

# A Hybrid Mobile Application for an e-Commerce Store

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**Abstract**— The use of the Internet has increased dramatically among people and has become reliable in all areas of life. The most successful one among others is e-Commerce/e-Marketing. E-commerce techniques allow the development of relationship with customers to such a level not previously reported. The reason is the process of purchase, distribution, shopping, demand and production are found in a modern mechanism which is no longer as it was in the traditional process. Therefore, many small business organizations, as like as large ones, are considering e-commerce mobile application as a better technological choice for developing and maintaining customer relationship. This paper proposes a hybrid e-commerce store mobile application for selling of products or services over the Internet that can operate on different operating systems such as windows, iOS, and android.

**Keywords**— e-Commerce/e-Marketing; mobile applications; clustering; E-commerce techniques

## I. INTRODUCTION

In the twenty-first century, the use of the Internet has increased dramatically among people and has become reliable in all areas of life from calls and communications to transport and many others. One of the most important Internet applications at the present time and one of the most successful ones is e-marketing or e-commerce. E-marketing techniques allow the development of relationship with customers to such a level not previously reported [1, 2].

There are several sites that promote e-marketing through the Internet and offer several marketing services. For example, the e-marketing site is dedicated to a particular subject for the promotion and advertising of the goods, and is engaged in marketing without papers such as the newspaper, but depends on the Internet and telephone and other digital devices that keep up with technological development. The daily world uses technology and development in the overall daily life of the individual, the process of purchase, distribution, shopping and demand and production are found in a modern mechanism is no longer as it was in the traditional process, which is expensive and takes a long time [1, 2, 3]. Therefore, many small business organizations, as like as large ones, are considering e-commerce mobile application as a better technological choice for developing and maintaining customer relationship.

Online shopping is an e-commerce format, in which real-time sales transactions occur as a consumer purchases an item or service from an online store. Mobile applications targeted for customers have good positive impact on the profitability of such small e-commerce stores [20]. As there are substantial variations among mobile application development technologies, it is crucial to choose appropriate one with the consideration of usability, performance, maintenance etc. This paper proposes a

hybrid e-commerce store mobile application for selling of products or services over the Internet that can operate on different operating systems such as windows, iOS, and android.

## II. AVAILABLE APPLICATIONS

In this Section, I will discuss about a number of current mobile applications that are available in the market that are used world-wide and in the context of Gulf region.

### Amazon

Amazon.com, Inc., doing business as Amazon is an American electronic commerce and cloud computing company based in Seattle, Washington that was founded by Jeff Bezos on July 5, 1994. The tech giant is the largest Internet retailer in the world as measured by revenue and market capitalization, and second largest after Alibaba Group in terms of total sales. The amazon.com website started as an online bookstore and later diversified to sell video downloads / streaming, MP3 downloads / streaming, audiobook downloads / streaming, software, video games, electronics, apparel, furniture, food, toys, and jewelry. The company also produces consumer electronics-Kindle e-readers, Fire tablets, Fire TV, and Echo-and is the world's largest provider of cloud infrastructure services Amazon also sells certain low-end products under its in house brand Amazon Basics [8].

In Amazon mobile app the user can quickly search for millions of items, and can scan barcode and compare prices, and all purchases are routed to amazon secure servers.



Figure 1. Amazon mobile app

### Alibaba

Alibaba is a Chinese multinational e-commerce founded by Jack Ma and Peng Lei Launched in 1999, Alibaba.com is the leading platform for global wholesale trade. Alibaba serve millions of buyers and suppliers around the world, Alibaba.com brings hundreds of millions of products in over 40 different major categories, including consumer electronics, machinery and apparel, Buyers for these products are located in 190+ countries and regions, and exchange hundreds of thousands of

messages with suppliers on the platform each day [9][10]. Alibaba is Amazon's number one rival and has a great platform.

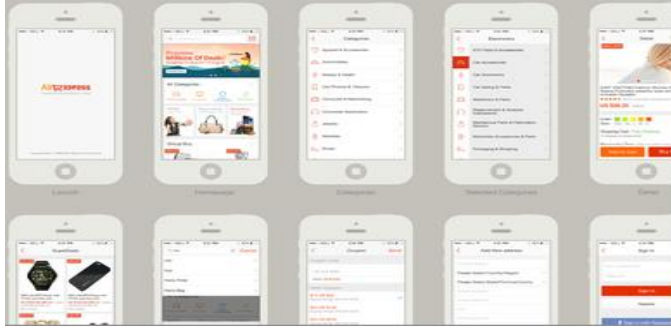


Figure 2. Alibaba mobile app

### Souq.com

Established in 2005 by Ronaldo Mashhor. Its headquarters is in Dubai, United Arab Emirates. SOUQ.COM is the largest e-commerce website in the Arab world, has more than 400,000 products from electronics, fashion, home editing, watches, perfumes, and more. Today, more than 23 million visitors are visiting. Often called "Amazon Middle East", it works as a site for sale exchange and your shopping online. Souq.com was a pioneer in online shopping in the region as an auction site and linked to the Arab Internet portal Maktoob. When Yahoo settled on Maktoob in August 2009, it was not included in the deal, separated from Maktoob to stay and from Jabbar Internet. Subsequently, in May 2011, the site became a market model selling at fixed prices, and then the retail division was launched in late 2011. The site was bought by Amazon in 2017 [11]. Souq app have a platform similar to Amazon and its one of the most used apps in the Middle East.

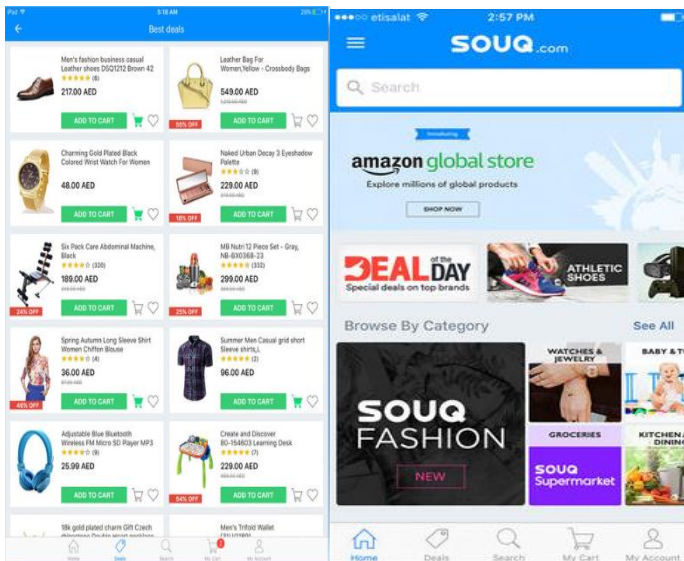


Figure 3. Souq.com mobile app

### eBay

eBay Inc. is a multinational e-commerce corporation based in San Jose, California that facilitates consumer-to-consumer and business-to-consumer sales through its website. eBay was

founded by Pierre Omidyar in 1995, and became a notable success story of the dot-com bubble. eBay is a multibillion-dollar business with operations in about 30 countries, as of 2011. The company manages eBay.com, an online auction and shopping website in which people and businesses buy and sell a wide variety of goods and services worldwide. The website is free to use for buyers, but sellers are charged fees for listing items after a limited number of free listings, and again when those items are sold [12].

Ebay app is the world leading auction store and have millions of user visiting every day.



Figure 4. eBay mobile app

### haraj.com

Founded by Eng. Yousef Al-Rashidi in 2005 as an assembly center for the sale of cars and then developed to become an auction site in 2008. The volume of sales traded monthly through the site has reached 400 million riyals, and the addition of 10 thousand ads a day, also less than 50 employees running the site. The founder pointed out that he does not want to increase the commission site over (1%) because it is not for profit, but a symbolic amount to support the site and the operator to continue [13][14].



Figure 5. haraj.com mobile app

### NOON

Mohamed Alabbar founded [www.noon.com](http://www.noon.com), an e-commerce marketplace in the Middle East set to compete with [souq.com](http://souq.com), with a 3.5 million square foot facility in the United Arab Emirates. Alabbar has raised \$1 billion from investors, half of which was committed by the Public Investment Fund of Saudi Arabia, to spearhead what will be a string of major digital and e-commerce launches in the UAE. He met with Jeff Bezos, the founder and CEO of Amazon.com, in Dubai in November 2016. In March 2017, it was announced that Amazon.com would acquire Dubai-based e-commerce company Souq.com, following which Alabbar immediately submitted a competing \$800 million bid via his Emaar Malls subsidiary. However Souq.com culminated a deal with Amazon.com due to an exclusivity agreement signed prior to Alabbar's bid [19].

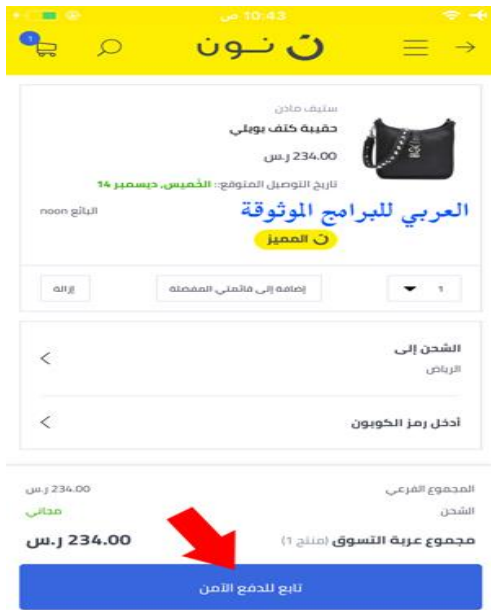


Figure 6. NOON mobile app

### Summary of mobile apps

There is no question eBay is best for some items, while Amazon and alibaba is best for the others. In general, eBay is best for used and vintage items. But the overlap is incredibly large. The vast majority of items that sell on Amazon and alibaba will also sell on eBay, except Amazon outsells most of those items, some costumers avoid Amazon because they think there are too many rules however eBay's User Agreement, is moving closer to Amazon's model, Amazon is the most common and the most used and considered the best, Alibaba is the best for wholesale, ebay is the best auction store. In the context of Saudi Arabia, Souq is widely used for online purchase of items. Haraj is not widely used due to its interface and lack of other benefits.

This paper aims to fill that gap and develop a hybrid mobile app with friendly user interface and wide range of features.

The following page contains a comparison of the apps in the market and my app in a tabular form.

### III. SYSTEM ANALYSIS AND DESIGN

I am proposing to develop a hybrid mobile application which will be built as an Ionic application framework. The Ionic application will use an WooCommerce [17] store in the back end. The e-commerce app that I will build in this paper gets the products' information from the WooCommerce store. All that is needed is just a WooCommerce store, either locally or on a remote server so that the Ionic application can communicate through REST API [15].

The application will allow the users to browse through the product catalog, search products in a particular product category, add product to their cart and then pay for their orders. The customers can pay using the PayPal payment gateway as well. The orders will be received on the WooCommerce and then can be processed further by the shop admin. The app takes care of user authentication and only allows users with valid customer accounts to place orders. The app also allows new customers to sign up for an account.

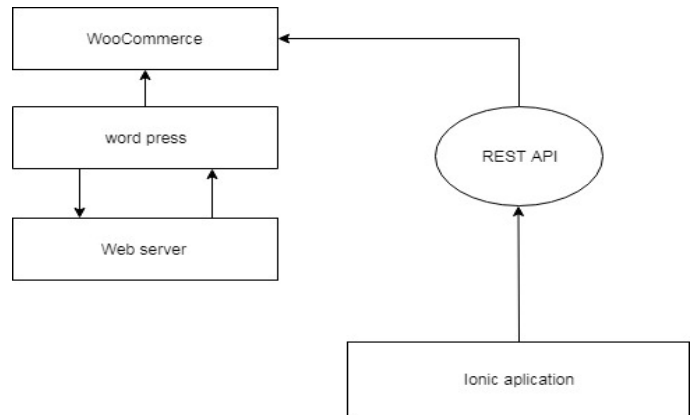


Figure 7. System architecture/model

The above diagram shows the system architecture. It shows the WooCommerce site hosted on a web server on a local computer or remotely to a server. WooCommerce will be installed as a plugin to WordPress [18] which is an amazing open-source website platform. WordPress has to be installed on a web server, which would either be part of an Internet hosting service or a network hosting its own right. WordPress' plugin architecture allows users to extend the features and functionality of a website. The Ionic application will communicate to WooCommerce site using REST API. REST or RESTful API design (Representational State Transfer) is made to take advantage of existing protocols. While REST can be used over nearly any protocol, it usually takes advantage of HTTP when used for Web APIs.

### IV. REQUIREMENT AND ANALYSIS

#### SOFTWARE

##### *Ionic*

Ionic is a complete open-source SDK for hybrid mobile app development targeted for Android, iOS and Windows based

systems. The original version was released in 2013 and built on top of AngularJS and Apache Cordova [4].

### **HTML**

Hypertext Markup Language is the standard markup language for creating web pages and web applications [5].

### **JavaScript**

Often abbreviated as JS, is a high-level, dynamic, weakly typed, prototype-based, multi-paradigm, and interpreted programming language. Alongside HTML and CSS, JavaScript is one of the three core technologies of World Wide Web content production [6].

### **CSS**

Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language [7].

### **REST API**

REST or RESTful API design (Representational State Transfer) is designed to take advantage of existing protocols. While REST can be used over nearly any protocol, it takes advantage of HTTP when used for Web APIs. This means that developers do not need to install libraries or additional software in order to take advantage of a REST API design, REST is not constrained to XML, but instead can return XML, JSON, YAML or any other format [15].

### **WampServer**

WampServer refers to a software stack for the Microsoft Windows operating system, consisting of the Apache web server, OpenSSL for SSL support, MySQL database and PHP programming language [16].

### **WooCommerce**

WooCommerce is an open source e-commerce plugin for WordPress. It is designed for small to large-sized online merchants using WordPress [17].

### **WordPress**

WordPress is a free and open-source content management system (CMS) based on PHP and MySQL [18]. It offers an amazing open-source website platform. WordPress has to be installed on a web server, which would either be part of an Internet hosting service or a network hosting its own right..

## **HARDWARE**

A computer and any device with an Android operating system or IOS or Windows.

## **FUNCTIONAL REQUIREMENTS**

### **ID:FR1**

TITLE: home page.

DESCRIPTION: when the application starts, the application shows the

Home page.

RAT: in order to allow the user to interact with the application.

DEP: None.

### **ID:FR2**

TITLE: menu page.

DESCRIPTION: when the user clicks on menu button the menu will appear.

RAT: in order to allow the user to login, signup and access products categories.

DEP: FR1.

### **ID:FR3**

TITLE: products details.

DESCRIPTION: when the user clicks on any products the products details will appear.

RAT: in order to allow the user to see products details.

DEP: FR1 and FR2.

### **ID:FR4**

TITLE: cart.

DESCRIPTION: when the user clicks on the cart icon the cart will appear.

RAT: in order to allow the user to see and add products to the cart.

DEP: FR3.

## **NON-FUNCTIONAL REQUIREMENTS**

### **PERFORMANCE REQUIREMENT:**

-The application should be effective and fast in performance without delay or boredom by the user and should not be difficult to use.

-Capacity and durability: our system must be able to support all versions of

OS and respond to all requests without delay.

-Modifiability: the system is able to add new functionalities.

-High performance: the application must effectively response to the given task.

### **USABILITY REQUIREMENT:**

Ease of use is one of the most important successful factors of the application.

## **V. IMPLEMENTATION**

### **SETTING UP**

#### **Installation of Node and Ionic**

We have installed Node.js which is a JavaScript runtime built on Chrome's V8 JavaScript engine. Installing and connecting all the software that we mentioned in requirement and analysis. Once we have installed Node.js we installed npm (node package manager) to install node modules. In fact, npm comes with the node installation. Then, we installed ionic using npm to build our application.

#### **Setting Up WooCommerce Locally**

WooCommerce is a customizable e-commerce platform which we can use if we own a wordpress website. WooCommerce manages everything for us such products, customers, product categories, prices, offers, coupons, discounts, orders and payments. WooCommerce offers an API that helps us get and send all the data to and from WooCommerce using our application. Our Ionic application will get data about customers, products and much more from the WooCommerce store and the application will send data about customers and orders back to the store.

First, we installed wordpress locally on our computer and then installed WooCommerce plugin in the wordpress



installation. Now, our Ionic application will use an WooCommerce API to talk to the woocommerce store.

To install wordpress, we need a webserver on our machine. We have installed WampServer which provides all the collection of tools that we need to run wordpress locally.

### Creating the database

We created the wordpress database as shown in the following diagram using wampserver's phpMyAdmin portal.

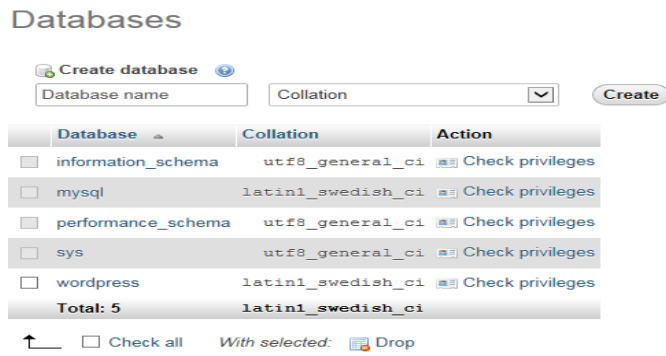


Figure 8. Database creation

### Creating Categories

Using WooCommerce plugin in wordpress creating categories for the products to be added later.

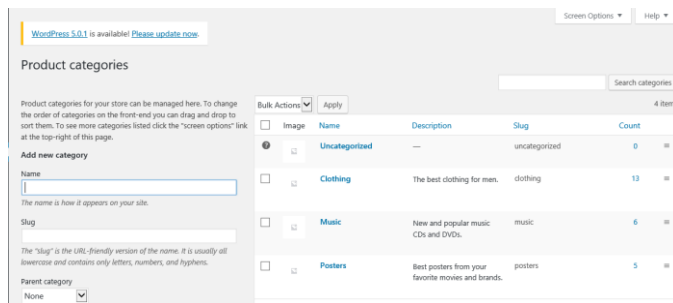


Figure 9. Categories creation

### Adding Products

Adding products to the categories created previously.

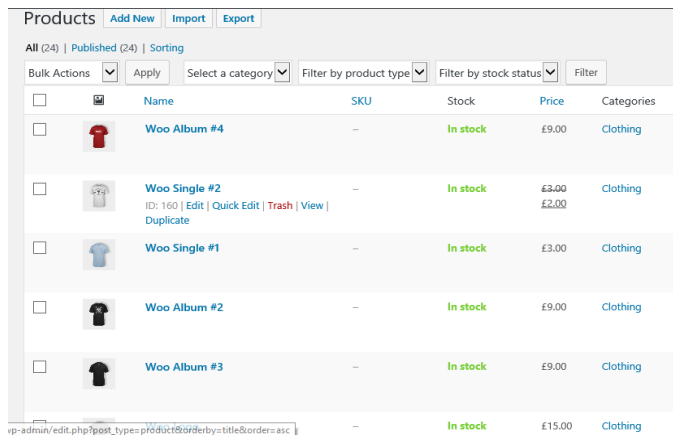


Figure 10. Product addition

### Activating WooCommerce Plugin

Once we installed the woocommerce plugin, we need to activate it. Also, we need to activate the REST API so that our Ionic application can communicate to the woocommerce store.

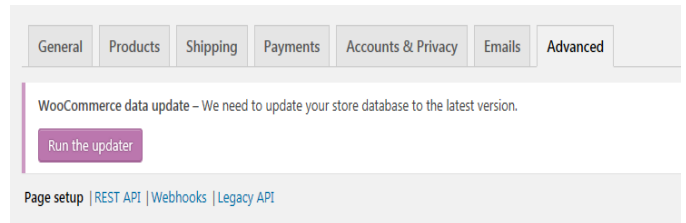


Figure 11. WooCommerce Plugin

### Building the App

In the following subsections, the different steps for the building the application are described. Our application is structured into different pages. Ionic supports creation of individual page of the app and sending data back and forth between different pages. Every page has three components: the interface (.html file), style sheet (.scss file) and a typescript (.ts file) for coding. This ts file contains all the code for communicating with the woocommerce store.

### Creating Home page

The following Figure shows the home page of the application. It contains a Menu icon on the left and a search bar to search for different products. Also, the home page contains the list of products with the images and a link to display the products details such as description, properties, and reviews and option to add the product to the cart.

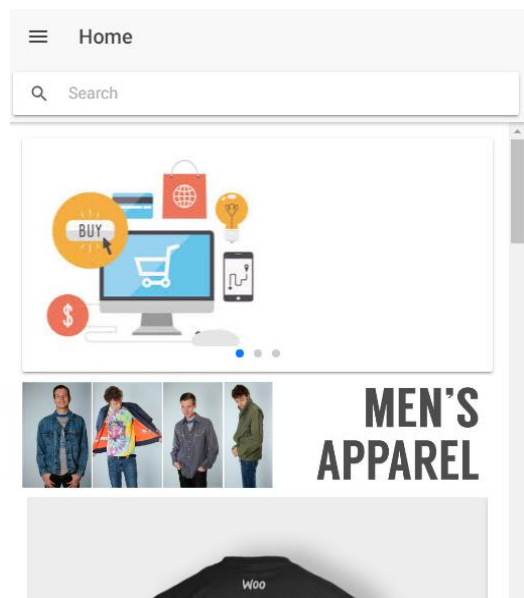


Figure 12. Creating Home page

### Products list

Creating a list of the products in home page so the user can choose one of them.

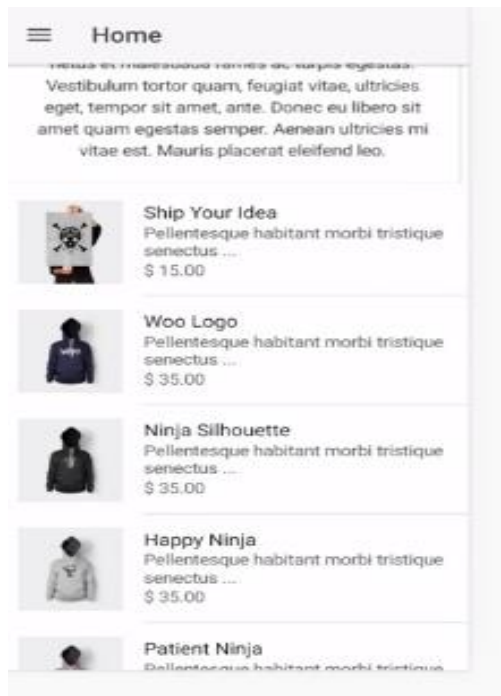


Figure 13. Creating Product list

### Adding Product Categories

We added different product categories to the menu. Customers can select any category to display all the items in that category.

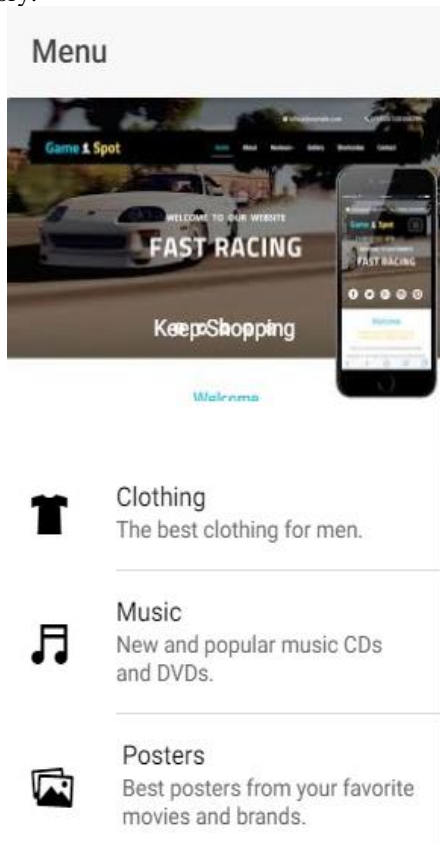


Figure 14. Adding product categories

### Displaying Products

Displaying products in the categories so the user can click on a category and the products of that category will be displayed.

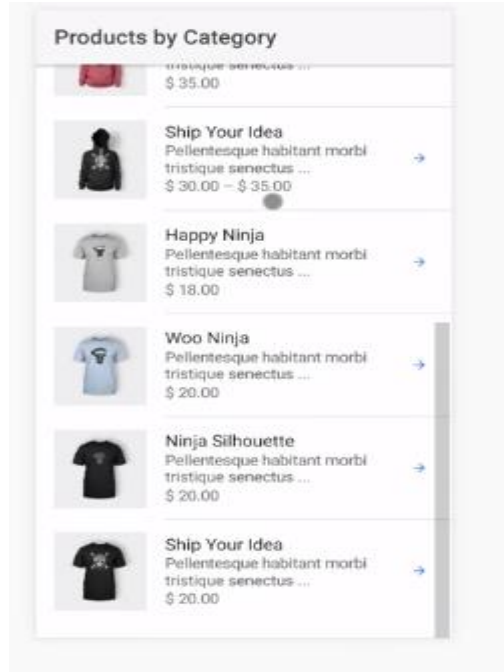


Figure 15. Product by category

### PRODUCTS DETAILS

#### Products image, title, and description

Displaying the image, title, and description to each product.



Figure 16. Product image

#### Products reviews

Displaying product reviews when the user scrolls down on the product page.

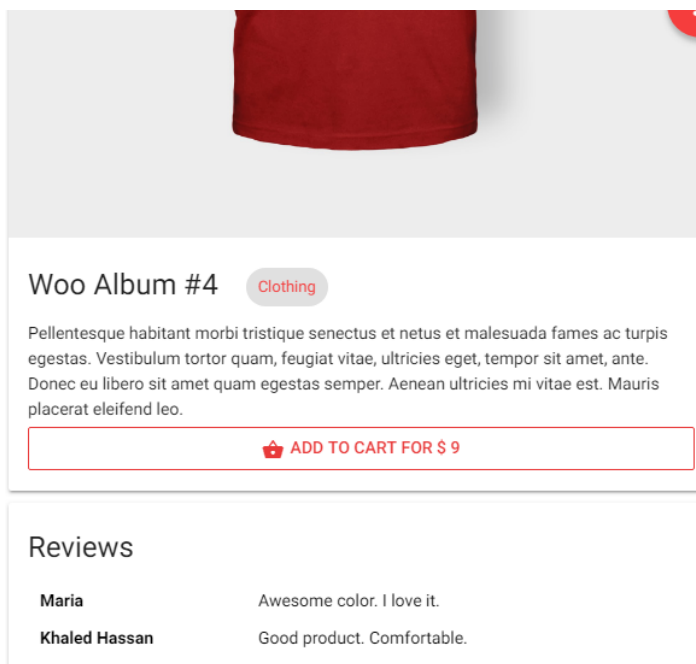


Figure 17. Product review

**CART**  
**Products in cart**

Displaying the products that the user picks in the cart.

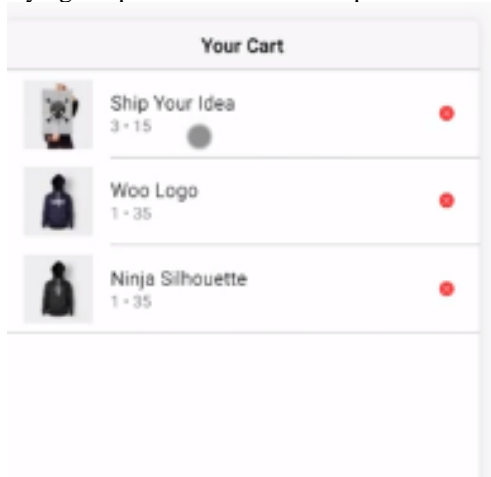


Figure 18. Product in cart

Finalizing the cart

Displaying the total price and the checkout button.

**SIGNUP AND LOGIN**

Sign up page

Creating sign up page form and display it to the user.

Login page

Creating login page form and display it to the user.

**Checkout**

Creating checkout form and display it to the user.

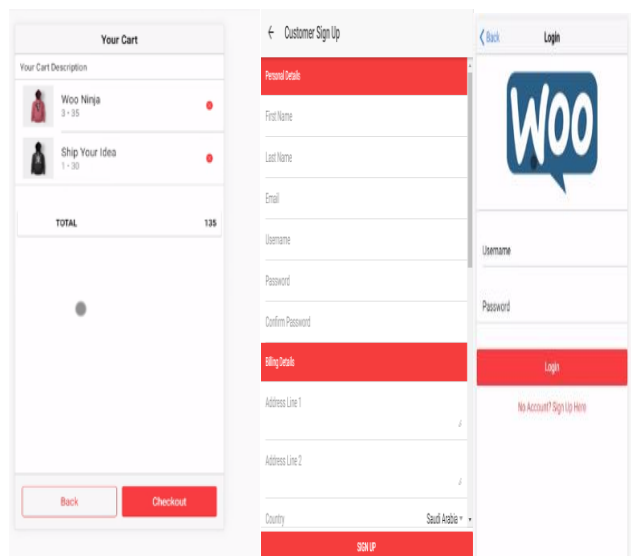


Figure 19. Signup and login

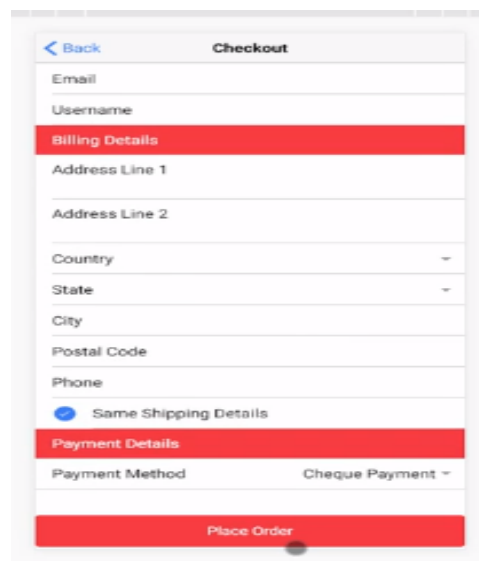


Figure 20. Checkout

**VI. CONCLUSION**

In this paper, we designed and implemented a hybrid e-commerce store mobile application that can operate on different operating systems such as windows, iOS, and android. The main objective of this paper is to develop an application that provide real opportunities for marketing and selling products and interacting with customers. We plan to fix some implementation issues that our app is currently facing. The signup pages throw a security error which needs to be solved. At present, customers are created in the WooCommerce portal. Second, placing order also throws a security error which needs to be addressed. In the future, we plan to add more features like integrating the app with PayPal and publishing the app to the play store.

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