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Assignment 2

Practical and Professional

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Table of Contents

INTRODUCTION	2
TASK 1: PROJECT MANAGEMENT	3
Q1. PROJECT MANAGEMENT & PLANNING	3
1.1 <i>Project Scope and Proposed Solution</i>	3
1.2 <i>Technologies and Resources</i>	3
1.3 <i>Project Timeline, Schedule and Constraints</i>	4
1.4 <i>Gantt chart</i>	5
1.5 <i>Development Method</i>	5
Q2. PROJECT DESIGN	6
TASK 2: ENTERPRISE	9
2.1 <i>PEST Analysis</i>	9
2.2 <i>SWOT Analysis</i>	10
2.3 <i>Legal and Ethical Considerations</i>	11
2.4 <i>Proposed Start-up: Name, Logo and Business Type</i>	11
2.5 <i>Business Strategy</i>	13
2.6 <i>Funding the Start-up</i>	13
TASK3: PROJECT REFLECTION	14
3.1 <i>Developing New Skills</i>	15
3.2 <i>Contribution to Society</i>	15
3.3 <i>Risks, Challenges and Mitigation</i>	16
CONCLUSION	17
REFERENCE:	18
APPENDIX – SUPPORTING DESIGN MATERIAL	21

Introduction

Food waste is a serious issue that brings about substantial damages in the retail industry, along with environmental impacts and social problems worldwide. Excess carbon emissions, cost and waste are caused by the unintended consequences of problems with inventory control, forecasting or if there are needs in the population that are not met by food supplies [1]. AI has introduced new solutions to address this, such as predictive analytics, intelligent inventory management, and automated decision-making processes. The proposed **FoodNova AI** would be a smart food waste reduction platform for supermarkets, which would use AI to predict customer food orders, manage prices, monitor product expiration, alert customers, and also coordinate food donations, thereby helping the supermarket to minimise unnecessary food waste. The project management and planning steps are explained, in addition to the system design, enterprise plans, and reflective evaluation for supporting the feasibility of the proposed platform, which is an innovative and sustainable retail solution.

AI-Powered Smart Food Waste Reduction Platform: FoodNova AI

Task 1: Project Management

Q1. Project Management & Planning

1.1 Project Scope and Proposed Solution

The scope of the FoodNova AI project is to implement reductions in food waste in supermarkets through inventory optimisation and predictive decision-making with AI. AI features would range from demand forecasting and stock control to expiry-date tracking and dynamic pricing, customer notification, food matching for donation and leaderboard dashboards, to support supermarket management, employees and shoppers, and to collaborate with partner charities [2]. The project promises to leverage efficiency in operation and minimise excess food waste. It will not contain physical logistics, warehouse automation, payment processing and transportation management. Ultimately, the expected goal is to create a scalable digital system that can contribute sustainably with a limited food redistribution cost and operational expenses.

1.2 Technologies and Resources

The proposed platform will be designed according to appropriate software technology and development resources to support the further implementation process without the need for a complete integration process. Python will be used for AI model development, and for the backend functionality, Django will be used. MySQL will be used as the relational database management system, while AWS will provide the cloud infrastructure and scalable storage services required by the platform [3]. Machine learning and data analysis will be implemented using TensorFlow and Pandas, while real-time customer alerts will be sent via Firebase and notification APIs.

Table 1.1: Proposed Technologies and Resources

Category	Proposed Resources
Programming	Python
Backend Framework	Django
Database	MySQL
AI Framework	TensorFlow ,Pandas
Cloud Platform	AWS
Development Tools	Visual Studio Code, GitHub, Draw.io, Project Libre
Team Resources	Project Manager, AI Developer, UI Designer, Database Engineer
Infrastructure	Laptop, Internet, Cloud Hosting

(Source: Self – Created)

1.3 Project Timeline, Schedule and Constraints

The project will be carried out in 8 weeks with a fixed timeline from project Planning to completion. The development stages will be executed sequentially, in order, to improve coordination and to reduce project risks [4]. Effective delivery will be based on efficient standards of resource allocation, technical skills, and data readiness. Key constraints include limited time, software licensing costs, insufficient high-quality training data, limited access to suitable hardware, unreliable internet connectivity and restricted project resources. Early planning, careful use of resources, and continuous monitoring will be used to minimise these constraints throughout the project life cycle. The project could also encounter constraints like budget limitations, lack of technical skills or unforeseen issues related to software compatibility. The factors may influence the quality of the project, timelines, and the accuracy of AI predictions. So, there will be a need for contingency planning, resource prioritisation, data validation and regular progress reviews to ensure project continuity and delivery.

Table 1.2: Project Schedule

Week	Project Activity
Week 1	Requirement Analysis
Week 2	System Design
Week 3	AI Model Planning
Week 4	Database Design
Week 5	User Interface Design
Week 6	System Testing Plan
Week 7	Deployment Planning
Week 8	Documentation and Review

(Source: Self-Created)

1.4 Gantt chart

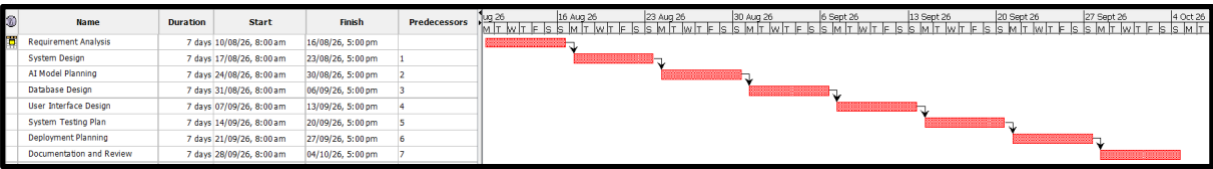


Figure 1.1: Project Timeline and Gantt Chart

(Source: Created Using ProjectLibre)

Project Libre is used to produce a Gantt chart and is included to illustrate the order and time of the project tasks [5]. The chart outlines an 8-week schedule of requirement analysis, system design, AI planning, database design, interface design, testing, deployment planning, documentation, and review.

1.5 Development Method

An Agile Software Development Life Cycle (SDLC) will be used for the proposed project because it requires incremental development, continuous testing, and frequent stakeholder feedback throughout the software development process [6]. Agile is a suitable methodology for AI-powered applications, which continuously need to be adapted to improve predictions and system performance. This will help ease the effort required to make further changes, if necessary, reduce risk and offer methods for further enhancements of FoodNova AI before its final deployment.

Q2. Project Design

These functional requirements define the core operations that FoodNova AI must perform, including secure access, inventory monitoring, AI forecasting, dynamic pricing, customer notifications and charity donation matching

Table 1.3: Functional Requirements

ID	Functional Requirement
FR1	Secure user authentication
FR2	Real-time inventory monitoring
FR3	AI demand forecasting
FR4	Expiry date identification
FR5	Dynamic pricing automation
FR6	Customer discount notifications
FR7	Charity donation matching
FR8	Sales and sustainability reporting

(Source: Sathyabama et al.(2024) [7])

These non-functional requirements define the quality standards needed for the platform, particularly security, availability, performance, scalability, usability and regulatory compliance.

Table 1.4: Non-Functional Requirements

ID	Non-Functional Requirement
NFR1	Secure authentication
NFR2	High system availability
NFR3	Fast response time
NFR4	System scalability
NFR5	Data security and privacy
NFR6	User-friendly interface
NFR7	Reliable system performance
NFR8	Regulatory compliance

(Source: Al-Ababneh et al. (2026) [8])

The flowchart of FoodNova AI consists of three operational phases such as inventory management, food distribution, and waste management. It offers practical applications of AI in decision-making, forecasting demand, price optimisation, inventory control, and food donation networks.

Link: <https://app.diagrams.net>

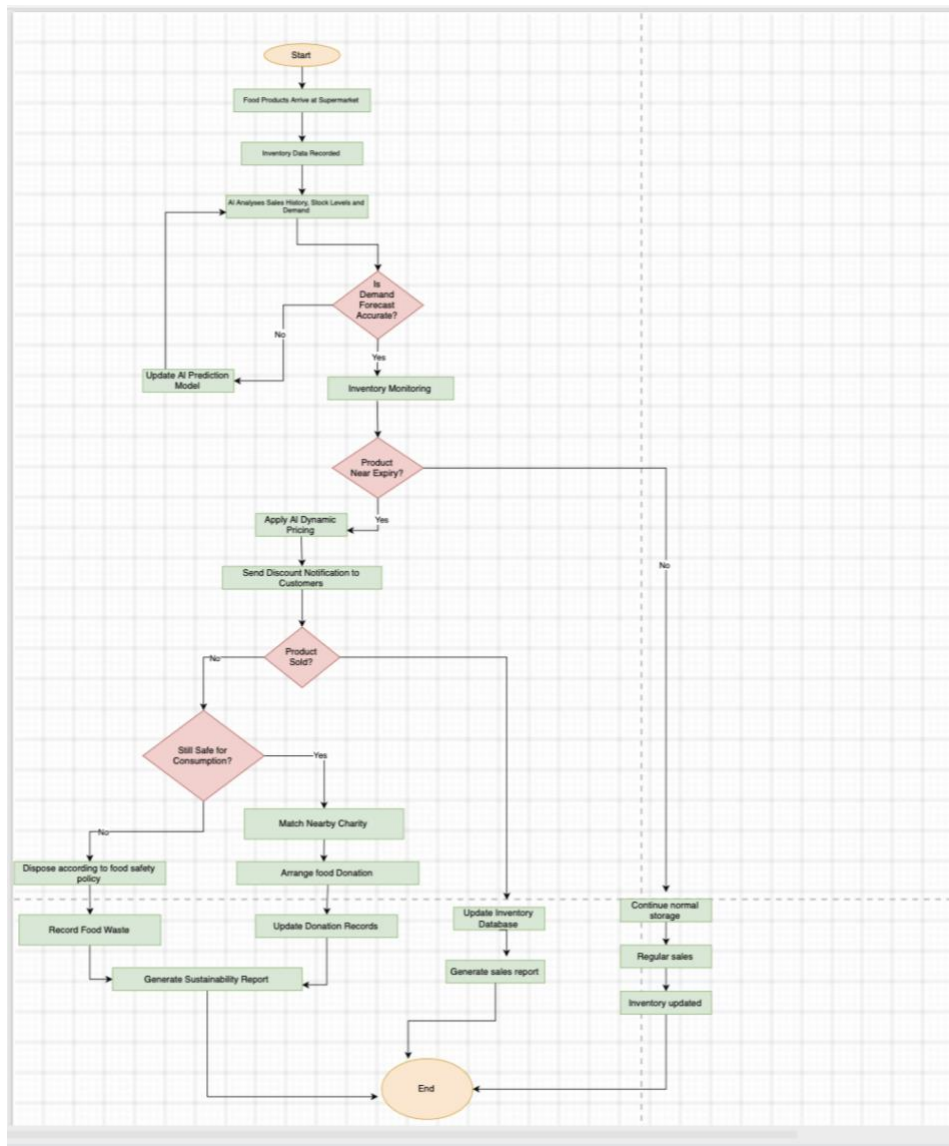


Figure 1.4: User Journey Flowchart of FoodNova AI

(Source: Created Using Draw.io)

Task 2: Enterprise

2.1 PEST Analysis

Winnow is chosen because it is an established provider of AI food waste solutions for commercial kitchens and hospitality providers that features sophisticated artificial intelligence technology [9]. PEST analysis identifies the external political, economic, social and technological factors influence the company's future direction and strategic decisions.

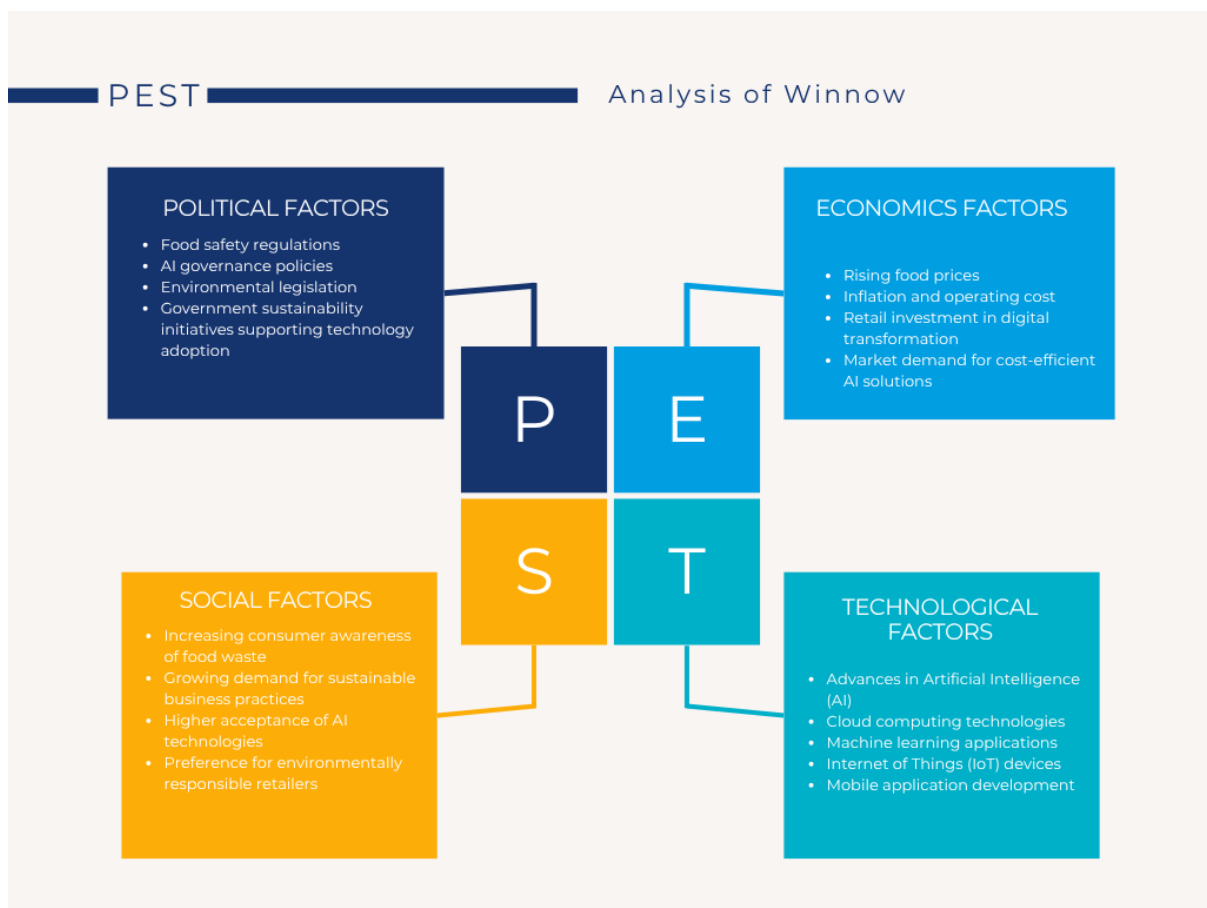


Figure 2.1: PEST Analysis of Winnow

(Source: Canva)

Link:

<https://www.canva.com/design/DAHRfxCmZQI/TAAXB9eretFZttYJHtLCug/edit?ui=eyJBIjp7fX0>

The key consideration is that the political and economic factors reinforce one another. Environmental legislation creates the requirement for kitchens to measure food waste, while inflation and rising food prices give them a financial reason to act on it. The technological factors are enablers rather than differentiators, as competitors have the same tools. The greatest uncertainty is AI governance policy, which may impose transparency obligations on how Winnow's vision system processes kitchen data

2.2 SWOT Analysis

The SWOT analysis evaluates Winnow's internal strengths and weaknesses alongside external opportunities and threats. Innovation and regulatory compliance are important strengths that support its sustainability in a rapidly evolving market [10].

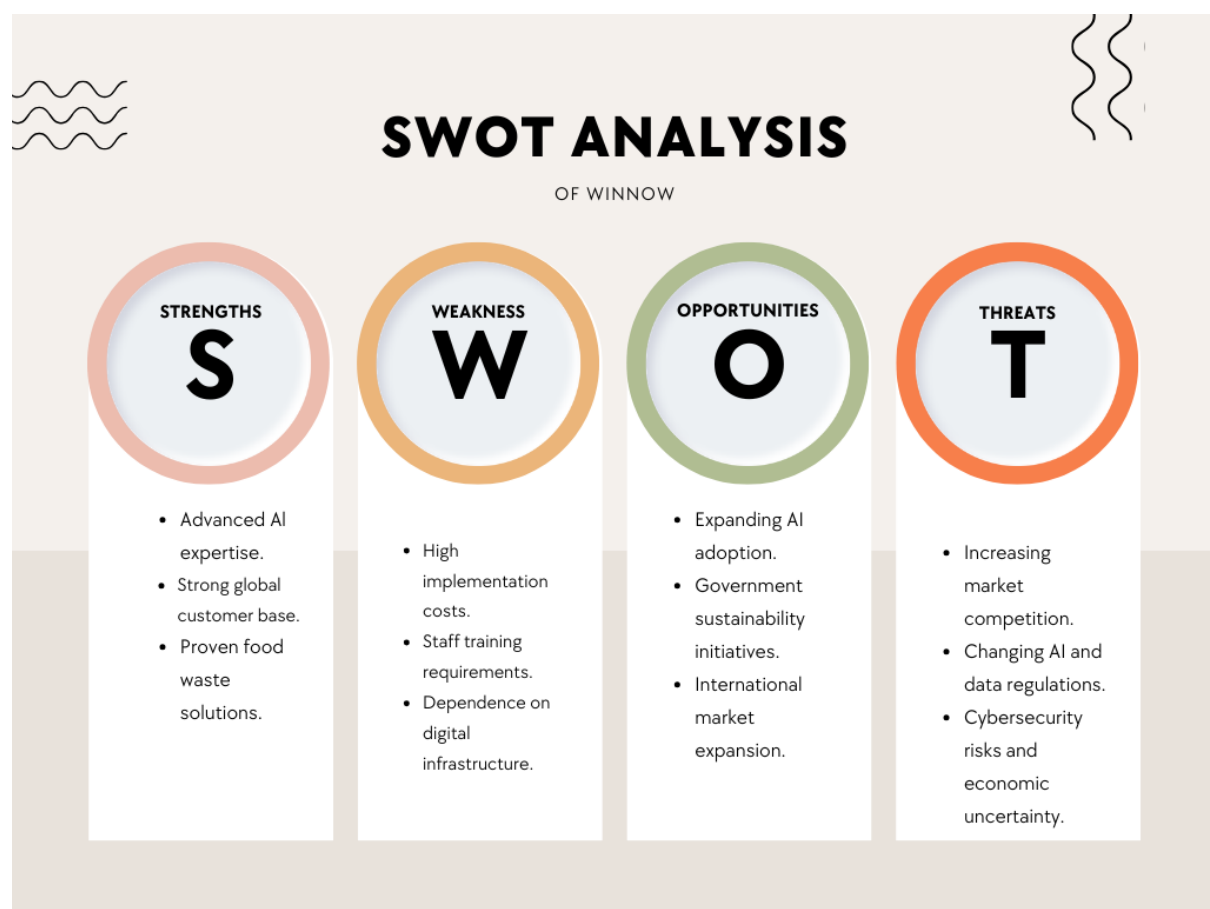


Figure 2.2: SWOT Analysis of Winnow

(Source: Canva)

Link: <https://www.canva.com/design/DAHRgA8-erU/C7l5Z21pBbsSnNCM8UDCyA/edit?ui=eyJBljp7fX0>

The key consideration is that Winnow's principal strength and weakness share one cause. The AI capability that differentiates the company also requires reliable digital infrastructure and trained staff, which raises adoption cost and slows expansion into smaller kitchens. The most serious threat is regulatory rather than competitive, as changing AI and data rules could force costly redesign. The clearest opportunity is to combine international expansion with government sustainability funding

2.3 Legal and Ethical Considerations

Winnow is a tech company producing AI solutions for food waste reduction and is clearly legally and ethically responsible for the application of technology. Customer and organisation data will be protected to the standards required by the GDPR and other data protection laws. AI should be implemented as transparently as possible by Winnow; it should be free of algorithmic bias, cyber-safety issues, protection of IP rights, and the observance of food safety rules [11]. All these components strengthen stakeholders' confidence, encourage responsible use of AI in food waste solutions and build trust in AI practices.

2.4 Proposed Start-up: Name, Logo and Business Type

The proposed start-up project is a Private Limited Company (LTD) named FoodNova AI. The legal form also provides limited liability cover, and it helps to communicate the nature of the business as a legal entity and generate further financial investment opportunities [12]. The designed logo shows what the purpose of the organisation is: food and artificial intelligence, but also sustainability, which is supported by technology, sustainability and a circular use of resources. The identity of the business organisation is conveyed through the name and the logo and the business type.



Figure 2.3: FoodNova AI Logo

(Source: AI- generated using ChatGPT)

ChatGPT Prompt for creating the logo Create a professional modern logo for FoodNova AI, an AI-powered smart food waste reduction platform.

Combine a green apple, leaves, circular sustainability arrows, and AI circuit/ network elements to represent food, sustainability, circular economy, and artificial intelligence. Use a clean green and navy-blue colour palette, with a modern corporate style. Include the text "FoodNova AI" and the tagline

"Smarter Food. Less Waste. Better Future." Keep the design clean, minimal, professional, and suitable for a sustainable technology start-up.

2.5 Business Strategy

FoodNova AI will operate on a Business-to-Business (B2B) basis with clients like food distribution firms, restaurants, retail outlets, and supermarket networks, focusing on the reduction of waste, optimisation of processes, and improvement of sustainability indicators. The platform will be monetised through software subscriptions, licenses for AI analytics solutions, implementation services, and maintenance documentation support [13]. Integrated AI demand forecasting, inventory optimisation, dynamic pricing, automatic customer notifications, and intelligent food donation matching are among the competitive benefits. There will be further reinforcement of customer relationships and enhanced competitiveness in the market due to ongoing product and customer evolution.

2.6 Funding the Start-up

The proposed business start-up will be funded by several means to help meet the business start-up and growth requirements. In the first phase, the sources of these are government grants, university enterprise programmes, angel investors, accelerator schemes and VC investment [14]. Business competitions and pitch events could provide opportunities to secure external funding, receive expert feedback and develop strategic partnerships. If the elevator pitch is well-defined and combines the parts of market opportunity, environmental benefit, and business viability, the investors will have confidence and will have reasons that justify further financial support.

Task3: Project Reflection

I have employed Gibbs' Reflective Cycle to structure my reflection for developing FoodNova AI project because it offers me a systematic framework to analyse an experience by description, feelings, evaluation, analysis, conclusion and action planning [15].

Description

In the FoodNova AI project, I have designed a proposed AI-based food waste reduction solution and identified its requirements, technologies, design, enterprise strategy, and implementation phases.

Feelings

Although I was initially unsure how to apply AI concepts within a supermarket context, completing this project increased my confidence in applying technology to a practical sustainability challenge.

Evaluation

The project has strengthened my understanding of AI applications, project planning and enterprise development; however, I have identified areas of technical knowledge that I still need to improve.

Analysis

I realised that I need to gain stronger skills in Python, machine learning, entrepreneurship, project management, communication, and understanding stakeholder and sustainability requirements.

Conclusion

I concluded that developing FoodNova AI requires more than technical expertise; it also requires effective planning, communication, leadership, business knowledge and responsible decision-making.

Action Plan

I will improve my Python and machine learning skills, gain project management experience and investor communication skills and expand my cybersecurity and AI implementation knowledge.

3.1 Developing New Skills

Through this project, I have developed both technical and professional skills that will better prepare me for a future career in artificial intelligence and software development. While planning the proposed FoodNova AI, I realise that I need to enhance my skills in programming in Python, machine learning, data analysis, and the domain of AI-driven decision-making. I will also strive to develop experience in project management techniques, application development technologies, and cloud technologies to create intelligent development environments [16]. The project also highlighted the importance of communication, leadership, presentation and problem-solving skills when managing projects, engaging with stakeholders and developing innovative business ideas. Furthermore, I think a business proposal and investor pitch writing capability will help me build my capability of taking a novel idea and making it viable and practical commercially.

3.2 Contribution to Society

The project has the potential to create significant social, environmental and economic benefits if it is successfully implemented. These potential applications of AI include predicting demand, managing inventory, and optimising food distribution networks to combat food waste and the carbon emissions associated with waste disposal [17]. I also recognise that the platform has tangible supermarket-charitable linkages and collaboration with charitable organisations, thereby increasing the amount of food shared with vulnerable communities. Personally, I see it as an opportunity to contribute to a concrete sustainability challenge using technology and improve respectful use of resources and the circular economy. I also feel that the project is relevant to the UN Sustainable Development Goals, including the goal of responsible consumption, the goal of reducing waste and the goal of sustainable business [18].

3.3 Risks, Challenges and Mitigation

I recognise that the future development of the proposed platform involves several potential risks and challenges. One of the most imminent obstacles is the lack of precise or adequate training data, which can also contribute to the issue of inaccuracy in AI demand forecasts [19]. In order to overcome this, I would analyse larger and better quality datasets and continue to refine the machine learning models. This platform will also have access to sensitive business data, which poses a significant threat of data privacy and cybersecurity breaches. I should work on building strong authentication, encryption or data protection mechanisms for these. Besides, I understand that some retailers might not be willing to accept the cost of implementation or organise the changes. I will suggest that users should learn how these are applied to their business, engage in pilot programs to showcase the significance of their business and seek support in funding through innovation funding or investors with low starting capital for their implementation.

Conclusion

The report describes the evolution of a proposed FoodNova AI Platform to be a novel solution to help mitigate food waste within the retail sector. The project management section presents project scope and required technologies, project development methodology, design parameters and project development timetable for successful project planning. The external business factors and capabilities of the organisation can also be analysed by using Winnow's PEST framework and SWOT analysis, which will help to gain effective insights into the business for building a competitive AI-driven solution. Moreover, the proposed start-up strategy involves potential business planning and opportunities for funding for future commercialisation. The reflective evaluation highlights lifelong skills development, social responsibility and hazard control, as crucial components of providing sustainable innovation. Overall, the report demonstrates that FoodNova AI has the potential to provide a practical and sustainable approach to reducing food waste through AI technology. However, its successful implementation will depend on reliable data, appropriate technical resources, stakeholder engagement, responsible AI practices and a viable business strategy.

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Appendix – Supporting Design Material

System Architecture Diagram of FoodNova AI

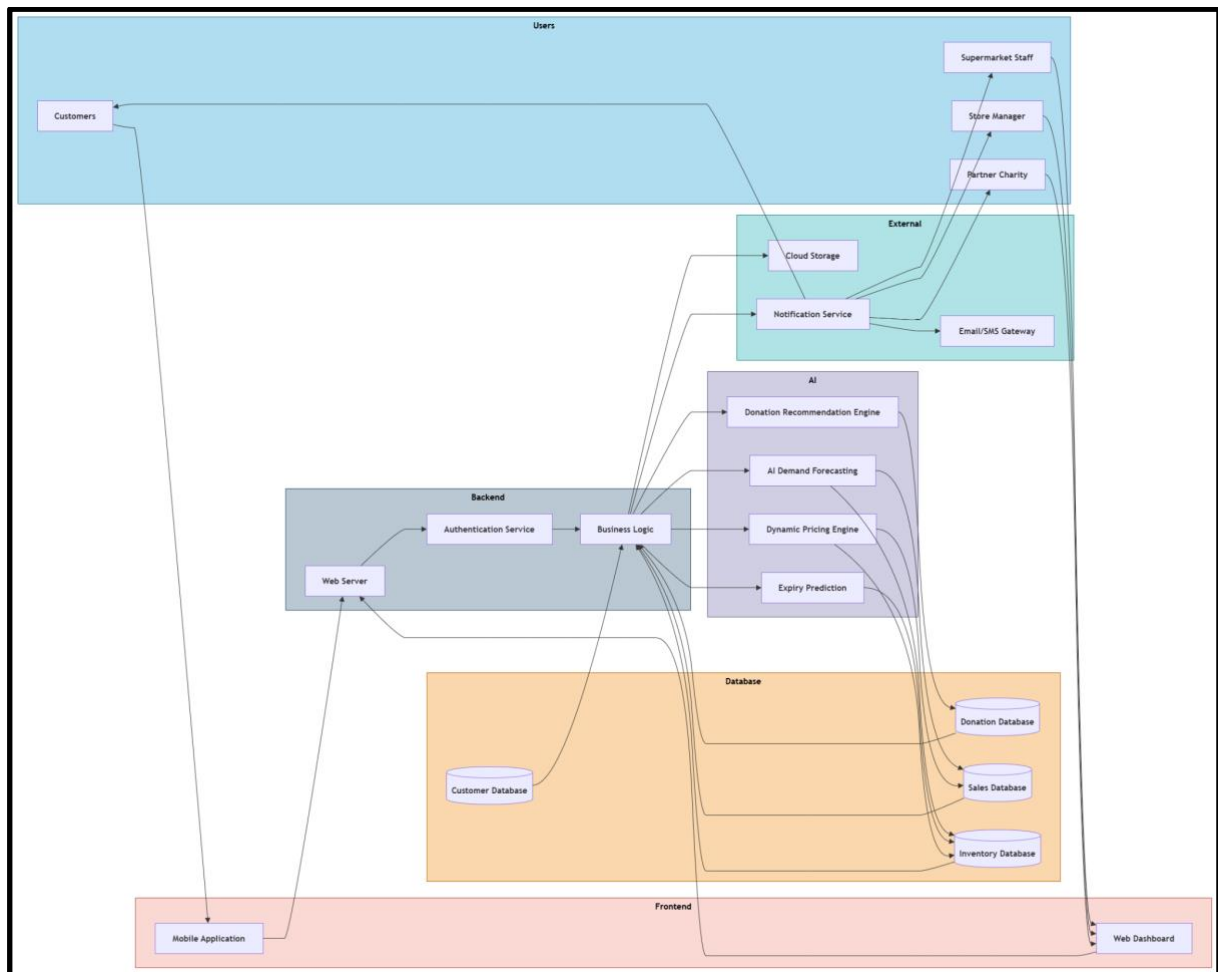


Figure 1: System Architecture Diagram of FoodNova AI

(Source: Created Using Draw.io)

