A logo for college computing

Description automatically generated

**Assessment Cover Page**

***Stimulating Ireland’s Innovation Ecosystem: Adapting to a New Geopolitical Era***

|  |  |
| --- | --- |
| *Student Full Name* | Adriana Soledad Yash Menjivar |
| *Student Number* | 2025141 |
| *Module Title* | Strategic Thinking |
| *Assessment Title* | Project Capstone 2 |
| *Assessment Due Date* | May 18, 2025 |
| *Date of Submission* | May 18, 2025 |

**Declaration**

By submitting this assessment, I confirm that I have read the CCT policy on academic misconduct and understand the implications of submitting work that is not my own or does not appropriately reference material taken from a third party or other source.

I declare it to be my own work and that all material from third parties has been appropriately referenced.

I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution.

Summary Table

[1. Introduction 1](#__RefHeading___Toc724_1685620820)

[2. Problem Definition: 1](#__RefHeading___Toc726_1685620820)

[3. Objectives 1](#__RefHeading___Toc1648_1685620820)

[3.1.General Objective: 1](#__RefHeading___Toc1652_1685620820)

[3.2.1.Objective: 1](#__RefHeading___Toc1654_1685620820)

[3.2.2.Objective: 1](#__RefHeading___Toc1656_1685620820)

[4. Literature Review 2](#__RefHeading___Toc730_1685620820)

[5. Scope Methodology 2](#__RefHeading___Toc1650_1685620820)

[5.1.Out of Scope:  3](#__RefHeading___Toc736_1685620820)

[6.Data Sources: 3](#__RefHeading___Toc1143_1685620820)

[7.Ethical Considerations 3](#__RefHeading___Toc742_1685620820)

[8.References 4](#__RefHeading___Toc732_1685620820)

# 1. Introduction

In an era defined by rapid geopolitical and economic transformations, Ireland faces critical challenges and opportunities in maintaining its position as a global innovation leader. The evolving international landscape-marked by shifting trade relations, technological advancements, and changing economic alliances-demands that Ireland adapt its innovation ecosystem to remain resilient and competitive. This study embraces these challenges as catalysts for creativity and growth, focusing on nurturing knowledge-driven startups, research institutions, and emerging technologies. Guided by the CRISP-DM framework over two semesters, the research aims to explore data-driven strategies that will empower Ireland’s innovation environment to thrive amid uncertainty and change.

# **2. Problem Definition:**

Ireland’s innovation economy confronts increasing pressures from global geopolitical volatility. The aftermath of Brexit, rising economic nationalism, and disruptions to supply chains and regulatory frameworks threaten the foundational elements that have supported Ireland’s competitive advantage. Heavy dependence on foreign direct investment, international research partnerships, and a global talent pool is now challenged by uncertain political and economic conditions. Without effective adaptation, these forces risk causing stagnation in key sectors, reduced startup dynamism, and diminished global economic standing. This study seeks to address the critical question: how can Ireland navigate this complex geopolitical landscape to protect and advance its innovation-driven future?

# 3. Objectives

## **3.1.General Objective:**

To comprehensively understand and enhance Ireland’s innovation ecosystem by applying data-driven methods that integrate multiple relevant datasets. This project involves conducting a thorough investigation of available datasets as a representative statistical sample, leveraging advanced data processing, statistical analysis, and machine learning techniques in Python and Jupyter Notebook to generate actionable insights that inform policy interventions and support the sustainable growth of knowledge-based startups.

## **3.2.1.Objective:**

To utilize Python tools and libraries effectively for data cleaning, integration, visualization, and modeling, ensuring a robust and reproducible analytical workflow that supports the exploration of innovation-related datasets.

## **3.2.2.Objective:**

To analyze technological adoption patterns, enterprise engagement, research and development investment, and intellectual property activities, focusing on patent counts and ownership nationalities, to identify external factors that stimulate Ireland’s innovation ecosystem and the flow of investment.

**3.2.3.Objective:**

**To position this integrated data analysis as one of multiple key indicators of innovation performance, recognizing its role within a broader framework of innovation metrics for comprehensive ecosystem assessment.**

# 4. Literature Review

Government policies, investments in education, and Ireland's strategic EU positioning have shaped its innovation ecosystem (European Commission, 2023). However, challenges like Brexit and the need for industrial diversification present both risks and opportunities. Brexit has disrupted trade and innovation with the UK, highlighting the need for market diversification (The Guardian, 2025). Ireland’s EU membership remains crucial for research collaboration. Emerging technologies, such as blockchain, offer growth potential, as seen in Ripple’s partnership with Trinity College Dublin, though challenges like scalability remain (Neuron Expert, 2025; TecnoHispano, 2025). Strengthening ties with partners like the United States and promoting local entrepreneurship are key to building a resilient economy (Taoiseach, 2021; Irish Government, 2021; Eurofound, 2021).

# 5. Scope Methodology

**Milestone based in the CRISP-DM[[1]](#footnote-2)**

|  |  |  |  |
| --- | --- | --- | --- |
| ****Phase**** | ****Description**** | ****Time**** | ****Tools & Actions**** |
| **Phase 1: Business Understanding** | Define objectives, and key questions. Conduct a literature review (qualitative). | 1st month | Secondary data (European Commission, Eurofound, Irish Government), Literature review. |
| **Phase 2: Data Understanding** | Collect and understand datasets (quantitative). Analyze economic indicators (trade, employment). | 2nd month | Python (Pandas), Excel for data exploration. |
| **Phase 3: Data Preparation** | Clean data, handle missing values, outliers (quantitative). | 3nd month | Python (Pandas), Jupyter Notebook for preprocessing. |
| **Phase 4: Modeling** | Apply machine learning models (regression, classification, unsupervised learning). | 5rd month | Python (Scikit-learn, TensorFlow), Jupyter Notebook. |
| **Phase 5: Evaluation** | Evaluate models (accuracy, precision, recall). Refine models. (quantitative). | 7rd month | Python (Scikit-learn), metrics libraries. |
| **Phase 6: Deployment** | Provide actionable insights and recommendations. Summarize findings (quantitative). | 9rd month | Python (Matplotlib, Seaborn), Jupyter Notebook, Git, GitHub. |

## 5.1.Out of Scope:

We won’t be going out into the field to do **primary data collection,** that means no surveys, interviews, or any form of hands on data. Our focus will be entirely on using **existing, publicly available datasets**. Also, we won’t be doing any **data identification** or creating new datasets.

# 6.**Data Sources:**

Data will be sourced from **Eurostat, OECD, WIPO, ECB, EEA, and the UN SDG Database**, covering economic, innovation, patent, financial, and environmental indicators. Historical data from the past 5 years will be analysed using **Python (Pandas, NumPy) in Jupyter Notebook**, with **GitHub for version control**. All datasets are **open-access**, requiring no special permissions. These sources will provide a comprehensive foundation for assessing Ireland’s innovation ecosystem within the European and global context.

# 7.Ethical Considerations

As we move forward with the project, ethical considerations are key to ensuring the integrity. Here’s how we’ll address them:

* **Avoiding Bias & Misrepresentation**: Committed to using validation techniques to ensure that our analysis is free from biases.
* **Compliance with GDPR & EU Regulations**: The project will comply with all necessary regulations, especially the General Data Protection Regulation (GDPR).
* **Data Privacy & Anonymity**: All datasets used will be publicly available and anonymized.
* **No Harm Principle**: The goal is to create recommendations that benefit all stakeholders, ensuring that the insights and strategies do not cause harm to businesses or communities.
* **Transparency & Objectivity**: Ensure full transparency in the methods and data used, providing a clear rationale for each decision made throughout the process

# Data understanding

# Data preparation

# Machine learning implementation

# Findings

# Conclusions

# Any future recommendations

# 8.References

* European Commission, 2023. Digital Economy and Society Index (DESI) 2023: Ireland. [online] Available at: <https://ec.europa.eu/digital-strategy/our-policies/desi> [Accessed 22 March 2025].
* Eurofound, 2021. Impact of Brexit on Ireland: Employment, Migration and Economy. [online] Available at: <https://www.eurofound.europa.eu/impact-brexit> [Accessed 25 March 2025].
* Irish Government, 2021. Ireland’s National Digital Strategy 2021. [online] Available at: <https://www.gov.ie/en/publication/ireland-national-digital-strategy> [Accessed 27 March 2025].
* Neuron Expert, 2025. Blockchain Innovations in Ireland: Ripple and Trinity College Dublin Collaboration. [online] Available at: <https://www.neuronexpert.com/blockchain-ireland> [Accessed 21 March 2025].
* Taoiseach, 2021. Building the Future: Ireland’s Innovation and Economic Resilience. [online] Available at: <https://www.taoiseach.gov.ie/building-ireland-future-innovation-resilience> [Accessed 29 March 2025].
* The Guardian, 2025. Impact of Brexit on Ireland’s Economy. [online] Available at: <https://www.theguardian.com/business/brexit-impact> [Accessed 26 March 2025].
* **ChatGPT, 2025.** Assistance in brainstorming and refining ideas for research. [AI-generated response]. OpenAI, 28 March 2025. Available at: [https://chat.openai.com](https://chat.openai.com/) [Accessed 28 March 2025].

1. CRISP-DM provides a structured framework for data analysis (Shearer, 2000). [↑](#footnote-ref-2)