

FEASIBILITY STUDY

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MOBILE POINT OF SALE USING QR

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1. PROBLEM STATEMENT

Mobile Point Of Sale Using QR

It is an android app which customers can use to scan product QR code thereby placing an order for it. The retailer can also offer products online and is managed by the admin who also authorizes customer and retailer accounts. There is a search feature to find a particular product, a buyer cart to view products selected by the customer and an online portal that displays the items offered by retailers.

The front end is an android app to perform the above operations and the back end comprises of a database, server side scripts and machine learning algorithms for product suggestion.

2. EXECUTIVE SUMMARY

The products are sold from retail stores and through an online platform. To ease the checkout process in offline stores, customers can use an app that records all the products a customer purchases by QR scanning the products and completing payment online. The products are later delivered to the customer's place. Since online shopping is getting more attention, the development of an online platform is necessary. The project's inflow has been healthy and the projections show a continued growth for the next five years. This growth can be further improved upon by working on the delivery system which consumes a lot of time. Work needs to be done on possible QR scan errors for error-free transactions. There are plans to invest on improving the online platform to increase the company's inflow by using new/existing technologies and by improving marketing and sales campaign.

3. CURRENT SYSTEMS AND PROCESSES

3.1 Current Operations

There exist many Online Shopping Platforms that act as middlemen between retailers and consumers. Due to the exponential variety of products on the market it has enabled various platforms such as Amazon, Flipkart, EBay, etc. to co-exist without infringing heavily on each other's profit margins.

There have also been instances of franchise retailers such as Walmart enforcing the Supply-Chain Strategy to compensate for product deficit at any of their numerous outlets.

3.2 Physical Environment

The Online Shopping Platforms are usually implemented on a Cloud Server in a format that is suitable to either scale-up or scale-out the platform. These Platforms must also have an elegant UI/UX web-based portal to draw users to their platform and also to enable them in purchasing goods. Some platforms have also moved towards the mobile platform in order to tap into the mobile user base.

Supply-Chain enforcing retailers also have their own private servers to operate algorithms on product inventory at each of their outlets that can determine the most cost-efficient inter-store relations without harming their ability to procure goods for the consumers.

3.3 User Organization

Online Shopping Platforms such as Amazon, Flipkart, EBay, etc. operate as middlemen to help their retail clients gain access to the consumer base across the world. They prefer to handle the delivery and return of goods between the two actors in exchange for a small fee percentage of the total sale. By utilizing a reliability rating on vendors it is possible for small-time retail owners to build their customer base over an easy and online platform.

Supply-Chain retailers like Walmart enforce their presence through the concept of franchise establishments. Small-time independent retailers are brought under a single banner to convert the local presence of a retail stores into a global brand. Successful inter-store interactions allow the brand to provide services to the consumers without the need for a limiter on seasonal and regional products.

4. SYSTEM OBJECTIVES

4.1 Description of Products and Services

Aim to build an application that would help manage retail stores and automate the checkout process in these offline stores. A significant amount of time is lost from customers waiting in long queues to have their items billed. The proposed system would allow users to scan products themselves and pay through their online wallet. The system could make shopping more convenient as users would be able to easily locate products in large retail stores using an app.

The app would also provide a platform for retailers to sell their products online to a larger customer base. The app would also recommend products to users based on their purchase history and suggest retailers who supply these products. This could significantly increase retail profit.



Retailers can expand their market base by offering products through the system's online portal, cutting off the barriers of geographical constraints.

Retailers in brick and mortar stores can increase profits by cutting out on billing staff for the company's automated billing system. Also the app would enable store owners to manage their stocks better through alerts and interactive UI.

4.4 Technology Considerations

All parties who would be a part of the system would need an interface to communicate with it. In view of the requirements of the project, it is reasonable for this interface to be a mobile application. Android, being the most popular of all mobile platforms, would hence be the natural choice for the platform on which the app would be built.

The system would evidently need a server to manage different requests that would emanate from clients. While there are several options from which to choose server side scripting languages, PHP would be the language of choice for the system due to its simplicity. The server would interact with a MySQL database and hence would require a comprehensive hold on SQL commands.

As recommendations have to be made based on user's purchase history, machine learning algorithms such as content based recommender systems and neighbourhood models would have to be used. Also, as image processing is one of the most important piece of the system, familiarity with OpenCV would be essential.

5. PRODUCT/SERVICE MARKETPLACE

The organization must be available to assist its customers both offline and online .The marketplace would consist of the basic needs of a customer's routine life. The top competitors here would be Walmart and Big Bazaar in the offline market and Amazon and Flipkart in the online market. The brand's presence in both the offline and online market would serve as an advantage by enabling customers to get back to us very easily at any of our stores in case of any issues. The presence of stores at various locations would enable product availability through supply-chain interactions with the app. Products shall be directly dispatched from the stores thereby eliminating the need of special warehouse investment and hence saving on maintenance cost. Shipping of products shall take place from the nearest store to the customer's location. Shipping charges would vary depending upon the distance from the store.

All stores would keep track of product demand in that particular month and ensure further availability of products preventing shortage. Similarly products which have not been sold in a particular store but are in high demand in other stores could be transferred appropriately. Adequate use of transport and products would be ensured.

6. MARKETING STRATEGY

The process by which this organization works makes itself unique to other marketplaces. The services provided will be customized towards the customers. Here the customer have an option of either visiting the store to place orders or can do so from the online site. There will be no requirement for either cash or card due to having wallet based transactions. Various offers can be made available for regular customers and usage of referral services to benefit introduction of new customers. Product return on delivery can be facilitated - which might give more freedom to customers in purchasing products. Proper mailing services of ordered lists, bills and offers shall be done. Employment of third-party accounting firms can be expedited in case of irregular sales. Prices offered can be made comparatively lower or equal to other marketplaces in case of constant profit margin increments.

Another strategy would be to have contracts with relevant stores towards providing coupons to their customers for discounted purchases at any of the company's retail stores. Utilizing seasonal sales and lucky draws for customers could create trends towards linking additional customers. There would be a need for initial spending towards initiation of new customers by providing benefits for new referrals and bulk purchases.

7. SCHEDULE

Sep 7, 2017: Completion of feasibility study report.

Sep 30, 2017: Data collection, Database design and UI wireframe, agreement on APIs.

Oct 6, 2017: Completion of image processing module (both frontend and backend) and population of database.

October 23, 2017: Evaluation of progress towards frontend development. Completion of user management module, ML engine and request of processors.

Nov 12, 2017: Completion of frontend, stock manager and search modules.

Nov 18, 2017: Testing and deployment of project.

8. FINANCIAL PROJECTIONS

Financial projections for the project are highlighted in the table below. This explains the projected summary of product sales, shipping, IT support, Web Server and Hosting, Platform Development & maintenance.

Assumptions for these projections are:

- Projections of store (building) and its maintenance remain constant.
- All milestones are performed in accordance with the schedule.
- Enough capital to invest in products.

<i>Measure</i>	<i>Year1</i>	<i>Year2</i>	<i>Year3</i>	<i>Year4</i>	<i>Year5</i>	<i>5 Year Total</i>
Sales & Vendor Commission Projections	₹ 2,00,00,000	₹ 3,00,00,000	₹ 5,00,00,000	₹ 10,00,00,000	₹ 15,00,00,000	₹ 35,00,00,000
Product Cost	₹ 1,60,00,000	₹ 2,30,00,000	₹ 3,50,00,000	₹ 7,00,00,000	₹ 11,00,00,000	₹ 25,40,00,000
IT Support	₹ 20,00,000	₹ 25,00,000	₹ 30,00,000	₹ 40,00,000	₹ 60,00,000	₹ 1,75,00,000
Packing and Shipping	₹ 10,00,000	₹ 12,00,000	₹ 13,00,000	₹ 15,00,000	₹ 18,00,000	₹ 68,00,000
Web Server & Hosting/Maintenance	₹ 1,50,000	₹ 0	₹ 0	₹ 0	₹ 0	₹ 1,50,000
Design and maintenance of application platform	₹ 10,00,000	₹ 12,00,000	₹ 12,00,000	₹ 25,00,000	₹ 25,00,000	₹ 84,00,000
Total Additional Cost	₹ 2,01,50,000	₹ 2,79,00,000	₹ 4,05,00,000	₹ 7,80,00,000	₹ 12,03,00,000	₹ 28,68,50,000
<i>Cash Inflow</i>	₹ -1,50,000	₹ 21,00,000	₹ 95,00,000	₹ 2,20,00,000	₹ 2,97,00,000	₹ 6,31,50,000

9. ISSUES

One of the possible issues in the system would be accurate identification of QR code scanned by the customer's camera. Incorrectly identifying a product because of a faulty image could end up becoming an inconvenience to the user and also costly in terms of utilization of network resources. Another issue would be giving recommendations to users with very little purchase history.

10. ASSUMPTIONS AND CONSTRAINTS

- ♦ The system can be kept operational until a certain period in time where the profit margins begin to stagnate or at a point where offline physical stores are no longer deemed necessary by the consumer market.
- ♦ The system can be made live as soon as the retail clients and the retail franchises of the company are able to produce products into the market for sale with a provisional support of door-door delivery of purchased goods.

- ◆ The system is able to interact securely and reliably with cash flow systems provided by consumer authorized banks and trusts.
- ◆ The system has undergone a series of testing phases and soft releases with developmental and operational costs incurred by the R&D funding allocated from company revenue. The system has been deemed functional and as a potential revenue stream to facilitate future company growth.
- ◆ The system has undergone all necessary licensing procedures to ensure minimal infringement of other patents and copyrights. In cases where licensing has not been possible, steps have been taken to ensure less than 25% overlap in the technology being used by the company.
- ◆ The system must undergo regular maintenance at the frequency of at least once a year. The system must be taken offline during this process with prior alerts to the consumers of the system. A discounted sale can also be provided after the required maintenance to appease consumer discomposure.
- ◆ The system will generate data on a daily basis which is to be stored in company servers for operational use. The original training data has been derived from pre-release sales and prediction algorithms to determine purchase patterns.
- ◆ The system has been designed for Android users. The company must take steps to ensure that consumers possess the necessary infrastructure to operate the system.

11.ALTERNATIVES

11.1 Alternative I

Technologies like Computer Vision, Deep Learning algorithms and sensors can be used to automate purchase, checkout and payment of a product. This would eliminate the need for individual scanning of products and ease purchase of a product. A major disadvantage here would be the increased costs incurred due to adoption of multiple sensors.

12.FINDINGS AND RECOMMENDATIONS

Based on the information presented in this feasibility study, it is recommended that we begin project initiation. The findings of this feasibility study show that this initiative will be highly beneficial and has a high probability of success. Key findings are as follows:

12.1 Project objectives

- The project has good scope in the marketplace because of the novel dimension that it would add to shopping in retail stores. As the online marketplace is still unsaturated, venturing into this field should be still profitable.
- One issue with the project would be accurately identifying QR codes and querying the database for the appropriate product.
- Results of research on hardware and software alternatives, technology, marketing, financial etc. Example could be like

Technology:

- Android application as an interface to interact with the backend
- OpenCV - An image processing library
- SQL for database management
- PHP for backend scripts
- Recommender systems to suggest products based on purchasing history

Marketing:

- The customers would mainly be retail store owners.
- Online shopping customer base would be another target audience.
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Financial:

- Shipping, IT support, Web Server and Hosting, Platform Development & maintenance are the sectors that would need financial investment
 - Plan to achieve a 5 year target of about 70 million rupees
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- The unpredictability of online markets and the possible obsolescence of retail stores are the major risk factors that could impede financial growth