**CHAPTER THREE**

**METHODOLOGY**

3.1 Introduction(!)

Convenience is essential in the fast-paced world of today. The car wash industry is not an exception to the growing demand for online services. Customers can save time and worry by scheduling their car cleaning services online from the comfort of their own homes with the use of an online carwash system. Following a defined technique is necessary to create an online carwash system that is both user-friendly and efficient.

3.2. Software model process adopted

To guarantee effectiveness and quality,  creating an online carwash system needs to follow a methodical process. Iterative progress, stakeholder involvement, and adaptation to changing needs are made possible by adopting Agile development as the software process paradigm. The process starts with gathering all of the requirements and using market research and user interviews to define the main features and scope of the system. Next, after choosing appropriate technologies and frameworks, the lone developer creates the system architecture, which includes the database schema and user interface diagrams. Best practices are followed when coding the system during implementation, and dependability is regularly checked and fixed through debugging and testing.

During the deployment phase, the system is made ready for production by setting up the hosting infrastructure and doing last-minute checks. After that, there is ongoing maintenance and support. The lone developer keeps an eye on the system's performance, fixes problems, and applies upgrades as required. A single person can design the online carwash system with efficiency and effectiveness thanks to this systematic approach and Agile principles, which guarantees a high-quality final product.

3.2.1 Strength

Flexibility is where Agile technique makes it possible to adjust to priorities and requirements that change. Early Delivery is where Agile iterations enable measurable advancement by facilitating the early delivery of functional components. Transparency is where Consistent engagement of stakeholders promotes openness and congruence with project objectives.  
Waterfall methodology's structured planning guarantees well-defined requirements and design prior to the start of development. Risk Mitigation is where Comprehensive testing and ongoing integration lower the possibility of significant flaws or system malfunctions.  
Incremental Improvement is where Agile iterations allow for ongoing enhancement in response to changing requirements and user feedback. Flexibility is where The hybrid model can adapt to different project sizes and levels of complexity. Resource Optimization: Agile prioritizes tasks well, which facilitates effective resource allocation and increases output. Quality Assurance where the Extensive testing at every turn guarantees that the system satisfies user requirements and quality standards.

3.2.2weakness

Here is some of the weakness of the model chosen: Scope creep is where If agile iterations are not properly managed, scope creep may occur, lengthening project durations and raising expenses. Integration Difficulties: There may be dependencies and integration difficulties when coordinating the Agile and Waterfall phases. Resource-intensive: Adding more staff, time, and equipment may be needed to implement both approaches. Documentation Overhead: The focus placed by Waterfall on documentation, especially in teams that are Agile-oriented, may result in overhead. Expectations from Stakeholders where it might be difficult to reconcile the flexibility of Agile with the regimented methodology of Waterfall.

3.3 requirement gathering tools

The process of creating an online carwash system follows a methodical approach that begins with the extensive collection of requirements through the use of multiple technologies. In order to comprehend the requirements and expectations of patrons, car wash operators, and administrators, stakeholder interviews are first carried out. This aids in determining the essential functions and characteristics that the system must have. Furthermore, questionnaires and surveys can be used to validate preliminary results and get input from a larger audience. Observational studies can also be helpful because they enable engineers to see how carwash operations are currently run and pinpoint any issues that need to be fixed with the system. Additionally, focus groups and workshops enable cooperative talks between stakeholders, promoting a common knowledge of requirements and encouraging creativity in idea generation. Lastly, early in the development process, stakeholders can offer feedback thanks to the visualization of user interfaces and system workflows made possible by prototype tools like wireframing software. Developers can make sure that the online carwash system successfully and efficiently satisfies user expectations by using these requirements collecting techniques.

3.4 System requirement

The process of creating an online vehicle wash system starts with a detailed comprehension of the system specifications. These specifications cover a wide range of topics, such as user requirements, corporate goals, and technological limitations. First and foremost, the online payment process, service selection, and appointment booking for car washes should all be easy for users to navigate via the system. To provide security and customisation, it must also have features like user registration and authentication. The system should also have administrative features for scheduling appointments, monitoring payments, and producing reports. Technically speaking, the system needs to interact with current payment gateways for safe transactions and be scalable to meet rising customer demand. Optimizing accessibility for users also means making sure that the system works with various devices and browsers.

In order to create a reliable and user-friendly online carwash system, a thorough grasp of these system requirements forms the basis for the development process and directs the phases of design, implementation, and testing.

3.4.1 Hardware requirements

The process of creating an online vehicle wash system involves multiple steps, and the hardware needs that are necessary for its effective operation are carefully taken into account. First off, hosting the system's backend components—such as the database and application server—requires a strong server infrastructure. The system can effectively manage concurrent user requests thanks to this server configuration, which guarantees peak performance and dependability. In addition, networking hardware like switches, routers, and firewalls is needed to provide safe connections between client devices and servers, protect private user information, and stop illegal access. Additionally, in order to access the frontend interface of the online carwash system, which allows users to book appointments, make payments, and communicate with the system without difficulty, clients such as PCs, iPads, and smartphones are required.

3.4.2 Software requirements

Gathering thorough software and system requirements is the first step in the process of creating an online carwash system, ensuring that every detail of the project is taken care of. A few software applications are necessary to make this process easier. First off, system requirements are best organized and documented using a requirements management tool like Google Sheets or Microsoft Excel. With the aid of these tools, a developer may effectively engage with stakeholders, track changes, and compile an organized list of features and functionalities. A diagramming program such as Microsoft Visio or Lucidchart is also essential for illustrating the system architecture and user interface design. With the assistance of these tools, a developer can produce intricate diagrams that clearly depict the user interface architecture and show the links between system components. Moreover, controlling changes to the system's source code requires version control tools like Git or Subversion. The developer can work with other members of the team, keep track of revisions, and guarantee the integrity of the codebase with the help of these tools. Lastly, the developer may better organize work, set deadlines, and monitor progress throughout the development process by using project management software such as Trello or Asana. These systems offer a consolidated project management platform that makes coordination and communication easier. All things considered, the online carwash system development process cannot be completed without the effective collection, management, and documentation of system and software requirements through the use of these software tools.