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Implementing a Secure and Compliant Online Pharmaceutical Store: A Project Quality Plan

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# Project Goals & Scope

## Introduction

We will focus on developing an online pharmaceutical store that caters to prescription medication requirements. With this platform, MediQuick aims to bridge the gap between pharmacies and patients, making it easier for customers to purchase prescribed medications from accredited pharmacies. The store will provide an intuitive, secure, and efficient experience for both customers and administrators.

System features

* **Prescription Verification:** The online store will have a system in place for verifying prescriptions uploaded by customers, following regulations, and ensuring only valid prescriptions are fulfilled.
* **Inventory Management:** The system will maintain real-time inventory levels, allowing pharmacies to manage their stock and preventing stock-outs or over-stocking scenarios.
* **Secure Payments:** Employing state-of-the-art encryption methods, the payment gateway will ensure the secure processing of all transactions.
* **Order Tracking and Notifications:** Customers will be able to track their orders in real-time, and receive notifications at various stages—order confirmation, dispatch, and delivery.

# Project Management Process

## Planning

Project plan and schedule

In crafting the project plan and schedule, we intend to synergize traditional planning tools with contemporary methodologies. Specifically, our use of Gantt Charts is aimed at providing stakeholders with a macroscopic perspective of the project's lifecycle, from inception to fruition. Each task within the Gantt Chart is meticulously delineated, inclusive of the resources allocated, dependencies outlined, and milestones demarcated. This panoramic view functions as a compass, directing the project team in both strategy and execution.

Simultaneously, we will adopt the Agile methodology, which is renowned for its adaptability and incremental progress through defined "sprints." Each sprint will encapsulate a subset of prioritized tasks and will be entrusted to specialized teams (Brush & Silverthorne, 2022). A Sprint Planning Meeting will precede each sprint, where the scope and objectives will be distinctly articulated. Upon conclusion, a Sprint Retrospective will be conducted to glean insights into what was successful and what needs refinement. This iterative approach affords us the latitude to recalibrate our strategies based on real-time feedback and performance metrics.

3 risks

**Security Breaches:** Given the sensitive nature of pharmaceuticals and customer data, a breach can be catastrophic. Mitigation: Incorporate multiple layers of security protocols and regular third-party audits.

**Regulatory Compliance:** Failure to comply with healthcare laws and regulations can result in severe penalties. Mitigation: Regularly update our compliance checklist and work with legal advisors specialized in healthcare e-commerce.

**Supply Chain Interruptions:** Any disruptions can lead to an inability to fulfill orders. Mitigation: Establish relationships with multiple suppliers and create a contingency inventory reserve.

## Executing

3 key deliverables

**Project Schedule:** The schedule will be developed collaboratively by all project stakeholders and will be approved by the Project Manager. It will be regularly reviewed and updated.

**Overall Budget:** Finance and Project Management teams will jointly create a budget, which will then be approved by the Executive Committee. The budget will be continually monitored for deviations.

**Status Reports:** A weekly status report will be generated to summarize progress, roadblocks, and upcoming tasks. Approval will be at the team lead level, with exceptions escalated to project sponsors.

### Governance

The customer's insistence on rigorous governance stems from the inherent complexities and regulatory requirements specific to the pharmaceutical industry (Management Sciences for Health, 2012). This sector doesn't merely involve commercial transactions; it also carries the weight of public health and safety.

* **Prescription Verification:** Ensuring that medicines are distributed solely on the basis of verified prescriptions is a crucial safety measure. Any deviation from this standard could result in hazardous health outcomes, such as drug misuse or harmful interactions. Robust governance in this area serves as a bulwark against potentially life-altering errors.
* **Secure Payments:** Financial transactions in this domain often accompany the exchange of confidential health data. Rigorous oversight ensures not just the secure handling of funds, but also adherence to healthcare-specific financial protocols, like insurance claims and reimbursements.
* **Data Storage and Confidentiality:** Storing pharmaceutical and customer data demands adherence to a host of legal and ethical requirements (Management Sciences for Health, 2012). Any lapse in data protection could result in severe penalties and a loss of credibility. Heightened governance mechanisms make sure that data repositories meet the most stringent security requirements.
* **Inventory Data Access:** Limiting access to inventory data is essential to protect sensitive details such as proprietary drug formulas or consumer demand patterns. Stringent governance protocols are in place to ensure that only authorized individuals can view this confidential information, minimizing the risk of intellectual property infringement or data manipulation.
* **Regulatory Compliance:** Violations of healthcare laws like HIPAA in the United States or GDPR in Europe can result in serious legal repercussions. Rigorous governance audits all activities to certify compliance, thereby shielding the organization from legal complications.

The customer’s insistence on a robust governance structure is far from an arbitrary decision; it is a calculated approach. This strategy aims to reduce risk, ensure full legal compliance, and uphold the highest standards of security and ethics throughout all aspects of the project.

## Monitoring and control

We will use tools like Jira and Confluence (Contegix, 2023) to track the project's progress. The Project Manager will be responsible for ensuring that all tasks are progressing as per the schedule, and deviations are immediately addressed.

* Weekly Status Report Example
* Week Ending: Todays Date
* Completed Tasks: Inventory System Backend, Initial UI for Prescription Verification
* Upcoming Tasks: Payment Gateway Integration, Prescription Verification Frontend
* Issues: Delay in third-party API for payment
* Risks: Potential delay in schedule due to API issue
* Approvals Needed: Budget review for additional API services.
* Team Lead Approval: [Name]
* Project Sponsor Approval: [Name if Required]

# Requirements Management (REQM)

The practice area of Requirements Management in the Capability Maturity Model Integration (CMMI) framework is designed to ensure that all project requirements are systematically managed from their inception to their fulfillment (CMMISM, 2002). The purpose is to align the project's objectives and outcomes precisely with the customer's needs and expectations. By focusing on traceability, clarification, and consistent updating of requirements, the practice area aims to create a structured environment where every team member understands what needs to be achieved. This enhances efficiency, reduces the risk of project failure, and ensures that the final deliverable meets quality standards and customer expectations.

In CMMI, Requirements Management doesn't just act as a preliminary phase but is a continuous process that runs parallel to the lifecycle of the project. It is intimately linked with other process areas like project planning, quality assurance, and validation. This interconnectedness ensures that as the project evolves, requirements are not left static; instead, they are revisited, updated, and aligned with the changing circumstances, keeping all stakeholders on the same page and driving overall project success.

## Actions for Promoting Quality Requirements

### Development of a Requirements Traceability Matrix (RTM)

One of the first steps in adhering to the CMMI standards for Requirements Management is the creation of a RTM (D'Agostino, 2023). This matrix is crucial for linking customer needs directly to system functionalities, design elements, and test procedures. By maintaining an RTM, we ensure a documented and systematic approach to validating that all requirements have been met in the final deliverable. It provides an audit trail for each requirement, making it easier to manage changes and assess the impacts across the project's lifecycle. This is not a one-time task but a living document that should be continually updated as requirements evolve or change.

### Regular Requirements Reviews with Stakeholders

Another vital action point is to conduct regular requirements review meetings with all pertinent stakeholders, including the customer, team members, and any third-party vendors. These meetings are not just about ticking off what has been achieved but involve a deep-dive into whether the interpreted requirements align with what the customer actually needs and expects. The focus is on clarity, completeness, and mutual agreement. This iterative verification and validation process helps in early identification of misunderstandings or ambiguities, thereby reducing the likelihood of costly rework or modifications later in the project. These meetings should be well-documented and any revisions in requirements should immediately be reflected in the RTM.

By diligently implementing these actions, we align ourselves closely with the CMMI's robust framework for Requirements Management, thus significantly elevating the likelihood of project success and customer satisfaction.

# Process and Product Quality Assurance

Process and Product Quality Assurance (PPQA) in the CMMI framework is geared towards ensuring that both the processes and products of a project meet the defined quality standards and are consistent with the project's objectives (Keshta, Niazi, Alshayeb, 2018). By providing a set of best practices and guidelines, PPQA enables teams to instate proactive quality control measures, rather than reactive fixes after problems have occurred. This practice area emphasizes on the auditing of processes and work products, feedback loops for continuous improvement, and involvement of an independent body for objective quality assessments. The aim is to build quality into the product by making it an integral part of the development process, thereby reducing errors, cutting down rework, and ultimately ensuring customer satisfaction.

PPQA offers a comprehensive approach to quality management, incorporating tools and techniques that can identify inefficiencies and defects at an early stage. Through a rigorous system of audits, reviews, and feedback, it allows teams to pinpoint areas that need improvement and take corrective actions promptly. This not only ensures that the project stays on track but also contributes to a culture of continuous improvement, whereby lessons learned are integrated into future projects.

## Actions for Promoting Quality Assurance

### Establishment of a Quality Assurance Team

One of the crucial steps in aligning with PPQA is to establish a specialized Quality Assurance (QA) team or designate QA roles within the existing team structure. This team is responsible for conducting regular audits of both the project's processes and its deliverables to ensure they meet predefined quality standards. It's vital that this team operates independently of the project team to ensure objective assessments (Chrissis, Konrad, Shrum, 2016). They should be empowered to halt processes if they see a significant quality issue, thereby serving as the last line of defense against defects that could affect the customer.

### Implement Regular Quality Audits and Reviews

To align with PPQA, regular quality audits and reviews should be incorporated into the project timeline. These are not merely check-box exercises but should be comprehensive evaluations that scrutinize all aspects of the project—from code quality to documentation, and from development practices to testing procedures. The outcomes of these audits should be documented and reviewed by both the project team and the QA team to identify any areas for improvement. Any discrepancies found should lead to immediate corrective actions and, if necessary, a revision of the processes to prevent similar errors in the future.

By integrating these PPQA-based actions into our project management framework, we aim to embed a culture of quality and continuous improvement that safeguards the integrity of our project outcomes and contributes to long-term customer satisfaction.

# Software Development Methodology

The selection of a suitable methodology is critical for ensuring the on-time, within-budget, and quality delivery of the software product.

## Methodology Selection: Agile Framework with Scrum

After careful consideration of various methodologies like Waterfall, Spiral, and DevOps, we have chosen the Agile Framework with a focus on Scrum (Inflectra Corporation, 2023; Peek, 2023). Agile is particularly suited for projects that require rapid changes and where requirements are expected to evolve.

### Rationale for Agile Scrum

* Iterative Development: Agile Scrum allows for iterative development and testing, ensuring that any shortcomings in security and compliance can be identified and rectified promptly (Inflectra Corporation, 2023).
* Stakeholder Engagement: Scrum facilitates continuous interaction with stakeholders, enabling real-time feedback (Inflectra Corporation, 2023; Peek, 2023). This is essential when dealing with sensitive matters like pharmaceuticals, where regulations and requirements can change.
* Flexibility: Agile methods are adaptive by nature, permitting changes to be made even in the later stages of development. This flexibility ensures the system can adapt to new laws and regulations concerning online pharmaceutical sales (Peek, 2023).
* Transparency: Scrum practices like daily stand-ups and sprint reviews ensure transparency and provide clear visibility into the project's progress, which is vital for quality assurance.

### Development Phases

1. Sprint Planning: This will involve the selection of user stories related to security and compliance from the product backlog (Inflectra Corporation, 2023; Peek, 2023).
2. Development and Coding: The primary focus will be on adhering to secure coding principles and ensuring alignment with healthcare regulations like HIPAA (Health Insurance Portability and Accountability Act) in the United States or GDPR (General Data Protection Regulation) in Europe (Miri & Mohammed, 2018).
3. Quality Assurance and Testing: This phase will focus on rigorous security testing, compliance checks, and quality assurance to ensure all features meet the specified criteria.
4. Deployment: Features that pass all checks will be deployed to the production environment in a controlled manner to ensure data integrity and system stability (Inflectra Corporation, 2023; Peek, 2023).
5. Monitoring and Maintenance: Constant monitoring for security threats and compliance audits will be integral in this phase (Inflectra Corporation, 2023).

## Quality Control Measures

* Code Reviews
* Automated Testing
* Compliance Audits
* Security Vulnerability Assessments

## Evaluation of Alternative Methodologies

While Agile Scrum offers numerous advantages for this project, it's essential to recognize why alternative methodologies were considered less suitable for meeting the stringent requirements of a secure and compliant online pharmaceutical store.

**Waterfall Model**

* **Inflexibility:** Waterfall's linear and sequential nature means that changes can't be easily accommodated once the project has started. In a highly-regulated environment like online pharmaceuticals, this rigidity is problematic (Shergil, 2023).
* **Late Testing:** Testing occurs late in the project, potentially resulting in costly and time-consuming fixes for compliance and security issues discovered at that stage (Shergil, 2023).

**Spiral Model**

* **Complex Risk Management:** While the Spiral model has a strong emphasis on risk management, it requires considerable expertise to conduct comprehensive risk assessments, especially when dealing with complex regulations (Pal, n.d.).
* **Cost:** The iterative nature and constant revisiting of phases can make this methodology expensive, particularly if each spiral requires its own compliance and security assessment (Pal, n.d.).

**DevOps**

* **Continuous Deployment Risks:** The continuous integration and continuous deployment (CI/CD) inherent in DevOps can pose risks when stringent compliance checks are necessary before releasing any update (Gunja, 2023).
* **Expertise:** Effective DevOps practices require a team well-versed in both development and operations. Balancing this while maintaining rigorous compliance could be challenging (Gunja, 2023).

**RAD (Rapid Application Development)**

* **Overemphasis on Speed:** RAD focuses on quick iterations, which could compromise the thoroughness of compliance checks and security audits (Kissflow, 2023).
* **Scalability Issues:** While RAD may work for smaller projects, the lack of a structured framework makes it less ideal for large-scale, complex projects like an online pharmaceutical store that requires robust security and compliance mechanisms (Kissflow, 2023).

By critically evaluating these methodologies, it became clear that Agile Scrum offers the best framework for balancing flexibility, stakeholder engagement, and rigorous compliance checks, thereby ensuring the quality, security, and compliance of the developed online pharmaceutical store.

# Standards

## Summary of Standards Adherence for Agile Scrum in a Pharmaceutical Store

In an industry where compliance and security are paramount, the adoption of structured frameworks like CMMI alongside Agile Scrum methodology provides a balanced approach for the development of our Secure and Compliant Online Pharmaceutical Store.

Project Planning (CMMI Level 2), (Carnegie Mellon University, 2002a), serves as the cornerstone for aligning the development process with stakeholder requirements and legal regulations. The Agile Scrum framework allows for sprint planning and backlog grooming, which make it easy to adapt to changes in compliance and quality needs. Stakeholder commitments are secured at the end of each planning session, thus ensuring a constant focus on priority features and issues, especially those relating to compliance and quality assurance.

Technical Solutions (CMMI Level 3), (Carnegie Mellon University, 2002b), are crucial in our project as they pertain to the security and integrity of pharmaceutical transactions. Secure architecture design, data encryption, and API integrations are continuously revisited and enhanced throughout the development sprints to ensure alignment with current best practices, security protocols, and regulatory requirements.

Process Performance (CMMI Level 4), (Carnegie Mellon University, 2002c), focuses on quantifiable metrics such as data security levels, user engagement rates, and compliance adherence. These performance indicators are not just measured but also compared against established baselines to manage the project quantitatively. This process ensures that any anomalies in data security or compliance are quickly identified and rectified, thus allowing for continuous optimization of the project.

Through the integration of CMMI standards with Agile Scrum, we aim to build a robust, secure, and compliant online pharmaceutical store that not only meets but exceeds industry standards.

| **Key Area (CMMI Level)** | **Activities to Promote Quality** | **Description on Promoting Quality** |
| --- | --- | --- |
| Project Planning (CMMI Level 2) | Developing the project plan | This activity is crucial for initiating the Agile Scrum process. During sprint planning, we will outline the essential features, fixes, and compliance needs for the pharmaceutical store. This allows us to prioritize tasks for quality assurance effectively. |
|  | Interacting with stakeholders appropriately | Through scheduled Scrum ceremonies and ad-hoc communications, we will keep stakeholders informed and involved. This ensures that any shifts in requirements, whether compliance or customer needs, are swiftly integrated into the project. |
|  | Getting commitment to the plan | Stakeholder commitments are sought at the end of each sprint planning session. This reinforces a culture of accountability and keeps everyone focused on quality and compliance objectives. |
|  | Maintaining the plan | Throughout the sprint, the plan is continuously updated to reflect completed tasks, new requirements, or changes in prioritization, always focusing on compliance and quality. |
| Technical Solutions (CMMI Level 3) | Select Product-Component Solutions | In the context of Agile, we constantly revisit our technology stack and security features. We choose the most secure and compliant solutions for our pharmaceutical store during the grooming and planning sessions. |
|  | Develop the Design | Designs for the online pharmaceutical store are developed iteratively every sprint, with an eye towards meeting the latest security protocols and compliance standards. |
|  | Implement the Product Design | We implement the chosen designs into functional components of the online pharmaceutical store. Agile enables us to continuously refine and test these components for quality and compliance. |
| Process Performance (CMMI Level 4) | Establish Performance Baselines and Models | With Agile's empirical nature, we collect data every sprint to establish performance baselines. This data-driven approach allows us to set realistic performance targets and maintain the focus on quality and compliance. |

# Project Quality

**Milestones & Reviews Table**

| **Milestone** | **Description** | **Review Process** | **Governance Needed** | **Project Management Activities** |
| --- | --- | --- | --- | --- |
| 1. Project Initiation | Formal start of the project. | Review project scope and initial objectives. | Senior Management | Kick-off meeting |
| 2. Project Planning Completion | End of planning phase. | Review and approve project work scope. | Project Board | Plan validation |
| 3. Requirements Gathering End | Final list of project requirements. | Review all requirements and early design documents. | Lead Analyst & Stakeholders | Requirements sign-off |
| 4. Design Phase Completion | Design of the online pharmaceutical store is complete. | Ensure designs meet security protocols and compliance standards. | Design Team & QA | Design validation |
| 5. First Scrum Sprint End | First set of features completed. | Review progress against the project plan. | Scrum Master & Product Owner | Sprint retrospective |
| 6. Midway Checkpoint | 50% project completion. | Evaluate overall project progress, ensure alignment with goals. | Project Board & Stakeholders | Progress assessment |
| 7. Pre-Release Testing | Before official release, ensure product readiness. | Testing results reviewed, performance against baselines checked. | QA Team & Technical Lead | Final testing |
| 8. Product Launch | Release of the online pharmaceutical store. | Ensure all launch criteria are met and product is live. | Senior Management & Tech Team | Product release |
| 9. Post-Release Review | Review after product launch. | Gather feedback, understand areas of improvement. | All Project Members | Feedback session |
| 10. Project Close-out | Formal ending of the project. | Review all deliverables, lessons learned, and formalize project end. | Senior Management & Project Board | Close-out meeting |

Key Points:

* The milestones are strategically set to monitor and validate crucial aspects of the project.
* Reviews after each milestone ensure the project remains on track and meets set standards and objectives.
* Governance at various stages ensures checks and balances, with different stakeholders taking charge to ensure quality and compliance.

# Product Quality

Product testing is pivotal to ensure the security, compliance, and functionality of our online pharmaceutical store. Our comprehensive testing process is devised to rigorously evaluate every facet of the product, guaranteeing optimal user experience while adhering to industry standards.

**Phases of Testing Table**

| **Testing Phase** | **Goal** | **Roles Involved** | **Deliverables & Approvals** |
| --- | --- | --- | --- |
| **Unit** | Test individual components of the application for accuracy and efficiency. | Developers | Test results for each unit, approval by Technical Lead |
| **Integration** | Evaluate the interaction between different units/components. | QA Team & Developers | Integration test report, sign-off by QA Lead |
| **System** | Ensure the entire system functions as per design and requirements. | QA Team | System test results, approval by Product Owner |
| **Acceptance** | Confirm the product meets end-user requirements and expectations. | End-users, Stakeholders, QA Team | User feedback report, sign-off by Stakeholders |
| **Performance/Usability** | Check product's user-friendliness and its performance under varying loads. | Usability Experts, QA Team | Performance metrics report, usability feedback, approval by Product Owner |

Key Points:

* Each testing phase serves a distinct purpose, ensuring every aspect of the product is vetted.
* Collaboration between different roles during testing ensures a comprehensive evaluation from various perspectives.

• Deliverables and approvals at each stage validate that the product meets or exceeds set benchmarks before progressing to the next phase.

# Quality Checklist

This table encapsulates the key deliverables across each phase of the software development life cycle. It outlines the nature of each deliverable, a brief description, and the criteria against which its quality would be evaluated (Office of the Under Secretary of Defense for Research and Engineering, 2022). Users can reference this table to better understand the deliverable expectations at each phase and the associated quality standards.

| **Phase** | **Deliverable Name** | **Deliverable Description** | **Description of Quality** |
| --- | --- | --- | --- |
| Requirements | Requirements document | A document capturing all user requirements and expectations. | Comprehensive, clear, and aligns with user needs. |
| Design | System Architecture | Blueprint detailing software's overall structure & components. | Logical, scalable, and maintainable design. |
| Design | UI/UX Prototypes | Visual representations of user interfaces. | Intuitive, user-friendly, and matches requirements. |
| Development | Source Code | Actual code written to implement the software. | Well-commented, efficient, and adheres to coding standards. |
| Development | Database Schema | Structure of the database detailing tables, relationships, etc. | Optimized for performance and normalized. |
| Testing | Test Cases Document | Document containing all test scenarios and conditions. | Comprehensive, covering all possible use-cases. |
| Testing | Bug Reports | Reports detailing discovered defects. | Clear, reproducible steps, and categorized by severity. |
| Deployment | Deployment Guide | A guide detailing the deployment steps & prerequisites. | Clear, step-by-step instructions ensuring smooth deployment. |
| Support | User Manual | Document detailing software use, features, and troubleshooting. | Comprehensive, user-friendly, and easily understandable. |
| Support | Issue Log | A log where all user-reported issues are maintained. | Regularly updated, clear categorization of issues. |

# Maintenance and Support

The aftermath of a software release is as critical as its development. Ensuring robust maintenance and providing seamless support is imperative for user satisfaction and system longevity (Simplilearn, 2023, March).

* **Change Management:** Changes, whether they arise from defects or enhancement requests, will be funneled through a structured process(Simplilearn, 2023, March).
* **Diagram showing the flow:** 
  + Issue Identification → Classification (Defect/Enhancement) → Prioritization → Development/Rectification → Testing → Deployment

**Patches/Software Maintenance Release Schedule:**

| **Release Version** | **Cut-off Date for Changes** | **Release Date** |
| --- | --- | --- |
| 1.1 | October 15, 2023 | November 25, 2023 |
| 1.2 | December 15, 2023 | January 25, 2024 |
| 1.3 | February 15, 2024 | March 25, 2024 |
| 1.4 | April 15, 2024 | May 25, 2024 |

* **User Support Plan:**
  + Users are the heart of any software, and their seamless experience is paramount. To this end, users will have access to an extensive User Manual detailing all functionalities and common troubleshooting steps(Simplilearn, 2023, March). For issues beyond the manual, first-level support will be provided via an FAQ portal and chatbots. If more intricate help is needed, second-level support, involving human intervention, will be available via email, phone, or ticketing systems.

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