BUSINESS CASE	
Proposed Project	StockMaster
Date Produced	18th September 2024
Background	Floor Coverings International Regina is a medium-sized flooring franchise looking to dramatically increase the production volume within the next calendar year. The on-site warehouse inventory is currently not being tracked leading to mismates and reordered products. Furthermore, there is a gap in employment for the warehouse employees which results in sales employees spending time in the warehouse tracking their customer's inventory.
Business Need/ Opportunity	Project Needs ● Track warehouse stock, reduce mismatches, and improve efficiency. ● Address the warehouse employment gap to optimise employee roles and reduce reliance on sales staff for inventory tasks. ● Streamline operations to meet production goals and integrate inventory data with sales processes. ● Ensure the solution is scalable for future growth Project Opportunities ● Enhance customer satisfaction with accurate and timely inventory management. ● Gain a competitive edge and increase revenue through higher production capacity and minimise losses. ● Leverage inventory data for insights and optimise stock management. ● Market the StockMaster app to other businesses, creating a new revenue stream. ● Improve employee satisfaction through clearer roles and optimised workflows
Options	Option1: Scrum Agile Method with Mvc Option 2: Iterative Waterfall method with Mvc

Cost-Benefit Analysis

This analysis covers the cost and benefits of developing a warehouse inventory management system using the MVC (Model-View-Controller) framework and Agile methodology, over a three-month period. The project is being developed by a team of three students which means it would be a customised in-house development. The key factors considered include financial costs, time expenditure, risks, and potential benefits, with a comparison of the project management using Agile vs. a more traditional development method (Waterfall).

Option 1: Scrum Agile Method with MVC

Costs:

1. Financial Expenditures:
   - Software and Tools: Open-source tools such as MySQL, Git, and other free MVC frameworks (e.g., Django, Laravel) reduce financial costs.
   - Learning Resources: Some budget may be needed for courses, tutorials, and licences for development environments.
   - Estimation: $100-200 for supplementary learning resources.

2. Time Commitment:
   - Agile development requires frequent sprint meetings, iterations, and testing phases.
   - Time spent on requirement gathering and flexibility: Regular adjustments may lead to reworking components.
   - Estimated time: ~10 hours per week per team member for 12 weeks.

3. Risks:
   - Potential feature creep: With Agile, the flexibility to adjust requirements might lead to feature overload.
   - Time overruns: Iterations can sometimes cause delays due to constant refinement of features .

4. Reduced Quality Risk:
   Risk of incomplete or unpolished features if time is mismanaged.

Benefits:

1. Flexibility and Adaptation:
   - Agile allows for adapting requirements as the project evolves, meaning more relevant solutions can be developed.

- Continuous feedback ensures the system meets stakeholders' needs (e.g., university guidelines).

2. Increased Productivity:
   - Regular sprints and iterative releases keep the team motivated and on track.
   - Early detection of issues through constant testing prevents major bugs at the end of development.
3. Reduced Errors and Ongoing Costs:
   - Agile testing processes reduce errors, ensuring a more reliable end product.
   - Lower maintenance costs post-development since most bugs are identified and fixed during iterations.
4. Experience and Marketability:
   - Knowledge and hands-on experience in Agile methodology and MVC are highly sought after in the job market, increasing the team's employability.
   - The adaptable system design is scalable for future use cases, which could provide a competitive advantage if marketed.

Option 2: Iterative Waterfall Method with MVC

Costs:

1. Financial Expenditures:
   - Same as Agile: Minimal software costs using open-source tools, with some budget for learning resources.
   - Estimation: $100-200 for supplementary learning resources.
2. Time Commitment:
   - The Waterfall method requires defining the entire project at the start, which could be more time-intensive during the initial planning phase.
   - Any changes post-implementation would require substantial time to rework.
   - Estimated time: 8-10 hours per week per team member for the first half, increasing during development.
3. Risks:
   - Inflexibility: Once requirements are set, changing them later is difficult and costly.
   - Risk of misalignment with stakeholders' needs, as feedback is collected only at the end.
   - Large-scale errors might only be caught at the end, leading to expensive fixes.

4.Quality Risks:
   - Reduced quality of final product due to limited testing phases compared to Agile's constant testing.

Benefits:

1. Clear Structure and Control:

- The Waterfall method provides a straightforward path from start to finish, making it easy to track progress.
- Less ambiguity compared to Agile, as the entire project scope is defined upfront.

2. Lower Management Overhead:
   - Less frequent meetings and updates mean more uninterrupted development time.
   - Estimated time savings of ~10% in management overhead compared to Agile.
3. Reduced Time Overruns:
   - A clearly defined plan with set timelines reduces the chance of time overruns, provided the scope remains static.
4. Potential for a Simplified System:

The Waterfall method may lead to a simpler system due to the lack of iterative scope expansion, which could be beneficial if the project is not expected to evolve much post-launch.

Recommendation

The Scrum Agile Method with MVC is the preferred choice for this project. The ability to adapt to changing requirements, gather continuous feedback, and prioritise quality and testing through iterations outweighs the slight increase in management overhead and risk of feature creep. Agile's flexibility will allow the team to respond to challenges and feedback more effectively, leading to a higher-quality and more reliable warehouse inventory management system.

Cost-Benefit Summary:

Costs: Agile has slightly higher management overhead but offers substantial benefits in terms of flexibility, continuous feedback, and error reduction.

Benefits: Agile's ability to adapt ensures a more refined, usable product. The experience gained in Agile practices also increases team members' employability.

Design Constraints

Here are the following ways we would tackle each of the project constraints

Economic Factors:

- Using free and open-source tools where possible minimises development costs. Prioritising cost-effective APIs and hosting solutions ensures that the project stays within budget.

Regulatory Compliance (Security and Access):

- Data security is critical, particularly when dealing with inventory and financial data. Ensuring compliance with regulations such as GDPR or industry standards on **access control and encryption** is essential, Implementing two-factor authentication.

Reliability:

- The system must be reliable to ensure **continuous operation** in a warehouse setting. Downtime could lead to costly delays, so testing for **high availability** is a priority.

Sustainability and Environmental Factors:

- The system will be designed with **efficient coding practices** to minimise its environmental impact (e.g., lower energy consumption by using optimised algorithms).
- Use cloud services that offer **energy-efficient data centres** to reduce environmental footprints.

Ethics:

- The system should adhere to ethical standards, ensuring that **personal data** is protected and used responsibly.

Societal Impact:

- Implementing this system in warehouses could contribute to **job displacement** due to increased automation, although it could also improve workplace conditions by reducing manual errors and streamlining operations.