e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

MVP DEVELOPMENT USING FLUTTER

G Abhi Rami*1, Dr. Khyati Zalawadia*2

*1Dept., Computer Science Parul Institute Of Engineering And Technology Vadodara, India.

*2Associate Professor, Dept., Computer Science Parul Institute Of Engineering And Technology Vadodara, India.

ABSTRACT

Developing a Minimum Viable Product (MVP) is a crucial step in the software development lifecycle, allowing startups and businesses to validate their ideas quickly with minimal resources. Flutter, Google's open-source UI framework, has emerged as a powerful tool for building cross-platform MVPs due to its fast development cycle, single codebase, and native performance. This project explores the process of developing an MVP using Flutter, focusing on key aspects such as UI/UX design, state management, backend integration, and deployment. Mobile operations are an everyday part of our ultramodern life, and hourly new mobile operations are developed by startups. Generally, startups have acutely limited coffers to work with, so they need to work innovatively and presto in the delicate early stages of their trip [8]. The study highlights the advantages of using Flutter for MVP development, including reduced time-to-market, cost efficiency, and ease of scalability. By implementing a real-world use case, the project demonstrates how Flutter accelerates prototyping and enables businesses to gather user feedback early in the development process. The findings emphasize that Flutter's rich widget ecosystem, hot reload feature, and seamless integration with Firebase and REST APIs make it an ideal choice for MVP development. The project concludes that leveraging Flutter can significantly enhance the efficiency and feasibility of bringing innovative app ideas to market.

I. INTRODUCTION

In the fast-paced digital era, businesses and startups aim to quickly bring their ideas to market while minimizing costs and risks. The *Minimum Viable Product (MVP)* approach has become a widely adopted strategy for validating ideas with minimal resources. In today's highly disruptive and competitive mobile app development world, businesses would not risk missing their presence on both platform stores, Google Play Store and the Apple App Store[10]. An MVP is a version of a product that includes only the core features necessary to address a problem and gather user feedback. This iterative development process enables businesses to test assumptions, refine their product, and make data-driven decisions before full-scale development. Flutter, an open-source UI framework developed by Google, has gained significant popularity for *cross-platform app development* due to its single codebase, Flutter aims to do application development with just one codebase for any platform [3]. By utilizing Flutter for MVP development, businesses can accelerate their development cycles while ensuring consistency across multiple platforms. Key features such as *hot reload, a rich widget library, and seamless backend integrations* make Flutter an efficient choice for building functional and scalable MVPs. This research paper explores the role of Flutter in MVP development, highlighting its advantages, challenges, and practical applications. The study investigates how Flutter enhances *rapid prototyping, cost-effectiveness, and user experience* in early-stage product development. Additionally, it examines real-world case studies where Flutter has successfully facilitated the MVP process. The goal is to provide insights into the feasibility and effectiveness of using Flutter for MVP development and its impact on the overall product lifecycle.

1. FLUTTER

Flutter is across-platform frame that targets developing high- performance mobile operations. Flutter was intimately released in 2016 by Google. Besides running on Android and iOS flutter operations also run on Fuschia. Flutter is chosen as Google's operation- position frame for its coming- generation

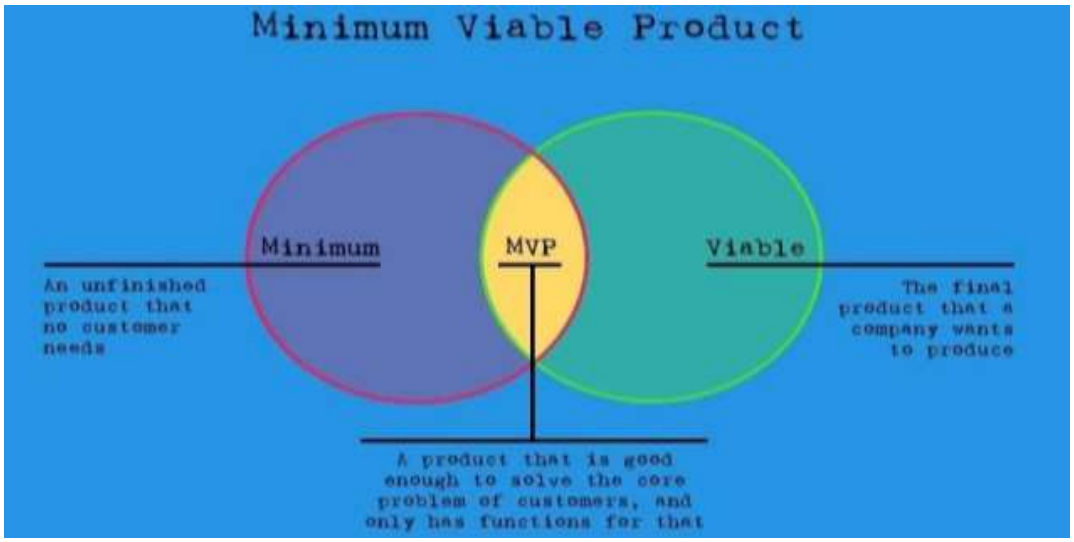
operating system. Flutter is exceptional because it's dependent on the device's OEM contraptions rather than consuming web views. Flutter uses a high- performance picture machine to render each view element using its own. This provides a chance to make operations that are as high- performance as native operations can be. In view of armature, the machine's C or C law involves compendium with Android's NDK and LLVM for iOS independently, and during the compendium process, the Dart law is collected into native law. Hot reload point

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

in Flutter is called as Stateful hot reload and it's a major factor for boosting the development cycle. Flutter supports it during development.

Stateful hot reload is enforced by transferring the streamlined source law into the running Dart Virtual Machine (Dart VM) without changing the inner structure of the operation, thus the transitions and conduct of the operation will be well- saved after hot reloading.

2. MVP DEVELOPMENT



Flutter is an ideal framework for *MVP (Minimum Viable Product) development* due to its ability to quickly build high-performance cross- platform mobile applications. The MVP approach focuses on developing a product with only the core features necessary to address the target users' needs. Using Flutter, developers can create a single codebase that runs seamlessly on both iOS and Android, saving time and resources. Flutter's rich set of customizable widgets and its high-performance rendering engine allow for rapid UI/UX design and implementation. Additionally, the *hot reload* feature enables developers to make real-time changes without losing the app's state, facilitating fast iteration during the development process. Flutter's flexibility supports agile development methodologies, where the app can be tested, refined, and launched iteratively. After launching the MVP, feedback from real users is collected continuously improve the product. This process is crucial for scaling the app based on user needs. In summary, Flutter's cross- platform capabilities, performance, and fast iteration make it an excellent choice for MVP development, enabling quick launches and efficient feature refinement.

II. LITERATURE REVIEW

This section explores the previous research related to startups, their development phases, product development in terms of MVP, and best practices or techniques involved successful execution of a startup. Startups are bringing disruptive innovation to the society. Going further, it is better to understand the definition of a startup. While traversing through several research papers and publications Author found the one and most accurate definition of the startup by Eric Ries. According to Ries, 'startup is a human constitution designed to create a new product or service under conditions of extreme uncertainty'.

Startups always struggle for their survival, especially in their early phase, and consist of a frequently changing and chaotic ecosystem. Applying efficient practices startups can increase their presence duration in the market and can cater to adverse conditions wisely. [1] These adverse conditions include time and resources, and it is more explained in section 4 of the thesis document. When developing a new product or service a startup steps through different stages such as Discovery, Validation, Efficiency, Scale, Sustain, Conservation According to one survey, over 309 million startups are registered every year globally and many of them are not sustained in the market. 9 out of 10 startups fail in the first three phases of their journey. The author explored past research and present market trends concerning the failures of startups and found the 'Lean Startup' method impactful. The Lean Startup method provides Startups with better and faster ways to deal with the progress of developing a product using 'trial and error'. The concept originated in the 2000s and came up as a methodology in 2010. The

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

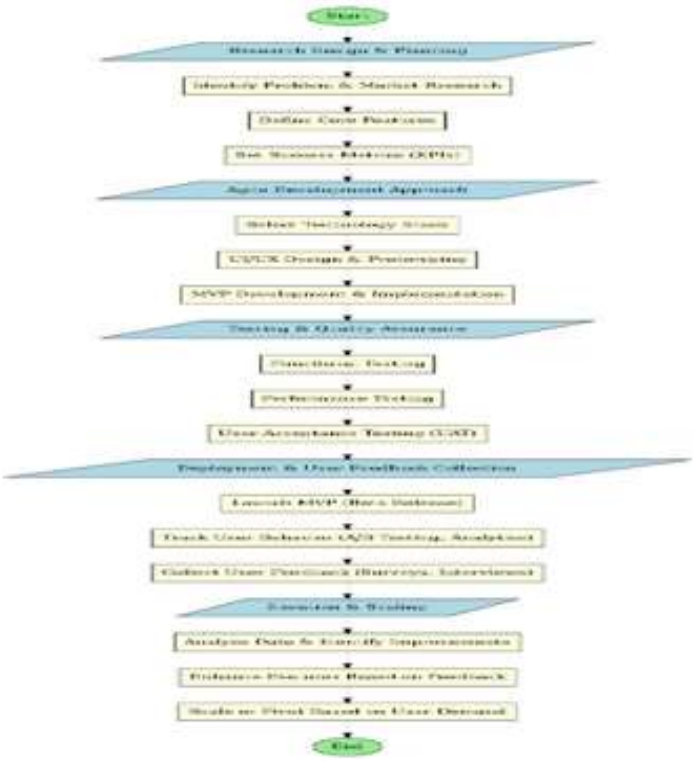
theoretical aspects of this methodology are covered of the thesis. Parallel, fostering the practical implications of 'The Lean Startup' can be identified while building MVP for 'Startup A'. MVP is the core principle of the Lean Startup. MVP means minimum viable product. In simpler terms, MVP is the sample of the product with minimum features for early customers.

In the environment of ' Startup A', the Author's primary vision is to explore and discover the once exploration or attestation related to the structure of MVP in the field of mobile operation development. The Author first collected data and stats related to the mobile operation and their development platforms. latterly, literature applicable to the specialized mound for erecting MVP is being explored. The stats covered in this section are the results of searching about the possibilities of mobile app business encyclopedically and locally.

As per the report by LambdaTest, encyclopedically the mobile operation business is booming and at its peak. We all calculate on mobile operations in diurnal life in numerous ways. According to the Statista Digital Market Outlook, profit across utmost parts of the mobile app assiduity is projected to reach roughly 613 billion U.S. bones by 2025. In the third quarter of 2022, 3.55 million apps were available in the Google Play Store, making it the biggest available app.

Also, The Apple Store, with 1.64 million iOS apps, makes it the second largest app store. According to Statista, in Finland, the total profit from the operation business is projected to reach 8.66(2022- 2027) which results in a request volume of€ 672.80 million in 2027.

III. METHODOLOGY



Developing a Minimum Viable Product(MVP) requires a structured and iterative approach to insure rapid-fire prototyping, stoner confirmation, and nonstop enhancement. The methodology should concentrate on nimble development, spare incipiency principles, and stoner- centered design to efficiently make, test, and upgrade the product. Below is a step- by- step methodology for MVP development.

1. Research Design & Planning

Before development, it's pivotal to define the problem, objects, and crucial features.

Identify the Problem Conduct request exploration and dissect challengers.

Define Core Features Focus on essential functionalities that break the problem.

Set Success Metrics Establish crucial Performance pointers(KPIs) like stoner relinquishment, engagement, and retention.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

2. Agile Development Approach

Using an nimble methodology ensures inflexibility, iterative advancements, and nonstop feedback. The development process follows Scrum or Kanban methodologies with short sprints and rapid-fire duplications.

a. System Architecture & Technology Selection

Choose the technology mound (e.g., Flutter forcross-platform development, Firebase for backend).

Define the data inflow, API structure, and database model .

b. UI/ UX Design & Prototyping

Produce wireframes and prototypes using Figma, Adobe XD, or Sketch . apply stoner- centered design principles to enhance usability.

Validate designs through stoner testing before development

c. MVP Development & perpetration .

Develop the product using Agile Sprints.

Use interpretation control(Git) and CI/ CD channels for smooth deployment.

Apply essential features only to insure a fast launch.

3. Testing & Quality Assurance

Functional Testing insure all features work as intended.

Performance Testing estimate app speed, cargo time, and responsiveness.

Stoner Acceptance Testing(UAT) Gather feedback from real druggies.

4. Deployment & stoner Feedback Collection

Launch the MVP on a limited scale(e.g., beta release, test requests).

Use A/ B testing and analytics tools(Google Analytics, Mixpanel) to track stoner geste.

Collect stoner feedback via checks, interviews, and reviews .

5. Replication & Scaling

Dissect stoner data and prioritize point advancements.

Apply advancements grounded on real- world feedback.

Plan for scalability and fresh features grounded on stoner demand

IV. DISCUSSION

As the first impression, Flutter is a powerful tool to develop cross-platform applications. The learning curve is quite steep at first, but the framework is pretty robust and full of potentials. With the ability to produce different platform applications from a single codebase, Flutter surely will attract more and more attention in the future.

This very first phase of the project aims to create a minimum viable product from the first ideas of the flashcard app Memoa. The developing team had to go through requirement analysis, designing, and developing the app from scratch. With the current stage of the application, this phase is considered a success. An MVP is produced within the timescope, and the quality of the application is at a reasonable level. The development process has been challenging due to the team being inexperienced in project management and having to work with a new framework. Carrying out the project in an agile fashion is a correct decision as it helped the team work more efficiently toward the preset goals. From the collected test users' feedback, improvements will be made to the app, and a stable version should be released soon.

The author had the chance to develop his skills in application development and project management during this project. By working in iterations, the author had to constantly review his performance and decide which features or tasks to be prioritized to achieve the project goals in time. The use of the Kanban board and other project management tools immensely helped prioritize tasks and keep track of the project progress. It is also an excellent opportunity to try new technologies and explore new concepts.

V. CONCLUSION

1. Stoner- Centric Design Prioritizing stoner requirements is pivotal for product Success.

2. Tech Integration Effective integration of colorful technologies is essential for a functional product.
3. Project Management Balancing specialized and strategic aspects is crucial to successful design prosecution
4. Marketing significance Strong marketing and branding sweats significantly impact stoner relinquishment
5. Nonstop enhancement Ongoing feedback and advancements are vital for maintaining applicability and satisfaction.

VI. REFERENCE

[1] Choudhary, Shivani." Developing an MVP using React Native with the Stylish Practices in Startup."
[2] Windmill, Eric. Flutter in action. Simon and Schuster, 2020.
[3] Kurnia, Yusuf." Online Learning Service Application Using Flutter Framework and Laravel." Tech- E 6.1 (2022) 39- 49.
[4] Koram, Neha, and Rakhi Garg." Review on Mobile App Development Tools and ways." 2023 IEEE World Conference on Applied Intelligence and Computing (AIC). IEEE, 2023.
[5] Atoui, Josef, and Erik Mattfolk." Encouraging social relations for spa goers using gamification ways." (2024).
[6] Rafael Fazzi Bortolini, Marcelo Nogueira Cortimiglia, Angela de Moura Ferreira Danilevicz, and Antonio Ghezzi. 2021. Spare incipiency A Comprehensive literal Review. operation Decision 59(8), 1765 – 1783.
[7] Huynh, Tung." A flashcard mobile operation development with Flutter."(2021).
[8] Taubert, Tuomas. ultramodern Mobile Application Development in a incipiency. MS thesis. 2023.
[9] Choudhary, Shivani." Developing an MVP using React Native with the Stylish Practices in Startup."(2024).
[10] Palum bo, Daniele. The Flutter frame Analysis in a mobile enterprise terrain. Diss. Politecnico di Torino, 2021.
[11] Koram, Neha, and Rakhi Garg." Review on Mobile App Development Tools and ways." 2023 IEEE World Conference on Applied Intelligence and Computing (AIC). IEEE, 2023.
[12] Gonzalez, Santiago Paeres, Germán A. Montoya, and Carlos Lozano- Garzón." Comprehensive Monitoring System for High- Risk gravidity." SN Computer Science 5.8(2024) 1- 12.