Master's Thesis proposal

(Fill in only the parts in light yellow)

Title / Topic	Smart Digital Platform for Efficient Fresh Product Distribution Using Cloud Computing, IoT, and Blockchain
Tutor (he/she must be professor of the Master program)	Ana Belén García Hernando and Miguel Ángel Valero Duboy
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Student (Only necessary if this is a joint proposal made by the student and the tutor/director)	Nuria Álvarez Río
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Location(s) (Where the work will be carried out)	UPM, Madrid

Master's Thesis description – 12 ECTS

Summarize the thesis.

Introduction

In today's market, access to fresh and sustainable products remains a challenge. Large supermarkets dominate the food supply chain, increasing costs for consumers while reducing profit margins for producers. Small retailers also struggle to compete due to the lack of digital tools that optimize their supply chain and expand their reach.

This project aims to develop a global digital platform that directly connects producers, supermarkets, and consumers, optimizing fresh product distribution. By integrating Cloud Computing, Edge Computing, IoT, and Blockchain, the platform will facilitate direct sales, improve logistics, and guarantee product traceability in an efficient and sustainable ecosystem.

Objectives

The main objective is to develop an efficient and scalable digital platform that enables:

- Direct connection between producers, supermarkets, and consumers, eliminating unnecessary intermediaries and optimizing costs.
- Logistics optimization through Edge Computing and IoT, reducing food waste by providing real-time stock monitoring.
- Traceability with Blockchain, ensuring transparency in product origin, certification, and quality.
- Cloud Computing for an accessible database.

Implementation and Technology

The platform will be built using a three-layer modular and scalable architecture:

1. Cloud-based Platform
   - Centralized storage for real-time inventory management and demand forecasting.
   - Secure transactions and authentication services.

2. IoT and Edge Computing
   - Smart sensors in warehouses and delivery vehicles to monitor freshness, temperature, and stock levels.
   - Edge processing for demand forecasting and automated stock replenishment.

3. Blockchain for Traceability
   - Each product will have a QR code linked to blockchain records, tracking its journey from farm to supermarket/consumer.
   - Transparent, immutable, and decentralized data to verify authenticity and certifications.

Expected Impact
The project aims to:
   - Reduce food waste by improving stock management and demand forecasting.
   - Increase efficiency in distribution, lowering costs for supermarkets and improving margins for producers.
   - Enhance consumer trust, providing transparent traceability and real-time product insights.

Conclusion
This Master's Thesis proposes an innovative and scalable solution to revolutionize the food supply chain by connecting producers, supermarkets, and consumers through advanced digital technologies. By eliminating inefficiencies and ensuring transparency, the platform will contribute to a more sustainable, cost-effective, and consumer-friendly food distribution system.