angular is a full-fledged [model-view-controller (MVC) framework.](https://www.simplilearn.com/tutorials/dot-net-tutorial/mvc-architecture) It provides clear guidance on how the application should be structured and offers bi-directional data flow while providing real DOM (Deshpande, 2022).

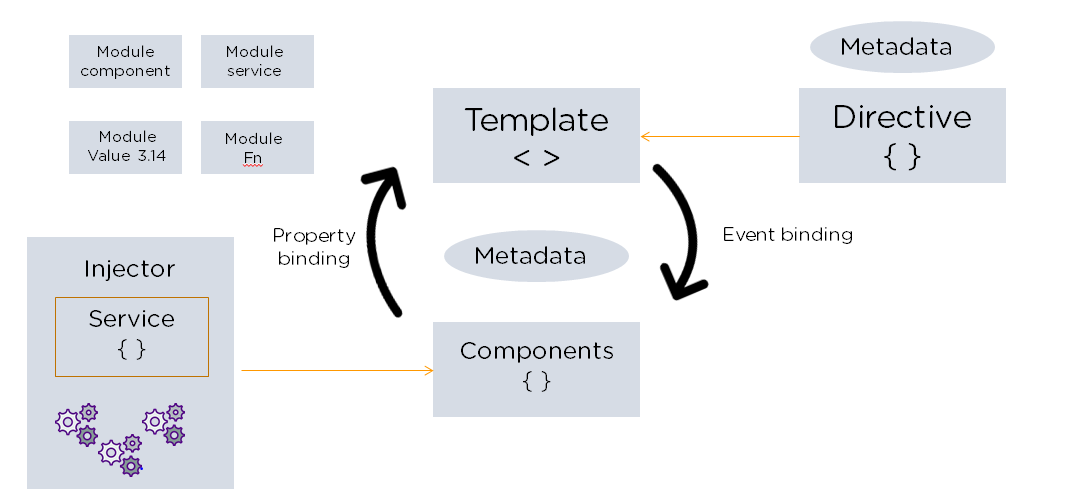


Figure 2.5: Angular Architecture (Deshpande, 2022)

### Node.js

Node.js is an open-source, cross-platform JavaScript runtime environment and library for running web applications outside the client's browser. Ryan Dahl developed it in 2009, and its latest iteration, version 15.14, was released in April 2021. Developers use Node.js to create server-side web applications, and it is perfect for data-intensive applications since it uses an asynchronous, event-driven model (Sufiyan, 2022).

#### Why Do We Use NodeJs?

There are many reasons for which we prefer using NodeJs for the server side of our application, some of them are discussed in the following (Sufiyan, 2022):

* NodeJs is built on Google Chrome’s V8 engine, and for this reason its execution time is very fast and it runs very quickly.
* There are more than 50,000 bundles available in the Node Package Manager and for that reason developers can import any of the packages any time according to their needed functionality for which a lot of time is saved.
* As NodeJs do not need to wait for an API to return data , so for building real time and data intensive web applications, it is very useful. It is totally asynchronous in nature that means it is totally non-blocking.
* The loading time for an audio or video is reduced by NodeJs because there is better synchronization of the code between the client and server for having the same code base.
* As NodeJs is open-source and it is nothing but a JavaScript framework , so for the developers who are already used to JavaScript, for them starting developing their projects with NodeJs is very easy.

#### Features of NodeJs

* Asynchronous in Nature and Event driven: The servers made with the NodeJs never waits for the from an API. Without waiting for the data from the API, it directly moves to the next API. So all the APIs of NodeJS are totally non-blocking in nature. In order to receive and track all the responses of the previous API requests, it follows an event driven mechanism. Hence we can say that all the NodeJs API are non-blocking in nature (Sufiyan, 2022).
* Single Threaded Architecture: With event looping, a single threaded architecture is followed by NodeJs and for this architecture makes NodeJs more scalable. In contrast to other servers, limited threads are created by them for processing the requests. Whereas for the event driven mechanism, the NodeJS servers reply in a non-blocking or an asynchronous manner and for this reason NodeJS becomes more scalable. If we compare NodeJs with other traditional servers like Apache HTTP servers, then we can say NodeJs handles a larger number of requests. A single threaded program is followed by NodeJS and this allows NodeJs to process a huge amount of requests (Sufiyan, 2022).
* Scalable: Nowadays, scalable software is demanded by most of the companies. One of the most pressing concerns in Software Development is addressed by NodeJs and that is scalability. Concurrent requests can be handled very efficiently using NodeJs. A cluster module is used by NodeJs for managing the load balancing for all the active CPU cores. The most appealing feature of NodeJs is that it can partition the applications horizontally and this partition procedure is mainly achieved by it due to the use of child processes. Using this feature, the distinct app versions are provided to the different target audiences and also for customization it allows them for catering to the client preferences (Sufiyan, 2022).
* Quick Execution time for code: V8 JavaScript runtime motor is used by NodeJs and this is also used by Google chrome. A wrapper is provided for the JavaScript by the hub and for that reason the runtime motor becomes faster and for this reason inside NodeJs, the preposition process of the requests also become faster (Sufiyan, 2022).
* Compatibility on the cross platforms: Different types of systems like Windows, UNIX, LINUX, MacOS and other mobile devices can use NodeJs. For generating a self-sufficient execution, it can be paired with any appropriate package (Sufiyan, 2022).
* Uses JavaScript: From an engineer's perspective, it is a very important aspect of NodeJs that this framework uses JavaScript Most of the developers are familiar with JavaScript, so for them it becomes very easier to grab NodeJs (Sufiyan, 2022).
* Fast Data Streaming: The processing time of the data that have been transmitted to different streams takes a long time. Whereas for processing the data, NodeJs takes a very short amount of time and it does it at a very fast rate. NodeJs saves a lot of time because the files are processed and uploaded simultaneously by NodeJs. So as a result, the overall speed of data and video streaming is improved by NodeJs (Sufiyan, 2022).
* No Buffering : The data is never buffered in NodeJs application (Sufiyan, 2022).

#### Node.js Architecture

Now that we established what is Node, let’s dig into its architecture. Node.js operates on a single-thread, allowing it to handle thousands of simultaneous event loops. Here’s a diagram, provided by Sinform.com, that best illustrates Node.js architecture (Sufiyan, 2022).

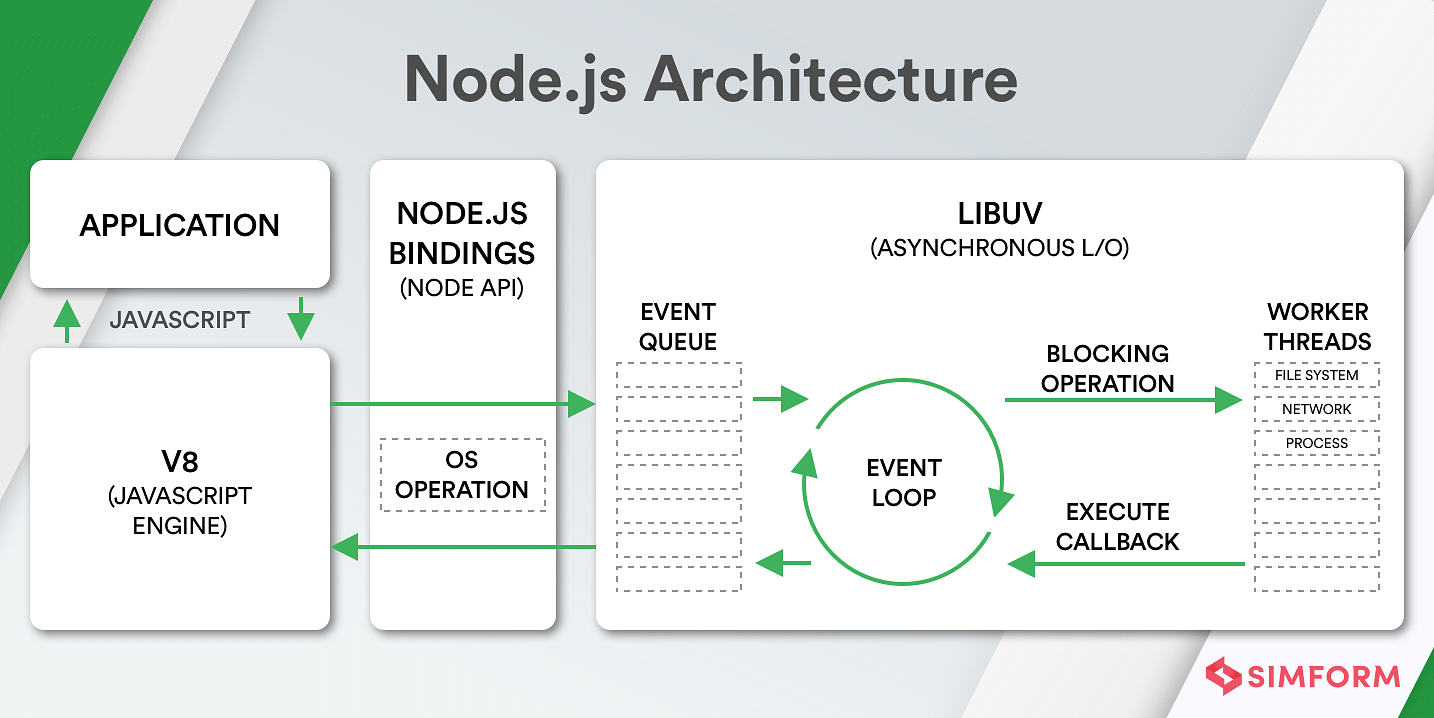


Figure 2.6: Architecture of Node.js (Sufiyan, 2022)

#### Parts of Node.js

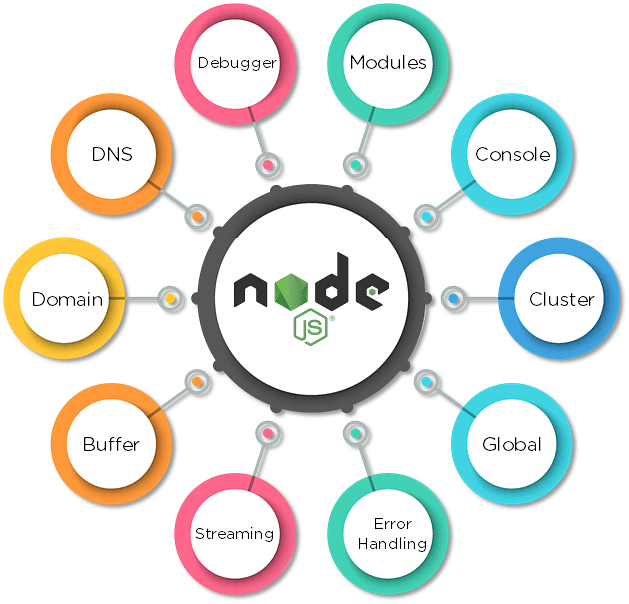


Figure 2.7: Parts of Node.js (Sufiyan, 2022)

## Related Literature

In this secion, literature from different sources (books, research paper and internet websites) on the ecommerce history, business model and comparative study has been discussed for better application development process. History of ecommerce says that web based shopping just wound up conceivable when the web was opened to general society in 1991. Amazon.com was one of the principal ecommerce destinations in the US to begin offering items on the web and a large number of organizations have pursued since. The tremendous fame of the web as of late has been powered generally by the possibility of performing business on the web. With the quick worldwide development in electronic trade, organizations are endeavoring to pick up an upper hand by utilizing internet business to interface with clients.

### Definition of E-commerce

There are numerous definitions for E-commerce which share a ton for all intents and purpose. By the by E-business has been characterized by researchers and specialists in various ways. Web based business alludes principally to the purchasing and offering exercises over the Internet, which incorporates exchanges, for example, setting orders, making installments, and following conveyance of requests on the Internet (Rodgers, 2002). The web based business is characterized as purchasing and offering of item administration or data through PC organizes mostly the web (Wen et al., 2001, as cited by SAHA, 2018) and individuals instantly consider shopper retail buys from organizations, for example, Amazon (Chaffey et al, 2006, as cited by SAHA, 2018). Be that as it may, internet business alludes to both monetary and educational electronically intervened exchanges between an association and any outsider it manages (Chaffey, 2006, as cited by SAHA, 2018). Further, Singh (2001, as cited by SAHA, 2018) upheld the definition by alluding web based business to an online administration offered to client to help their shopping knowledge over the web.

Online business is exponentially expanding the accessibility of data, giving clients access to more information, of preferable quality and quicker over previously. Mechanical headway drove an unstable improvement in electronic business, the reasons for that are the web end the World Wide Web (WWW), which are making electronic trade considerably more available. Web internet business incorporates electronic exchanging of physical merchandise and of intangibles, for example, data. This incorporates all the exchanging steps, for example, web based promoting, requesting, installment and support for conveyance (Trimmers, 2000, as cited by SAHA, 2018).

Online business is utilized wherever in regular daily existence. Presently a days it is used for everything from Visa approval, travel reservation over a system, wire support exchanges over the world, purpose of offer (POS) exchanges in retailing, electronic managing an account. It helps in create interest for the items and benefits and enhances arrange the executives, installment and other help capacities (Awad, 2004, as cited by SAHA, 2018). Thus, online business diminishes the expense of making, preparing, disseminating and recovering paper based data. Further encourages the advantages which incorporate enhanced picture, enhanced client benefit, streamlined procedures, packed cycle and conveyance time, disposing of printed material and expanded adaptability (Turban et al, 1999, as cited by SAHA, 2018).

Additionally, online business isn't just about purchasing and offering as it is likewise about electronically imparting, teaming up and finding data (Turban et al, 2004, as cited by SAHA, 2018). It can include the Internet, groupware programs, open email systems (Adams, 1994, as cited by SAHA, 2018), innovations, for example, electronic information trade (EDI) and electronic supports exchange (EFT) and all the more as of late, administrations related with cell phones and computerized TV (Voss, 1999, as cited by SAHA, 2018). E – Business has turned out to be exceptionally well known due to the advantages and accommodation it brings along as it is not any more an option, it is a goal (Wen et al, 2001, as cited by SAHA, 2018). E-trade is by and large dependent on financial exchange and e-administrations are the piece of electronic trade, as cited by (SAHA, 2018).

### History of Ecommerce

The historical backdrop of web based business begun 40 years prior and, right up 'til today, keeps on developing with new technological advancements, innovations, and a huge number of organizations entering the online market every year (SAHA, 2018).

Electronic Data Interchanges and mail order shopping during the 1970s made ready for the present day internet business store. The historical backdrop of online business is nearly entwined with the historical backdrop of the web. Web based shopping just ended up conceivable when the web was opened to the general population in 1991 (SAHA, 2018).

Web based shopping was designed and spearheaded in 1979 by Michael Aldrich in the United Kingdom. He associated an adjusted local TV by means of a phone line to an ongoing multi-client exchange handling PC (SAHA, 2018). The framework was promoted starting in 1980 and offered fundamentally business-to-business frameworks that were sold in the UK, Ireland, and Spain. One the most punctual purchaser shopping encounters was Book Stacks Unlimited, an online book shop made by Charles M. Stack in 1992 (SAHA, 2018). Stack's store started as a dial-up release board two years previously Amazon was established by Jeff Bezos. In 1994, Book Stacks Unlimited moved to the Internet as Books.com and was eventually acquired by Barnes & Noble (SAHA, 2018).

The main online exchange was, by a few reports, marijuana sold by Stanford students to MIT students by means of the Arpanet account at their artificial intelligence lab in 1972 (SAHA, 2018). In any case, the primary web based shopping exchange on the Internet occurred exactly 22 years after the fact. With the feature "The Internet is Open", the August 12, 1994, issue of New York Times chronicled the deal between two companions of a Sting CD. The Times said, “The team of young cyberspace entrepreneurs celebrated what was apparently the first retail transaction on the Internet using a readily available version of powerful data encryption software designed to guarantee privacy (SAHA, 2018).”

History of online business is unimaginable without Amazon and eBay which were among the principal Internet organizations to permit electronic exchanges. Because of their originators we presently have an attractive web based business area and appreciate the purchasing and offering points of interest of the Internet (SAHA, 2018).

Amazon is one of the primary web based business organizations to build up a partner promoting system, and these days the organization gets about 40% of its deals from associates and outsider venders who rundown and offer products on the site. In 2008 Amazon entered into the film and is right now supporting the film "The Stolen Child" with twentieth Century Fox (SAHA, 2018).

As per the exploration led in 2008, the space Amazon.com pulled in around 615 million clients consistently. The most well-known component of the site is the audit framework,

i.e. the capacity for guests to present their audits and rate any item on a rating scale from one to five stars. Amazon.com is additionally outstanding for its clear and user-friendly advanced search facility which empowers visitors to search for keywords in the full content of numerous books in the database (SAHA, 2018).

### Different types of E-commerce

The E-trade exchanges occur between opposite sides of an exchange. The sides of this exchange can be a customer, a business, inner or the administration. At the point when the transaction is between the business and the consumer, it is called B2C. The transaction between businesses is called B2B E-commerce (SAHA, 2018). For the same reason the when E-commerce happens between business and government, it is called B2G and C2C for consumer to consumer (SAHA, 2018).

The following table is a quick demonstration of different types of existed E-commerce/E- businesses (SAHA, 2018).

* Not easy to classify
* Many real models fall into multiple categories

TABLE 2.1: EXAMPLE OF DIFFERENT TYPE OF THE E-COMMERCE

|  |  |  |
| --- | --- | --- |
| **B2B**  Business to Business   * PayPal (and B2C, B2B2C) * Optize (and B2C) * Alibaba Group | **B2C**  Business to consumer   * Amazon * FreshDirect * Zynga (and C2C) | **B2G**  Business to Government   * E-Procurement |
| **C2B**  Consumer to Business   * ZonZoo * Fotolia * Google Adsense | **C2C**  Consumer to Consumer   * Prosper (P2P) * eBay * Facebook | **C2G**  Citizen to Government   * Agencia Tributaria (Tax agency online) |
| **G2B**  Government to Business   * E-Government * AEPM * Certificado Digital | **G2C**  Government to Citizen   * E-Government * eDNI * USA.gov (also G2B) | **G2G**  Government to Government   * Government Gateway * Schengen Information System |

### E-commerce Usage in Developed vs. Developing Countries

Online business can possibly enhance proficiency and efficiency in numerous regions and, accordingly, has gotten critical consideration in numerous nations. Be that as it may, there has been some uncertainty about the significance of web based business for developing countries (SAHA, 2018). The nonappearance of satisfactory fundamental infrastructural, financial and the absence of government national ICT systems have made a huge hindrance in the adoption and development of online business in developing countries. For web based business in developing countries, social issues also should be considered (SAHA, 2018).

Nham (2022) outcome of the project based on this thesis is an e-commerce webstore prototype. The web app will allow people to buy and sell items that are relevant to their needs. The website also provides useful tools to help the owners managing their e-commerce store in handling orders, payments, and logistic. By implementing the serverless backend, the maintenance has become easier and easier, especially for the developers compared to the traditional backend technologies.

Wu et al. (2020) paper combs the concept of C2B according to the relevant literature research, through the comparative analysis of the decision relationship between B2C and C2B, discusses the essential connotation of C2B electronic commerce, and analyzes the C2B conceptual misunderstanding existing in the application of e-commerce combined with practical cases. On this basis, the C2B application platform and the main bottlenecks that may exist in the application of electronic commerce are discussed. Finally, the solution strategy of C2B application bottleneck and the future trend of C2B application are discussed.

E-commerce is mainly divided into three types, but (Xu & Chen, 2020) mainly analyzes the application of big data technology in B2C e-commerce precision marketing pattern. Firstly, the notion and features of B2C e-commerce as well as the concept and characteristics of precision marketing mode are described. Secondly, this paper further analyzes some challenges faced by B2C e-commerce in the times of large data. Finally, taking China Amazon B2C electronic commerce as an example, this paper briefly analyzes the ratio of B2C e-commerce in China’s online retail B2C market share in the third quarter of 2017, which is 4.1%. This shows that B2C e-commerce is developing rapidly under the background of large data era.

Qwaider (2020) introduces the concepts of e-commerce application framework based on cloud computing, the development trend of cloud computing that adapts to the problem of e-commerce and the storage and distribution of resources. A proposed structure allows organizations to reduce costs through the effective implementation of ecommerce activities and solve the problem of large companies to improve e-commerce applications through cloud computing.

Agrawal & Dhar (2021) reported in this paper primarily focuses on India’s top B2C organizations and the role of definitive user experience elements in shaping the success of these organizations. A heuristic-based comparative study was conducted among the top e-commerce Web applications in order to identify unique features that contribute to a sumptuous user experience. The analytical study was backed up by user studies that report the expectation of the customers and their frustrations. The collective insights were then correlated to each platform’s market ranking and share with an objective to identify and analyze features, design cues and elements that contribute to their standing in the Indian market. In a nutshell, the qualitative study explores connections between market ranking, usability heuristics, and user study insights in order to prescribe design features, cues, and elements that benchmark the user experience framework for B2C applications in an Indian context. The insights elaborate on the current trends, gaps, and opportunity areas for B2C applications.

Defiesta et al. (2020) discusses the development of an ecommerce platform with inventory integration for a mining equipment supplier companies. Because of e-commerce's low barrier of entry, many vendors and distributors sell directly to customers. With this, there is an opportunity to automate the business processes of the mid-size mining equipment supplier company to improve the service and sales performance. In turn, it can ease the management profit of the distributor channel. The system produces an e-commerce web application that can be overall access by the administrator. Likewise, distributors and customers' accounts can be partly access through the web application. This research includes modules to improve the system such as admin module, vendor module, distributor module, customer module and IT management system.

Nguyen (2021) The purpose of the thesis is to study the origins of Single-Page Applications and follow along the evolution of JavaScript and its ecosystem on how they redefine the norms of building modern web applications. To demonstrate the functionalities of the mentioned JavaScript tooling, the thesis will include examples of SPAs as subjects of research, and explore how they are being orchestrated in harmony under-the-hood by tools and libraries such as React.js, Next.js, Webpack.js, TypeScript. In ad-dition, different types of SPA will be taken into account, for example server-side ren-dering, client-side rendering and static site generation, to measure impact of JavaS-cript toolkit on the process of creating those applications.

# CHAPTER THREE PROPOSED METHODLOGY



## Introduction

This chapter covers the analysis models (data flow diagram, sequence, class and entity relationship diagram) of the project and the higher-level solution (programming language) approach used.

## Number of modules of e-commerce application

This E-commerce project is divided into 9 modules:

* + Registration Module
  + Products Browse Module
  + Products Search Module
  + Shopping cart Module
  + Shipping & Billing Module
  + Payment Module
  + Admin User Management Module
  + Admin Catalog Management Module
  + Admin Order Management Module

## Analysis Models

Analysis models is a technical representation of the system. It acts as a link between the system description and the design model. In Analysis Modelling, information, behavior, and functions of the system are defined and translated into the architecture, component, and interface level design in the design modelling.

### Use Case Diagram

Use-case diagrams **describe the high-level functions and scope of a system**. These diagrams also identify the interactions between the system and its actors. The use cases and actors in use-case diagrams describe what the system does and how the actors use it, but not how the system operates internally.

Figure 3.1: Use Case Diagram

### Data Flow Diagram

A data flow diagram (DFD) maps out the flow of information for any process or system. It graphically represents the flow of data in a business information system.

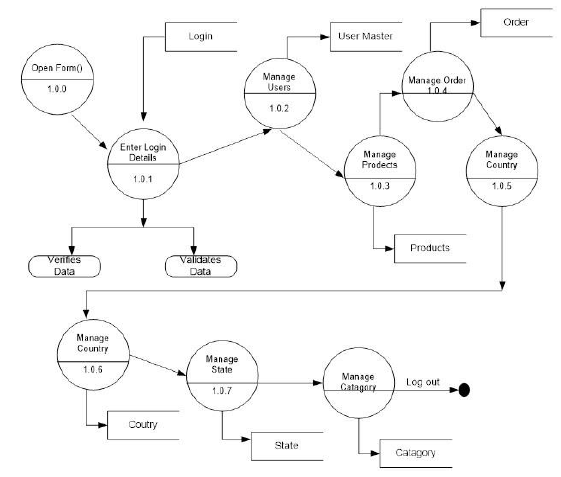


Figure 3.2: Data Flow Diagram

### Sequence Diagram

Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration.

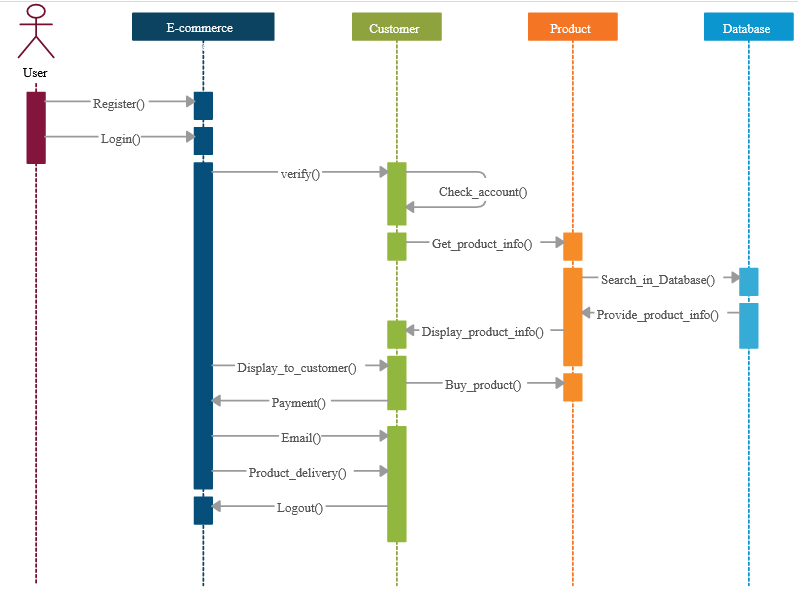


Figure 3.3: Sequence Diagram

### Entity-Relationship Diagram

An entity-relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.

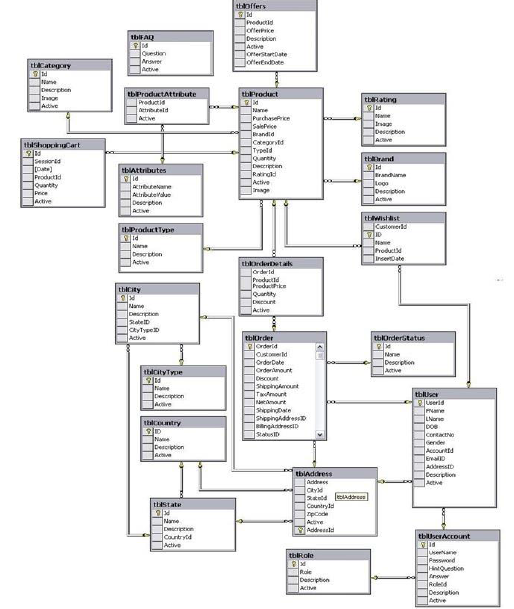


Figure 3.4: E.R Diagram

### Architecture Diagram

Class diagram is basically **a graphical representation of the static view of the system and represents different aspects of the application**. A collection of class diagrams represent the whole system. The name of the class diagram should be meaningful to describe the aspect of the system.



Figure 3.5: Class Diagram

## Programming languages used

* Angular
* Node.js

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