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**Assessment Cover Page**

***AI in the International Political Economy****: a machine learning approach to FDI risk analysis using decision tress and K-means clustering*

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| *Assessment Title* | Capstone Project Proposal |
| *Assessment Due Date* | 27/10/24 |
| *Date of Submission* | 27/10/24 |

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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.

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# Introduction

Foreign Direct Investment, or FDI, has become an integral part of the global economy. For countries such as Ireland, FDI can make up a significant part of a nation’s total GDP, and often substantial investment in a country can lead to accelerated economic growth, and increased returns for companies looking to expand their operations (World Bank, 2024).

However, investing in a countries’ economy can pose a significant risk to foreign multinationals, especially if companies fail to consider the overall stability of a countries’ economy and political institutions. While investing in a supposedly stable country, such as a member of the EU, would generally be considered a safe bet, failing to account for economic and political trends could result in serious negative consequences for the company and its investment (Kobrin, 1979).

The recent surge in AI research and use of data analytics could provide a possible solution to the substantial risks involved in Foreign Direct Investment (Burkov, 2019). Using common machine learning techniques such as decision trees and K-means testing (Liu, 2020), I intend to show how data analysis could be used to create a risk-assessment model for Foreign Direct Investment, by using data on the economic and political stability of a given country to rank them based on investment risk. My hope is that this project will provide a clear proof of concept for how data analysis tools can be used to practically assess the current and possible future economic and political stability of any given nation.

# Objectives

1. Gather and compile relevant and trustworthy sources of data on the economic and political stability of nations that can be used to train the risk assessment model
2. Identify key risk indicators such as GDP, inflation rate, government decision making and cohesion, and frequency of regime changes to refine the key metrics of the risk assessment model
3. Develop a ranking system that can be used to score countries from high risk to low risk based on data gathered regarding economic and political stability
4. Clearly present the results of the model in a concise and easy to understand manner
5. Examine how the model can be used to help make practical decisions on where companies should focus their efforts on foreign direct investment

# Problem Definition

While AI research and development continues to develop at an increasingly rapid pace, it appears at times as though geopolitical stability is moving equally fast in the opposite direction (Council on Foreign relations, 2024). In addition to the very serious ethical and humanitarian issues that increased geopolitical volatility creates for nations, rising tensions and instability also naturally have a significant effect on the global economy, and by extension can have serious repercussions for international businesses (Ghemawat, 2007). Bad investment decisions in countries previously thought of as safe bets could have negative consequences not just for the companies themselves, but also for the international markets in which they operate.

History has proven that suffering economies only exasperate tensions between nations, as well as key problems within the nations themselves (Acemoglu and Robinson, 2012). Because of this, it is especially important at volatile times like these for companies to act on data driven insights, and this project aims to provide relevant analysis that could potentially be used to help improve the decision-making process when it comes to Foreign Direct Investment.

# Scope

This project will be completed over two semesters. I will be using data gathered from reputable sources on economic and political trends seen in a range of countries to build a risk assessment model that analyses the overall stability of a given countries’ economy and political institutions. For the purposes of this project, stability can be defined as overall consistency in key areas such as GDP, inflation, employment levels, frequency of regime changes, and levels of corruption in institutions (World Bank, 2024; Transparency International, 2024). Countries will be deemed as low risk if the data collected shows evidence of positive trends in key indicator areas, and high risk if the opposite is the case.

This project is not intended to provide real time data on these indicators, as that would be outside the capabilities of the data analysis techniques I will be using (Müller and Guido, 2016). Additionally, this project is not intended to provide an intricate analysis of any given countries’ economic and political wellbeing, or an in-depth analysis of any specific industry that would have an interest in investing in these countries.

I will build the risk assessment model using two common machine learning techniques: Decision Trees and K-means Testing. I will use decision trees as a classification tool to identify countries as either high risk or low risk investments. Once these data points have been properly classified, I will then make use of K-means clustering to divide these countries into similar groups based on their classification (Liu, 2020; Burkov, 2019).

While I also considered making use of Natural Language Processing (NLP) sentiment analysis to gather and analyse data on public sentiment towards economic and political institutions (Liu, 2020), for the purposes of this project I will only be using the two previously mentioned machine learning techniques, to prevent overcomplicating the results. However, it would be possible to expand a risk model such as the one I intend to create by including an analysis of data gathered on public sentiment in a future project.

# Project Timeline

1. Data collection and treating: **3-4 weeks**
2. Building the risk assessment model: **4-5 weeks**
3. Testing the model and examining results: **3-4 weeks**
4. Finalizing the project and displaying results: **4-5 weeks**

# Data Sources

**Data on Economic Stability:**

* International Monetary Fund (IMF) <https://www.imf.org/>
* World Bank <https://data.worldbank.org/>
* Organisation for Economic Co-operation and Development (OECD) <https://stats.oecd.org>
* United Nations Conference on Trade and Development (UNCTAD) <https://unctad.org/>

**Data on Political Stability:**

* The Economic Intelligence Unit (EIU) <https://www.eiu.com/>
* Freedom House <https://freedomhouse.org/>
* Global Conflict Tracker <https://www.cfr.org/global-conflict-tracker>
* World Governance Indicators (WGI) <https://info.worldbank.org/governance/wgi>
* Transparency International <https://www.transparency.org/en/cpi>

# Ethical Considerations

All data I intend to use for this project is publicly available and therefore there should be no issues regarding privacy or misuse of data. Despite this, a significant aspect of the project that must be considered is how the results of a risk assessment model like this could be used in decision making processes, and how those decisions could affect companies and countries alike (O'Neil, 2016). Companies looking for an edge in the global market might make use of models like this to gain a competitive advantage over competitors, and the possible negative effects of their investment decisions might not be a primary concern. It is important to acknowledge that businesses and governments alike should always use models like these carefully and responsibly, to avoid any unforeseen negative consequences that could affect the global economy or geopolitical stability.

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**Github Link:** https://github.com/CCT-Dublin/ca1-capstone-project-proposal-EoinFitz24