GLOBAL ECONOMY, SOCIAL MOVEMENTS, AND INNOVATION: ANALYSES FROM TURKEY AND NORTH AFRICA PERSPECTIVES

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Prof. Dr. Burcu GÜVENEK

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PREFACE

In an increasingly interconnected world, the dynamics of the global economy, social movements, and innovation are deeply intertwined, influencing both local and international landscapes. This book aims to explore these themes through the lens of Turkey and North Africa, two regions with rich historical, cultural, and economic significance. By analyzing these interconnected areas, the chapters collectively offer fresh perspectives on contemporary issues that shape global markets, social change, and investment trends.

The chapters included in this book cover a wide range of subjects. From financial vulnerability and derivatives markets to the effects of innovation on domestic and foreign investment, the contributors dive deep into the mechanisms that drive economic growth and development. The discussion of social movements presents a unique exploration of the forces that drive societal change, shedding light on the evolving role of activism in shaping public policy and cultural identities. Additionally, the analysis of urbanization models and responsibility accounting opens new avenues for understanding sustainable practices in the modern world.

One of the book's distinctive features is its focus on Turkey and North Africa. These regions, each with its own set of challenges and opportunities, provide a fertile ground for examining how global trends manifest at the local level. By drawing on case studies and empirical research, the contributors highlight how innovation and investment in these areas are critical to shaping their futures within the broader global context.

In bringing together a diverse range of topics and perspectives, this book not only enhances our understanding of the complex interactions between the global economy, social movements, and innovation but also provides valuable insights for policymakers, researchers, and practitioners alike. We hope that readers will find inspiration in these analyses and continue to explore the ever-evolving relationships between economies, societies, and the forces of change.

As you journey through these chapters, we invite you to reflect on the implications of these interconnected themes for the present and the future, both in Turkey and North Africa, and beyond.

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CHAPTER 1

CONSUMER FINANCIAL VULNERABILITY CONCEPTUAL FRAMEWORK

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1. INTRODUCTION

The COVID-19 pandemic, coupled with rising living costs and inflation, has profoundly impacted consumers' financial stability worldwide. According to the International Labour Organization (ILO), global unemployment surged to 220 million in 2021, representing a significant increase compared to pre-pandemic levels (ILO, 2022). Concurrently, inflation rates have reached historic highs; for instance, the United States experienced inflation at 9.1% in 2022, marking the steepest rise in over four decades (Bureau of Labor Statistics, 2022). Similarly, energy and food prices across Europe rose by approximately 30% during the same period, further straining household budgets (Eurostat, 2022).

In Turkey, the economic challenges have been even more pronounced, exacerbated by persistently high inflation and currency devaluation. According to the Turkish Statistical Institute (TÜİK), the annual inflation rate stood at 64.77% in 2023, reflecting the ongoing pressures on the cost of living (TÜİK, 2023). The prices of essential goods, particularly food and energy, have surged, disproportionately impacting lower and middle-income households (World Bank, 2023). Youth unemployment remains a critical issue, with the unemployment rate among individuals aged 15–24 recorded at 17.4% in 2023, highlighting the precarious financial situation faced by younger generations (TÜİK, 2023).

These economic pressures have rendered Turkish consumers particularly vulnerable. While the inflation rate has shown some moderation compared to its peak in late 2022, the ongoing erosion of purchasing power continues to affect households. Recent reports suggest that nearly 50% of Turkish households struggle to meet basic living expenses, a figure significantly higher than the global average (Ipsos, 2023). These challenges, coupled with declining consumer confidence and rising debt levels, underscore the heightened financial fragility of consumers across all socioeconomic groups (Şahin, 2023; Yazdanparast & Alhenawi, 2022).

This study re-evaluates the concept of financial vulnerability, offering a comprehensive framework that captures its multidimensional and dynamic nature. Traditional approaches to financial fragility often associate vulnerability exclusively with low-income individuals. However, recent data highlight that financial fragility has become a widespread phenomenon. For instance, a 2022 McKinsey report indicates that nearly 40% of middle-income

households in developed countries struggle to cover essential expenses, while over 60% report being unable to manage unexpected financial shocks of $1,000 or more. Such findings underscore the need to redefine financial vulnerability as a broader issue affecting individuals across various socioeconomic groups and life stages.

Consumer vulnerability, as documented in prior research, manifests in distinct contexts, including housing crises, natural disasters, and economic recessions (Andreasen, 1975; Baker et al., 2007). For example, the global financial crisis of 2007–2008 resulted in 8.8 million job losses in the United States alone, with over 10 million households experiencing foreclosure. Similarly, during the Covid-19 pandemic, food bank demand in the UK increased by 110% between 2019 and 2021, reflecting the pandemic's strain on household finances. While low income is a major driver of financial fragility, factors such as cognitive decline in aging populations, unexpected health emergencies, and inflationary pressures are equally critical contributors to vulnerability (Moschis, 1994; Himmelstein et al., 2019).

A crucial distinction exists between financial vulnerability and financial harm. Financial vulnerability refers to the risk of future financial difficulties, whereas harm describes the immediate financial loss or hardship experienced by individuals (Rapp and Hill, 2018; Şahin et al., 2017). For example, the World Bank reports that 60% of temporary or gig economy workers face significant vulnerability due to irregular incomes, even if they do not experience immediate harm. This distinction underscores the importance of addressing vulnerabilities before they escalate into more severe consequences.

The economic disruptions caused by global crises have tested consumers' financial resilience, compelling many to make radical decisions to adapt. Rising energy costs alone have pushed millions into fuel poverty; in 2022, over 15% of households in the European Union reported spending over 25% of their disposable income on energy bills. These statistics highlight the growing importance of fostering financial resilience to mitigate the adverse effects of unexpected challenges.

This study aims to provide a nuanced understanding of consumer financial fragility through a multidimensional and dynamic framework. By exploring service-oriented strategies to enhance financial resilience and reduce vulnerabilities, the proposed framework offers significant insights for

policymakers, organizations, and researchers. These strategies hold potential not only to alleviate short-term financial challenges but also to foster long-term consumer well-being.

2. CONCEPTUAL FRAMEWORK

2.1. Conceptual Framework and Evolution of Consumer Financial Vulnerability

Consumer financial vulnerability has gained increased attention in the marketing literature, reflecting the growing recognition of its multifaceted and dynamic nature (Basu et al., 2023; Hill and Sharma, 2020; Riedel et al., 2022; Salisbury et al., 2023). While earlier studies primarily addressed static aspects of vulnerability, recent research has focused on its evolving characteristics. For example, Hill and Sharma (2020) emphasized that consumers' access to resources and coping mechanisms can change over time, underscoring the fluid nature of vulnerability. Similarly, Salisbury et al. (2023) demonstrated that access to financial resources has both immediate and delayed effects, highlighting the interplay between short-term shocks and long-term stability.

This study builds on this dynamic perspective by conceptualizing consumer financial vulnerability as an evolving process influenced by external circumstances, life events, and individual preferences. It explores how vulnerability fluctuates across time and contexts, reflecting diverse trajectories based on resource availability and external shocks. Blocker et al. (2023) provides further insights by investigating how states of shock and recovery shape resource bundles over time, arguing that vulnerability is best understood as a journey of resource accumulation, depletion, and adaptation.

Additionally, as in other domains of consumer behavior research—where perceived and actual knowledge are distinguished (Alba and Hutchinson, 1987, 2000)—financial vulnerability must also be analyzed from subjective and objective perspectives. Objective financial vulnerability refers to tangible constraints such as an inability to meet financial obligations, whereas subjective vulnerability pertains to individuals' perceptions of their financial circumstances. These dimensions often interact, as subjective perceptions can amplify or mitigate the effects of objective financial limitations. For example, research has shown that subjective beliefs about financial security significantly influence decision-making, even when objective conditions remain constant (Fox and Tversky, 1995; Şahin et al., 2013).

2.2. Expanding the Dimensions of Consumer Vulnerability

Traditional definitions of consumer vulnerability often focused on low-income populations or marginalized groups (Baker et al., 2005; Shultz and Holbrook, 2009). However, vulnerability extends far beyond these boundaries, encompassing individuals from various socioeconomic backgrounds and life stages. Salisbury et al. (2023) expand this understanding by framing consumer vulnerability as a dynamic process shaped by changing conditions and situations. This dynamic framework enables a more nuanced analysis of vulnerability, accounting for its multidimensional and context-specific nature.

In this study, consumer vulnerability is explored through two dimensions: breadth and depth.

- Breadth refers to the range of factors contributing to vulnerability, such as income, age, disability, language proficiency, and financial literacy. For instance, older adults may experience vulnerability due to cognitive decline, while younger consumers might face challenges related to employment instability or student debt.

- Depth measures the intensity of vulnerability within each factor. For example, two individuals may both experience financial instability, but the severity of their situations may differ significantly based on the extent of their financial obligations and available coping mechanisms.

2.3. The Life Course Perspective and Vulnerability Dynamics

The life course perspective offers a valuable framework for understanding the temporal and contextual dimensions of vulnerability (Ferraro and Schafer, 2017; Hanappi et al., 2014). This approach emphasizes that vulnerability processes unfold across different stages of life and are influenced by specific historical, social, and economic contexts. Spini et al. (2017) describe three critical dimensions for analyzing vulnerability:

1. When: Vulnerability can emerge at specific life stages or during particular historical periods (e.g., economic recessions, health crises).

2. Where: It can vary across social groups, institutional environments, or geographic regions.

3. For whom: Vulnerability may be experienced differently based on individual characteristics such as gender, ethnicity, or social class.

Life Course Theory (LCT) further enriches this perspective by highlighting the dynamic interplay between risks and resources. According to LCT, vulnerability is shaped by three core principles:

1. The Spread of Stress and Resource Mobilization: Vulnerability spans multiple life domains, requiring consumers to mobilize diverse resources to cope effectively.

2. Multi-layered Structure: Vulnerability operates at individual, group, and societal levels, creating interconnected challenges that require comprehensive solutions.

3. Dynamic Process: Vulnerability evolves over time, reflecting shifts in exposure to risks and fluctuations in resource availability.

2.4. Consumer Vulnerability Pathways: Transitioning States of Vulnerability

Building on these insights, this study introduces the concept of "consumer vulnerability pathways," which examines how individuals transition between different vulnerability states. These pathways include:

- **Transition into Vulnerability:** Events such as job loss, health crises, or sudden economic downturns can push consumers from a stable state into a vulnerable one. For instance, the COVID-19 pandemic exacerbated financial vulnerabilities by increasing unemployment rates and disrupting income streams (Yazdanparast and Alhenawi, 2022).

- **Transition out of Vulnerability:** Conversely, effective coping strategies, institutional support, or the development of financial literacy can help consumers regain stability and reduce their dependence on external resources.

2.5. Practical Implications and Strategic Responses

Recognizing the multidimensional nature of consumer vulnerability provides critical insights for both policymakers and businesses. Organizations can leverage this framework to design proactive strategies aimed at enhancing consumer resilience. For example:

1. Financial Literacy Programs: Increasing consumers' understanding of financial concepts can empower them to make informed decisions and mitigate risks (Fernandes et al., 2014; Brüggen et al., 2017).

2. Customized Support Services: Tailoring products and services to address the specific needs of vulnerable groups can enhance accessibility and inclusivity.

3. Long-term Resource Development: Encouraging savings and investments can help consumers build financial buffers against future risks.

By adopting these strategies, organizations can play a pivotal role in reducing consumer vulnerability and fostering sustainable well-being.

3. DISCUSSION

This study offers a comprehensive conceptual framework for understanding consumer financial vulnerability, emphasizing its dynamic, multidimensional, and evolving nature. The findings demonstrate that financial vulnerability is not confined to low-income consumers but extends to individuals across various socioeconomic groups and life stages. Economic shocks, such as the COVID-19 pandemic, have exacerbated these vulnerabilities, restricting access to financial resources and exposing systemic weaknesses in consumer financial resilience. By examining the objective and subjective dimensions of financial vulnerability, this research provides valuable insights into the interplay between external factors and individual perceptions, offering a nuanced understanding of how vulnerability manifests and evolves.

Objective financial vulnerability is influenced by factors such as indebtedness, unstable income, inflation, and health crises, while subjective vulnerability stems from individuals' perceptions of their financial conditions and their behavioral responses to these perceptions. For example, a sudden job loss may create objective financial vulnerability, but a lack of awareness about alternative financial strategies could amplify subjective vulnerability. Addressing both dimensions is crucial for developing effective interventions that enhance financial resilience. Recognizing that vulnerability is a dynamic process that fluctuates over time, this study highlights the need for adaptive and proactive strategies. Life events such as divorce, job loss, or unexpected health emergencies can shift individuals into vulnerable states, underscoring the importance of resilience-building measures such as financial literacy programs, improved budgeting behaviors, and the establishment of savings buffers. These measures not only prepare consumers to face unexpected challenges but also contribute to long-term economic stability.

This study introduces the concept of vulnerability pathways, which examines how individuals transition between different states of vulnerability. These transitions can include entering vulnerability due to adverse events or exiting it through recovery mechanisms like financial support or education. By mapping these pathways, the framework provides actionable insights for policymakers and organizations aiming to reduce financial fragility and foster resilience. For instance, businesses can develop innovative financial products, such as flexible repayment plans or tailored savings mechanisms, to address the specific needs of vulnerable consumers. Governments, in turn, can focus on macro-level policies that promote equal access to financial education and resources, thereby reducing systemic disparities.

The broader societal implications of financial vulnerability are also critical. Vulnerability at the individual level often translates into systemic challenges that undermine social cohesion and economic sustainability. Addressing these issues requires a holistic approach that integrates individual-focused strategies with broader societal initiatives. For example, promoting equal access to financial resources and implementing safety nets can mitigate the adverse effects of economic shocks, benefiting both individuals and the larger community.

Furthermore, this study underscores the importance of future research to deepen the understanding of financial vulnerability. Exploring the role of technology, such as AI-driven financial planning tools, can offer innovative solutions for managing financial fragility. Similarly, examining cultural differences in perceptions of financial vulnerability and resilience strategies can provide a more global perspective on the issue. Behavioral interventions, including nudges or gamified savings tools, also hold significant potential for fostering financial stability and resilience.

In conclusion, this research highlights the necessity of recognizing consumer financial vulnerability as a dynamic and multifaceted phenomenon. By advancing a comprehensive framework that captures both objective and subjective dimensions, the study contributes to a deeper understanding of the issue and offers practical strategies to mitigate its impact. Strengthening financial resilience through targeted interventions is essential not only for improving individual well-being but also for fostering economic and social sustainability. Developing resilience-focused strategies that address the diverse needs of consumers represents a crucial step toward creating a more equitable and stable financial ecosystem.

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CHAPTER 2

DERIVATIVES MARKET AND DERIVATIVES INSTRUMENTS IN TURKEY

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INTRODUCTION

Derivative markets are financial markets where instruments that allow buying or selling transactions to be conducted on a specific date in the future at a predetermined price are traded. These instruments generally derive their value from underlying assets. Some of these underlying assets include stocks, exchange rates, interest rates, commodities, and indices. Emerging from the trade of agricultural products and with organized structures dating back to 1848, derivative markets gained interest in Turkey during the 2000s. In 2013, the Turkish Derivatives Exchange (VOB) was integrated into Borsa Istanbul, leading to the establishment of the Futures and Options Market (VİOP), which continues its operations today. In Turkey, derivative markets facilitate transactions through futures contracts, options contracts, swap contracts, and forward contracts. Derivative markets provide parties with the opportunity to mitigate certain financial risks.

1. DEFINITION AND HISTORICAL DEVELOPMENT OF DERIVATIVE MARKETS

Derivative markets are financial platforms where instruments that enable transactions to buy or sell at a specific price on a future date are traded. The value of these instruments depends on another asset, called the underlying asset. Underlying assets include stocks, exchange rates, interest rates, commodities, and indices (Hull, 2022).

The emergence of derivative markets worldwide is rooted in the trade of agricultural products. In particular, the establishment of the Chicago Board of Trade (CBOT) in 1848 formalized futures contracts within an organized structure. In Turkey, the development of derivative markets began in the early 2000s. The Izmir Futures and Options Exchange (VOB) was established in 2005 to provide an organized platform for derivative instruments (Borsa Istanbul, 2023).

During the early 2000s, trends like financial market liberalization and globalization increased interest in derivative instruments in Turkey. In 2013, VOB was integrated into Borsa Istanbul, leading to the formation of the Futures and Options Market (VİOP), where the trading of derivative instruments continues.

2. STRUCTURE AND OPERATION OF THE DERIVATIVE MARKET IN TURKEY

In Turkey, the operation of organized derivative markets is overseen by Borsa Istanbul. VİOP offers a wide range of underlying assets, including stocks, foreign exchange, interest rates, commodities, and indices, providing a diverse platform for trading derivative instruments.

The transaction volume and market depth in derivative trading are generally concentrated in currency and index futures and options. For instance, in 2023, 60% of the total transaction volume in VİOP was generated through BIST 30 Index Futures (Borsa Istanbul, 2024).

The contracts traded on Borsa Istanbul VİOP are standardized, and price discovery is conducted transparently through an electronic trading platform. To ensure the security of transactions, Takasbank manages the collateral and clearing of all derivative transactions (Takasbank, 2023).

2.1. Underlying Assets Traded on VİOP

Table 1. Main Underlying Assets Traded on VİOP

Underlying Asset Type	Example Contracts	Transaction Volume Share (%)
Stocks	BIST 30 Index Futures	60%
Foreign Exchange	USD/TRY Futures	25%
Interest Rates	Benchmark Bond Futures	10%
Commodities	Gold Futures	5%

Source: *Borsa Istanbul, 2024.*

3. TYPES OF DERIVATIVES

Derivatives are financial instruments used for purposes such as hedging, speculation, and arbitrage. In Turkey, the most commonly used derivatives include futures contracts, options, swaps, and forward contracts.

3.1. Futures Contracts

Futures contracts are standardized agreements between parties to buy or sell a specific asset (such as commodities, currencies, stocks, or interest rates) at a predetermined price on a specified future date. These contracts aim to minimize uncertainty and market risks for the parties involved (Hull, 2022). Futures contracts offer investors the opportunity for both hedging and speculation.

Futures contracts date back to 17th-century Japan, where they were used for rice trading. The modern concept of organized futures markets began in 1848 with the establishment of the Chicago Board of Trade (CBOT). CBOT played a pivotal role in standardizing futures markets and promoting their global adoption. The use of financial instruments as derivatives grew significantly during the 1970s, and futures contracts became widely used worldwide (Fabozzi, 2019). In Turkey, futures markets were established in 2005 with the launch of the İzmir Futures and Options Exchange (VOB), which was integrated into Borsa Istanbul in 2013 (Korkmaz and Aksoy, 2022).

3.1.1. Features of Futures Contracts

The primary features of futures contracts stem from their standardized structure and the aim of minimizing risks between parties. Key features include:

- **Standardization**: Each futures contract specifies the quantity, quality standards, delivery date, and other trading conditions in advance. This standardization facilitates trading and enhances liquidity. Contract size, expiration date, and delivery terms are predetermined by the market (Cochrane, 2020).

- **Margin and Clearing Mechanism**: Futures transactions are conducted through a clearinghouse. The clearinghouse acts as an intermediary between buyers and sellers, regularly monitors margin accounts, ensures transaction security, and minimizes counterparty risk (Black, 1976).

- **Leverage**: Futures contracts allow for high-volume trades with a small margin requirement (Cochrane, 2020). However, leverage also increases the risk of losses (Jorion, 2021).

3.1.2. Operation of Futures Markets

Futures markets typically operate on organized exchanges. In Turkey, the Borsa Istanbul Futures and Options Market (VİOP) provides such a platform. Prices are determined by supply and demand dynamics. Traders must deposit margins to manage the risks of their positions. Margins are classified into initial and maintenance margins. If price fluctuations cause margin levels to fall below the required amount, investors receive a margin call to replenish their funds (Black, 1976).

The trading process involves:

- **Buying and Selling Contracts**: Investors take long positions (buy contracts) or short positions (sell contracts) in specific futures contracts.
- **Margin Management**: Transactions are conducted with initial margins. If prices fluctuate and reduce the margin, additional funds may be required from the investor.
- **Settlement and Delivery**: The price of futures contracts is based on the spot market price. However, factors such as carrying costs (interest rates, storage costs) may influence the price (Hull, 2022). Most contracts are cash-settled, although physical delivery is possible for certain assets like commodities.

3.1.3. Pricing Models for Futures Contracts

3.1.3.1. Cost of Carry Model

The theoretical price of a futures contract is calculated as follows:

F=S×e(r+c−y)tF = S \times e^{(r + c - y)t}F=S×e(r+c−y)t

Where:

- FFF: Futures price
- SSS: Spot price
- rrr: Risk-free interest rate
- ccc: Storage costs (applicable for commodities)
- yyy: Dividends or other returns

- ttt: Time to contract maturity

This model is widely used for financial assets (e.g., stocks and currencies) and commodities. For example, storage costs play a significant role in agricultural products, while dividend yields are critical for stocks (Hull, 2022).

3.1.3.2. Risk-Neutral Pricing

The risk-neutral approach assumes no arbitrage opportunities and calculates the futures price by projecting the spot price forward at the risk-free rate. This method is particularly useful for analyzing equilibrium prices in derivative markets.

3.1.3.3. Commodity-Specific Pricing Factors

Commodity futures pricing is influenced by supply-demand dynamics, seasonality, carrying costs, and delivery terms. For example:

- **Backwardation**: When the futures price is lower than the spot price, indicating supply shortages.
- **Contango**: When the futures price is higher than the spot price, often due to high carrying costs.

3.1.4. Types of Futures Contracts

3.1.4.1. Financial Futures

- **Currency Futures**: Used to hedge or speculate on currency exchange rate fluctuations. For instance, an exporter may use currency futures to mitigate the risk of currency depreciation.
- **Interest Rate Futures**: Involve trading bonds, notes, or other interest rate-based instruments. These contracts are ideal for hedging against interest rate fluctuations.
- **Index Futures**: Based on stock indices. For example, BIST 30 Index Futures allow investors to protect their portfolios in the Turkish market.

3.1.4.2. Commodity Futures

- **Agricultural Products**: Futures contracts based on crops like wheat, corn, and coffee. Seasonality and natural disasters significantly influence pricing.
- **Energy**: Futures contracts for oil, natural gas, and other energy resources provide protection against price volatility.
- **Precious Metals**: Gold and silver contracts are often used to hedge against inflation.

3.1.4.3. Hybrid Futures

Hybrid futures are based on a combination of different asset types, such as contracts influenced by both currency and interest rate movements.

3.1.5 Applications of Futures Contracts

Futures contracts can be utilized for the following purposes:

- **Hedging:** Futures contracts enable businesses and individuals to protect themselves against price fluctuations. They are used to mitigate the risk of future price changes. For instance, a farmer may sell a futures contract to eliminate the risk of a decline in the price of their crop.
- **Speculation:** Investors can engage in futures trading to profit from market movements. Speculators use futures contracts to capitalize on price changes in the market. These investors typically aim to benefit from short-term price fluctuations (Jorion, 2021).
- **Arbitrage:** Arbitrageurs aim to profit from differences between futures prices and spot market prices. By exploiting price differences across markets, they seek to achieve risk-free gains. Such activities contribute to market efficiency.

3.1.6 Risks in Futures Markets

Like other financial instruments, futures contracts carry certain risks, including market risk, counterparty risk, liquidity risk, and leverage risks. While leverage can amplify potential gains, it also increases the risk of loss (Jorion, 2021).

- **Market Risk:** Losses may occur due to price fluctuations.

- **Leverage Risk:** Although leverage increases potential returns, it can also magnify losses.
- **Liquidity Risk:** A lack of sufficient buyers or sellers for certain futures contracts may increase transaction costs.
- **Counterparty Risk:** While largely mitigated through central clearing systems, counterparty risk can arise in cases of extreme volatility (Hull, 2022).

3.1.7 Different Types of Futures Contracts

Futures contracts can be classified based on the type of underlying asset and their intended purpose:

3.1.7.1 Financial Futures

- **Currency Futures:** These are used to hedge against or speculate on exchange rate fluctuations. For example, an exporter may use currency futures to minimize the risk of a decline in exchange rates.
- **Interest Rate Futures:** These involve trading on bonds, treasury bills, or other interest-based instruments. They are ideal for managing risks associated with interest rate fluctuations.
- **Index Futures:** Contracts based on stock market indices. For instance, BIST 30 Index Futures allow investors to hedge their portfolios in the Turkish market.

3.1.7.2 Commodity Futures

- **Agricultural Products:** Futures contracts for agricultural products like wheat, corn, or coffee. Seasonal patterns and natural disasters are significant pricing factors for these contracts.
- **Energy:** Futures based on energy resources like oil and natural gas provide protection against price volatility in energy markets.
- **Precious Metals:** Futures contracts for metals like gold and silver are often used as a hedge against inflation.

3.1.8 Futures Markets in Turkey: VİOP

Futures markets in Turkey began with the establishment of the İzmir Futures and Options Exchange (VOB) in 2005. Later, VOB was incorporated into Borsa Istanbul, and futures trading commenced under the Futures and Options Market (VİOP) of Borsa Istanbul. VİOP offers a variety of contracts ranging from agricultural products to energy, interest rates, and currencies (Korkmaz & Aksoy, 2022).

Futures markets in Turkey are particularly significant for exporters and importers seeking protection against exchange rate risks. Additionally, they allow individual investors to manage their financial risks.

Futures markets in Turkey are organized by the Borsa Istanbul Futures and Options Market (VİOP). The characteristics and development of futures markets in Turkey are as follows:

3.1.8.1 Futures Products in Turkey

- **Index Contracts:** BIST 30 Index Futures are among the most liquid contracts in the market.
- **Currency Contracts:** USD/TRY and EUR/TRY futures are commonly used for hedging against currency risks.
- **Gold Futures:** Gold-based futures contracts in Turkey are important instruments for both individual and institutional investors.
- **Commodity Contracts:** Futures contracts for agricultural products like wheat and cotton, as well as gold futures, are traded by both individual and public investors.

3.1.8.2 Advantages of Futures Markets in Turkey

- **Risk Management:** They provide protection against fluctuations in currency and commodity prices, especially for companies involved in exports and imports.
- **Liquidity:** VİOP's high trading volumes enable investors to buy and sell quickly.
- **Tax Advantages:** Transactions in futures markets in Turkey offer certain tax benefits under specific conditions.

3.1.8.3 Example VİOP Transactions

A Turkish exporter can purchase a USD/TRY futures contract to hedge against exchange rate volatility. If the value of the dollar decreases, the gains from the futures contract can offset the losses in the spot market.

- **BIST 30 Index Futures Contracts:** These contracts are used for hedging against index volatility or for speculative gains.
- **Currency Futures Contracts:** Contracts like USD/TRY are frequently used by importers and exporters to mitigate exchange rate risks (Borsa Istanbul, 2024).

The standardization of futures contracts enhances price transparency for investors and ensures market liquidity. However, their leveraged nature requires careful usage, as it can amplify both potential gains and losses (Hull, 2022).

3.2. Options Contracts

Options contracts grant the buyer the right, but not the obligation, to buy (call option) or sell (put option) an underlying asset at a specified price on or before a specific date. Although the options market in Turkey is relatively new, interest in currency and stock options has been growing significantly (Hull, 2022).

3.2.1 Types of Options:

- **Call Option:** The investor has the right to buy the underlying asset at a predetermined price. For example, a USD/TRY call option is used by investors expecting an increase in the exchange rate.
- **Put Option:** The investor has the right to sell the underlying asset at a predetermined price. This option is advantageous for investors anticipating a decline in the price of the underlying asset.

3.2.2 Options Market in Turkey:

In Turkey, options are used for both risk management and speculative purposes. For instance:

- **Stock Options:** These are preferred by large investment funds to reduce portfolio risk.

- **Currency Options:** These help businesses engaged in imports and exports hedge against exchange rate risks (SPK, 2023).

The flexibility offered by options enables investors to achieve high returns without using leverage. However, options pricing is complex as it is influenced by various factors, including volatility (Hull, 2022).

3.3. Swap Contracts

Swaps are financial agreements in which two parties exchange cash flows or interest payments. In Turkey, swap transactions are primarily conducted between banks and large financial institutions. Currency swaps, in particular, are used as a monetary policy tool in developing countries like Turkey (Takasbank, 2023).

3.3.1 Swaps in the Turkish Financial System

- **Currency Swaps**: These are the most commonly used type of swaps in the
- Turkish banking sector. They are typically executed to hedge against exchange rate risks or to provide short-term liquidity.
- **Interest Rate Swaps**: Preferred by businesses and institutions seeking to hedge against interest rate fluctuations. For example, interest rate swaps can be used to convert a fixed-interest liability into a variable one (Takasbank, 2023).

3.3.2 Swap Contracts and Regulations in Turkey

The swap market in Turkey began to grow in the early 2000s with economic reforms and the liberalization of the financial sector. Banks and large corporations have actively utilized swap contracts to hedge against interest rate and exchange rate fluctuations. However, the market's development has been shaped by Turkey's economic conditions and the regulatory authorities' approaches (Hull, 2018; CBRT, 2020).

3.3.2.1 Legal Framework for Swap Transactions

The regulation of swap contracts in Turkey aims to maintain the stability of the financial system and is overseen by the Banking Regulation and Supervision Agency (BRSA), the Capital Markets Board (CMB), and the Central Bank of the Republic of Turkey (CBRT).

3.3.2.2 Banking Regulation and Supervision Agency (BRSA)

The BRSA regulates the risk management processes and limits related to swap transactions in banks. Following the 2018 currency crisis, various restrictions were imposed on swap transactions to increase foreign exchange liquidity and limit speculative activities. The BRSA adjusted the maturities of swap transactions and limited transactions involving the Turkish lira to reduce foreign currency liquidity risks for banks (BRSA, 2018).

3.3.2.3 Capital Markets Board (CMB)

The CMB regulates derivative transactions conducted on organized markets. Swap transactions can be traded on platforms such as the Borsa Istanbul Futures and Options Market (VIOP). The CMB's supervision focuses on standardizing these transactions and enhancing transparency (CMB, 2021).

3.3.2.4 Central Bank of the Republic of Turkey (CBRT)

The CBRT plays an active role in the currency swap market. Its swap transactions with banks aim to manage foreign exchange reserves and regulate market liquidity. The CBRT occasionally adjusts swap limits to reduce exchange rate volatility and ensure market stability. For instance, in 2020, the CBRT introduced regulations limiting domestic banks' capacity to engage in swap transactions abroad, aiming to mitigate speculative pressures on the Turkish lira (CBRT, 2020).

3.3.3 Effects of Swap Regulations in Turkey

The impact of swap regulations in Turkey has been felt differently by various market participants:

- **Liquidity Management**: Swap restrictions introduced during currency crises reduced market liquidity but also prevented speculative attacks on the Turkish lira (BRSA, 2018).
- **Impact on Foreign Investors**: Swap limits restricted the flexibility of foreign investors in Turkish lira transactions, reducing market depth (CBRT, 2020).
- **Exchange Rate Risk Management**: Regulations partially constrained companies' ability to manage exchange rate risks but helped reduce local banks' foreign exchange open positions (Hull, 2018).

3.3.4 Borsa Istanbul and the Swap Market

Borsa Istanbul supports the development of derivative markets by offering organized swap transactions through VIOP. Such transactions provide a standardized structure to reduce counterparty risks and transaction costs. However, compared to OTC (over-the-counter) markets, transaction volumes in organized markets remain limited (CMB, 2021).

3.3.5 Future of the Swap Market in Turkey

The future of the swap market in Turkey depends on the regulatory authorities' balanced approach and economic reforms. To deepen the market:

- **More Transparent Regulations**: Swap transaction restrictions should be structured to enhance predictability for market participants.
- **Educational and Awareness Initiatives**: Training programs should be promoted to help companies and investors better understand the use of swaps.
- **International Integration**: Aligning Turkey's swap market with international standards could attract foreign investors and increase transaction volumes (Fabozzi et al., 2006).

Swaps play a crucial role in derivative markets by mitigating systemic risks and enhancing liquidity. However, their complex structure requires financial expertise.

3.4. Forward Contracts

Forward contracts are derivative instruments traded in over-the-counter (OTC) markets, which are non-standardized and not organized. These contracts are used as an alternative to spot markets to manage future price uncertainties. In forward contracts, elements such as maturity, price, and quantity are agreed upon in advance between the parties. Similar to futures contracts, forwards operate on the same principle but are not standardized. The primary features of forward contracts are as follows:

- **Customization:** The terms of the contract can be freely determined by the parties.
- **Counterparty Risk:** Since there is no central clearinghouse, there is a risk that one party may fail to fulfill its obligations.

- **Low Liquidity:** Due to their non-standardized nature, liquidity is often limited.

3.4.1 Applications of Forwards

In Turkey, forward contracts are primarily used for hedging against exchange rate risks. For instance, an importer may enter into a forward contract today to secure an exchange rate for a foreign currency payment due in six months, protecting against currency fluctuations.

Their trading in OTC markets allows for flexible arrangements between parties. However, this flexibility increases counterparty risk, making these contracts closely monitored by regulatory bodies (Capital Markets Board of Turkey, 2023).

3.4.2 Mechanism of Operation

Forward contracts involve two parties: the buyer (long position) and the seller (short position). The buyer agrees to purchase the underlying asset at a predetermined price on a future date, while the seller commits to delivering the asset. On the maturity date:

- If the spot price exceeds the forward price, the buyer gains.
- If the spot price is below the forward price, the seller benefits.

3.4.3 Advantages and Limitations

The key advantages of forward contracts are their flexibility and customizability. However, counterparty risk and lack of liquidity can limit their use. Additionally, their non-standardized nature compared to exchange-traded futures contracts poses risks for market participants.

3.4.4 Role in Financial Markets

rticularly in managing currency risk, interest rate risk, and commodity price risk. For example, exporters and importers frequently use these contracts to minimize the impact of currency fluctuations. Furthermore, they are widely used in the agricultural and energy sectors to stabilize commodity prices.

3.5 Other Derivative Instruments

In addition to the aforementioned instruments, exotic options and structured derivatives are also traded in derivative markets. In Turkey, these instruments are mainly used by institutional investors.

3.5.1 Exotic Options

Exotic options are financial instruments with more complex features compared to standard options. For instance, barrier options activate when the underlying asset reaches a certain level.

3.5.2 Structured Products

In Turkey, investment banks combine derivative instruments to create products tailored to specific investment needs. These products are designed particularly for portfolio management and investors seeking high returns.

Derivative instruments provide significant risk management tools for both individual and institutional investors. In Turkey, the demand for derivatives has grown rapidly with increasing market volatility and uncertainties. However, the complex nature of derivative transactions necessitates improved financial literacy and the effective functioning of regulatory mechanisms.

4. FUTURES MARKETS AND REGULATIONS IN TURKEY

Futures markets in Turkey are regulated and supervised by the Capital Markets Board (CMB). The key regulations governing the market include:

- **Capital Markets Law:** Law No. 6362 defines the legal framework for futures markets. It establishes the definition of derivative instruments and specifies the tradable assets and market participants.
- **CMB Communiqués:** Communiqués issued by the CMB provide detailed regulations on collateral requirements, settlement rules, and the management of client accounts. For instance, the "Communiqué on Principles Regarding Futures Transactions" sets the standards for market operations.
- **Central Clearing Rules:** Futures market transactions in Turkey are guaranteed by Takasbank. Acting as a central counterparty (CCP), Takasbank ensures risk management and enhances market security.

The CMB conducts regular audits to ensure the market operates transparently, reliably, and efficiently. It also requires market participants to obtain licenses (Korkmaz and Aksoy, 2022).

5. MARKET DYNAMICS IN TURKEY

The main factors influencing the operation of Turkey's futures markets are:

5.1 Trading Volume and Product Diversity

- The highest trading volume in Turkey's futures markets is in BIST 30 index futures. Currency futures (USD/TRY, EUR/TRY) also attract significant demand.
- Gold futures are popular among both individual investors and players in the jewelry sector.

5.2 Domestic Economic Factors

- **Exchange rate volatility:** Due to the import- and export-driven structure of the Turkish economy, currency futures play a crucial role.
- **Interest rate fluctuations:** Changes in interest rates increase interest in bond and treasury bill futures.

5.3 Participant Profile

- In Turkey, both individual and institutional investors are active in the futures markets. Banks, exporters, and portfolio management companies use these markets primarily for hedging purposes.
- Increased investor awareness and the prevalence of digital trading platforms have contributed to the market's growth (Yıldırım and Ersan, 2021).

5.4 Tax Regulations

Gains from futures contracts are taxed under the Income Tax Law. However, under certain conditions, these transactions offer withholding tax advantages, which particularly attract institutional investors.

The operation of Turkey's futures markets differs in several ways compared to developed and emerging markets:

6.1 Comparison with Developed Markets

- **USA (CME Group):** The Chicago Mercantile Exchange (CME) is the world's largest futures market. Trading volumes are high,

and product diversity is vast, including innovative products such as weather futures.

- **Europe (Eurex):** The Eurex exchange, Europe's largest futures market, specializes in equity derivatives and interest rate futures. Compared to Turkey, it boasts higher liquidity and a greater proportion of international participants.
- **Asia (SGX):** The Singapore Exchange (SGX) is strong in regional currency pairs and commodity futures. While sharing characteristics with developing markets like Turkey, SGX benefits from greater global investor interest.

6.2 Comparison with Emerging Markets

- **India (NSE):** The National Stock Exchange (NSE) of India is one of the fastest-growing futures markets. India surpasses Turkey in terms of product diversity and local investor participation.
- **Brazil (BM&FBovespa):** The Brazilian futures market is strong in commodity-based products and currency contracts. Similar to Turkey, it is sensitive to local economic fluctuations.

6.3 Turkey's Position in International Markets

Turkey has a relatively organized futures market among emerging economies. However, there is significant potential for growth in product diversity and attracting international investors. In this context, VIOP (Borsa Istanbul Futures and Options Market) needs to introduce new products that meet international standards and deepen the market (Korkmaz and Aksoy, 2022).

7. REGULATORY FRAMEWORK AND BORSA ISTANBUL VIOP

The regulation of derivatives markets in Turkey is overseen by the Capital Markets Board (CMB). The CMB is responsible for ensuring that derivatives instruments are regulated and supervised in a transparent, efficient, and reliable manner (CMB, 2023).

VIOP operates on a world-class electronic trading platform. This platform provides investors with price transparency and ease of trading. In addition, Takasbank manages the collateral for derivatives transactions, preventing systemic risks.

8. THE ECONOMIC IMPACT OF DERIVATIVES MARKETS AND THEIR ROLE IN RISK MANAGEMENT

Derivatives markets play a vital role in risk management, increasing liquidity, and ensuring price stability in the economy. For example, a company seeking to hedge against exchange rate fluctuations can use currency futures to make its future costs more predictable. In Turkey, derivatives are particularly preferred in the energy and agricultural sectors to reduce cost uncertainties (Hull, 2022; Borsa Istanbul, 2024).

However, derivatives can also be used for speculative purposes, increasing risks such as excessive leverage. For this reason, regulatory authorities like the CMB have introduced measures to limit market participants' risks (CMB, 2023).

CONCLUSION

Futures contracts are critical instruments used in modern financial markets for both hedging and speculation purposes. With the integration of global financial markets, futures have become a significant strategic tool for investors. Futures contracts are an indispensable part of global financial markets. Investors and businesses can use these instruments to minimize their risks and benefit from market volatility. However, features such as leverage must be managed carefully. The effectiveness of futures markets can be enhanced through transparency ensured by regulatory bodies and increased investor awareness. It can be said that Turkey’s Futures and Options Market (VİOP) is progressing towards an internationally standardized structure with its diverse product offerings and transaction volume.

Turkey’s futures markets have made significant strides toward integrating with both local and global markets. However, to reach the product diversity and liquidity levels of developed markets, greater emphasis should be placed on introducing new products (such as cryptocurrency futures), fostering international collaborations, and enhancing investor education. Through these efforts, Turkey can achieve a level comparable to developed countries.

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CHAPTER 3

GENERAL CHARACTERISTICS OF THE SOCIAL MOVEMENT PHENOMENON

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INTRODUCTION

The first person to use the concept of social movement was Saint Simon. Simon first used the term to refer to social protest movements in France and later in other countries and regions. While the concept of social movement was initially used to refer to existing political forces, its meaning has gradually expanded and is now generally used to include groups and organisations outside the centre of the political structure. Today, the concept is more often described as an organised effort by a significant number of individuals to change one or more of the major features of society (Marshall, 1999: 746).

Explaining social movement within socialisation with a single definition means not being able to reveal the nature of social movement. Social movements have many social, political, economic and religious aspects. Since social movements originated in Western countries, the socio-political aspects of the West are more predominant in social movements. In particular, social movements have become more visible in modern times. However, it is not a correct approach to see social movements only as a part of Western societies. In the 21st century, the existence of social movements in both Western and non-Western societies is evident: There are many social movements such as peasant movements, trade unionist movements, religious movements, women's rights movements and LGBT movements.

As stated by Türkdoğan, social movements are collective behaviours that aim to create a new way of life and a new formation in the social structure. Social movements are actually a set of collective behaviours with a socio-psychological aspect. Attitudes in the form of collectivity are behavioural patterns that reveal the attitudes, behaviours and mentality structures of individual and social life. In such a case, it is necessary not to leave behind the influence of the type and structural formations caused by the social structure in a broad perspective (Türkdoğan, 2015: 11-13).

1. Explanation of the Concept of Social Movement

When defining the concept of social movement, it corresponds to the actions to be carried out jointly by individuals who struggle to put forward both a new way of life and a new formation in the social structure, and who have agreed within the framework of attitudes and attitudes towards similar goals (Korkmaz, 2017: 482). However, social movements have more meaning

than this. When defining a social movement, first of all, the nature of the concept of 'movement' is important. The definition of a movement emerges as a result of a social action. These include preparatory meetings, declarations, panels, protests. In movements, actions are evaluated in meetings, networks are formed and a process is completed (Karakaş, 2005: 28-29). Understanding only street movements from such a definition is an incomplete understanding.

Many thinkers have put forward ideas on social movements. According to the determinations of Tilly, one of them, the understanding of social movement has been carried out in the form of campaign types that interact with the birth of the movement since the 18th century. According to Tilly's statement, social movements combine 3 types of arguments. The first of these, the programme argument, involves supporting or rebelling against the actual or assumed actions of the objects of action. The second, identity assertion, involves the assertion of a mutual authority in which 'we', the proponents of the assertion, must be involved. Finally, third, stance arguments emphasise both the relationship and the similarity with other political figures, such as an excluded minority, a group of citizens, or official supporters of the regime. In addition to these ideas, Tilly emphasises that democratisation has a positive impact on social movements. According to Tilly, democratisation actually limits reasonable and effective popular action. What Tilly means by democratisation is the maturation of regime forms that have a somewhat broad scope, that provide for equal citizenship, that determine the opinions of citizens according to state policy, personnel and resources, and that relatively protect citizens from the indiscriminate behaviour of those in authority in state institutions. Indeed, in this respect the function of democratisation is in a real sense to limit both rational and active popular action. For example, the presence of violence in democratic institutions often prevents popular uprisings (Tilly, 2004: 29-31).

Touraine, on the other hand, explains social movements as one of the methods of revealing group demands and needs. As a form of collective behaviour, social movements are similarly the movement of individuals within the same cultural target, actors aiming to revise the social predispositions inspired by the culture in question (Touranie, 1999: 43-45). Similar to Touraine, Tarrow, while explaining the concept of social movement, draws a path by putting the phenomenon of collectivity in the foreground. Tarrow argues that individuals must be organised for social movements to emerge. Moreover, Tarrow emphasises that the determining

characteristic of this collectivity should be sought in the conflict-prone nature of collectivity (Tarrow, 1994: 2-3). While all participants of any social movement mobilise for their goals, they are in conflict with those who oppose them or with those in authority. This feature of social movements distinguishes them from other collectivities. In such a sense, conflict is realised in social relations. In fact, this situation shows that conflict in social movements will occur under all circumstances (Tarrow, 1998: 3). Finally, according to Melucci's findings, a social movement should have both solidarity and conflict, as well as a feature that pushes the limits of the structure (Melucci, 1999: 87).

As a result, in the formation of social movements as a whole, it is seen that the individual and the society exhibit a counter stance together. Most of the time this situation is in the form of rebellion and most of the time it is a more moderate protest. It is seen that social movements appear especially as an economic, political, religious and cultural opposition. Social movements more often manifest themselves in the form of conflict rather than reconciliation. Moreover, these conflicts sometimes lead to an unpredictable path within the country. While analysing social movements, they have historically passed through certain stages and have come to the present day. There are certain understandings of social movements in the literature. When the history of modern social movements is analysed, old social movements and new social movements approaches offer us a perspective on the issue of social movements.

2. Forms of Social Movement

An important issue within social movements is the types of social movements. In this sense, many social scientists have made determinations in this regard. In relation to this, Şentürk stated that Smelser adopted four types of basic principles while explaining collective behaviour. The first of these is the basic components of values and legality. Secondly, they are regulators that coexist with norms. The third are those that have individual impetus in specific roles and general organisation. Finally, the fourth are the facilitations or barriers appropriate to the situation. But basically each type of collective behaviour has to be directed towards different elements of the social action pattern. In this way, it is possible to talk about ‘value-oriented movement’, which constitutes the reorganisation of values, and ‘norm-oriented

movement', which plans the structuring of norms on behalf of determined beliefs (Şentürk, 2006: 38).

The main thing in value-oriented movements is to reassemble the system of values existing in the social structure and to re-explain the norms. Value-oriented movements aim to put forward alternatives by investigating the entire existing social structure. Value-oriented movements, which have transformative features, aim for a broad change and transformation in the social structure. While they collectively put forward a form of change, there is a focus on a widespread social interest such as peace, freedom, democracy or nationalism. Ultimately, such movements can be said to have a particularly alternative model. For example, national liberation struggles and revolutionary movements can be considered within such a group (Kökalan Çımrın, 2009: 47). In short, value-oriented movements correspond to radical changes in the social structure. Therefore, in value-oriented movements, there is a motive to replace one thing while destroying another.

When we analyse norm-oriented movements, it is seen that there is a harmony. In these movements, preservation of norms is in question. Therefore, it is seen that there is a protection in the social structure. Türkdoğan, while analysing the norm-oriented movements, focuses on the forms of action such as panic, frenzy and hostility (Türkdoğan, 2015: 39). Norm-oriented movements prioritise the social structure and show an attitude against the way it is implemented. Due to the adoption of priorities, it is not possible to present a model. Norm-oriented movements can also be called reform movements. Because these movements are constantly striving for a change in the social structure. Environmental movements in the USA can be given as an example. These movements have a narrower social interest than value-oriented movements such as voting, child labour and drinking alcohol (Şentürk, 2006: 39). As a result, norm-oriented movements change the social structure in certain respects.

3. Evolution from Classical Social Movements to New Social Movements

When analysing classical social movements, an assessment is made on the nature of old and new social movements. The distinction between old and new social movements began to emerge in the late 1960s and early 1970s. These movements, which emerged in the form of resistance, caused debates in the social structure. When making the distinction between old and new social

movements, what is old is resistance and struggle. While class conflict and nationalist discourses are at the forefront of resistance and struggles, issues such as human rights, women's rights, ecological and environmental movements are at the forefront in new social movements. Structural differences are taken into consideration when analysing old and new social movements. Today, while the influence of old social movements is gradually decreasing, new social movements are more active in social life. The underlying reason for this is the development of information and information technologies and the understanding of faster organisation with the influence of social media. While economic and political issues were at the forefront in the old social movements, themes related to culture and identity have started to be at the forefront in the new social movements.

When analysing social movements, an analysis is made through old social movements. Offe states that old social movements consist of 'class' and 'nationalist' movements that emerged in parallel with industrial capitalism in the 19th century. Offe states that these two types of movements were realised in parallel to each other. Both movements have equal aspirations. The main feature of the old social movements is to unite class and nationalist movements on a common ground. The aim here is to seize state power, that is, power. These movements target the state in the modern world. In this sense, old social movements have a different structure from new social movements (Offe, 1999: 15).

Capitalism has an important function in old social movements. While mentioning the importance of old social movements, partnerships are at the forefront. Therefore, while explaining the partnerships in the old social movements, the relationship with capitalism becomes important in the social structure. In this respect, it is correct to associate the main reason why social movements are organised and constantly on the agenda with capitalism. While analysing the phenomenon of capitalism in social movements, certain demands are in question. Capitalism determines the nature, owners and aims of these demands. Therefore, it should be understood from this situation that the main aim of the class movements in the old social movements was to eliminate the class uncertainties and inequalities created by capitalism. Such movements have the idea of creating a structure oriented towards labour. On the other hand, nationalist movements adopting nationalism, on the one hand, aimed to struggle on the basis of citizenship, and on the other hand, they

aimed to achieve economic and political autonomy against both colonialist and imperialist states (Yenal and Kırlı, 2005: 11).

While analysing class movements, Touraine focused on their characteristic features. He states that class movements are mostly organised by socialists, social democrats or in dependence on labour or communist parties. Touriane states that the main position in the class movement tries to keep the labour conflict at the centre by placing its struggle within modernity. Therefore, Touraine sees the labour movement as a great collective action that turns it into a social movement. He believes that with this approach, working class movements can be explained with the understanding of social movement rather than class consciousness, contrary to the Marxist perspective (Touraine, 2002: 265). In fact, Touraine's perspective is more related to social movement than Marxist class mentality.

The old paradigms have become less and less effective in the new world. We see this especially in the 1960s and 70s in Europe as well as in America. This coincided with the emergence of environmental, ethnic, feminist and local autonomy movements. These movements have been labelled by many social scientists and theorists as new social movements in contrast to the old social movements, which had big ideas and a revolutionary vision. In such a situation, it is seen that there is a search for identity in the new world. The search for a new identity calls into question the role of the state and civil society and redraws the boundaries of the private and public spheres. With these developments, two theoretical paradigms are encountered. These are the resource mobilisation paradigm and the new social movements paradigm, which focuses on the process of actors constructing their identities. The former emphasises the economic/political and the latter the cultural aspects of the conflict created by new movements (Çayır, 1999: 8-15).

New social movements adopt a model of society that presents itself as new. In such an innovation, new forms of power, new forms of sovereignty, as well as new investment models are included. It is seen that cultural emphasis is at the forefront of these innovations. The most decisive factor in the emergence of new social movements is the new complex situations in society and the frustrations arising from unequal situations. This is not the first time we have encountered such a situation in the social structure; such situations have been encountered in social events before. However, inequalities and contradictions in the social structure have reached such a

point that new forces and areas of struggle have emerged. In these areas of struggle, certain groups revolving around gender, race, ethnicity and environmental movements have emerged and these groups have struggled for their recognition. In particular, the development of the information society has led to a renewal of social movements in new areas of struggle. This change and transformation from old social movements to new social movements has extended beyond the material values of industrial society and expanded into new social movements.

While talking about new social movements, Çayır states that they did not emerge as a result of an economic collapse, on the contrary, they gained momentum with the strengthening of the understanding of civil society and democracy in the social structure. According to him, since the ideals defended by new social movements are more cultural than material, the struggle is directed towards civil society. In the field of civil society, new social movements, together with the idea of democracy, have focused on issues such as equality, diversity, participation and identity construction, unlike the old policies. In particular, the defence of new identity politics has come to the fore. Thus, the construction of identity in new social movements has become one of the new areas of conflict (Çayır, 1999: 27). The change in new social movements after the 1960s shows that traditional theories are insufficient to explain new social movements. In fact, this situation is related to the inability to grasp the identity dimension. Because in some cases, the new social movements could not explain the individual, collective and public identity conceptions embodied in the new social movements, and therefore new movement styles were needed to respond to the changes in the social structure. Therefore, resource mobilisation theory has emerged as a new model in new social movements.

Resource mobilisation theory has caused very important breaks and changes in the theory of social movements. Gustave Le Bon's idea that irrational crowd psychology and the subsequent resentment and deprivation paved the way for collective behaviour and therefore such movements were far from rationality was broken and abandoned in the 1970s. Thus, the idea that collective behaviour could be rational like other social behaviours began to dominate. The basis of this dominance was the interest in student movements in the 1960s all over the world, especially in the USA and the West. Researchers, many of whom were particularly involved in such movements, later analysed these studies and gave importance to the idea that

individuals who demanded civil rights and participated in protests were ordinary individuals who took a rational stance by interpreting profit/loss, cost/benefit and risk/benefit like other individuals. Researchers have called this approach resource mobilisation because the resources available to social movements are central to their analyses and, moreover, because it deals dynamically with processes such as the development, change and decline of movements. The pioneers of these theories are John D. McCarthy and Mayer N. Zald. In the late 1980s, the Discourse Approach, based on symbolic interactionism and Social Constructionism, and the theory of New Social Movements emerging in Europe, maintained its weight until it faced serious criticism (Uysal, 2010: 219).

After the resource mobilisation paradigm lost its influence, the new social movements approach became more effective. It can be said that the new social movements approach was founded on the criticism of the Maxist theory in Europe. According to Touriane, the emergence of this paradigm with such a criticism has revealed the importance of the dimension of culture and identity in this paradigm. Therefore, this paradigm is adopted as new (Touraine, 1981; 13). Melucci, on the other hand, focuses on system thinking together with social movements. He stated that new social movements have shifted from the political to the cultural sphere (Melucci, 1999: 84). Ernesto Laclau and Chantal Mouffe, two other names within this paradigm, put forward a perspective related to capitalism different from Marxist approaches. In their view, power is fragmented in contemporary capitalism. According to them, power is produced through the totality of discursive practices and both linguistic and non-linguistic practices that underpin and encompass social connections (Gladwin ve Belkız, 1999: 130). In conclusion, it can be stated that Resource Mobilisation and the New Social Movement model generally focus on a particular form of social movement.

CONCLUSION

Most social scientists agree that social movements emerged with modernisation. Modernisation has brought about changes in many aspects of society. These changes affect where people work, where they settle, family planning, lifestyle, cultural habits and even religious beliefs. Industrialisation and industrialisation have led to a series of changes in the socio-cultural and political economy of societies. In sociological terms, the first social movements consisted of groups claiming equality, justice and economic

rights. These groups are generally anti-systemic social movements based on relations of production-exploitation and ethnic oppression, with macro-organisational forms such as trade unions, political parties and large international representation. The participants of these social movements have a collective identity, are consciously organised around certain goals, and ensure the continuity of this state of organisation; politically, they have right, left, liberal and conservative political identities, and socio-economically, they consist of marginals, working class, poor and other excluded people. This social movement opposes the government and aims to seize the state apparatus and replace it.

While explaining the social movements that came to the agenda after 1960, social scientists have put forward theses that social movements in the modern age have lost their opposition characteristics. These theses argue that the age we live in is not the industrial age, so the changing and transforming world conditions have also changed the socio-economic, socio-political and demographic structures of people. Therefore, instead of the class-based class-based economic and political criticisms of the classical social movements, they emphasise the cultural field; they try to force governments to solve problems in areas such as democracy, rights, justice, individuality, sexual orientation, ecology, nuclear power plants, etc. by putting problems on the agenda of governments, not through opposition to the system, but through the existing system. New social movements focus on cultural reproduction, social integration and socialisation. The members of the new social movement do not present a homeogenous structure as in classical social movements, on the contrary, they exhibit a heterogeneous actor profile. This heterogeneity gives people with different world imaginations in terms of economic, political, social or sexual preferences the freedom and flexibility to oppose each other. The actors of the new social movement consist of educated, middle-class individuals with different lifestyles.

When classical and new social movements are evaluated together, it is thought that it is difficult to consider both social movements completely separate and different from each other. Although the situations such as scientific, technological, social explosions, etc. that can have serious effects on human life in the ages in which human beings live differ, basically, human beings have a number of needs such as physiological, psychological, unchanging need to eat, drink, etc. feelings in every age. In this framework, some of the aspects that both movements have in common can be considered

as economic-based opposition, and the aspects that they differ can be considered as taking over the government through opposition to the system.

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CHAPTER 4

A GLOBAL BRAND WITHIN THE FRAMEWORK OF STORYTELLING:

UNITED COLORS OF BENETTON

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INTRODUCTION

Although story and storytelling are interconnected, it is more accurate to define them separately. At times, narratives that incorporate fantastical elements have maintained a strong connection to reality and have acted as a medium of communication for centuries. Stories grounded in lived experiences are influenced by the interaction of cultural norms, human existence, and notable events (Akbayır,2016). Thus, stories are the bond that unites us; storytelling is how that bond is spread (Barel et al.,2024). Stories are essential for building empathy, allowing people to interpret and understand events through imagination. They deepen emotional experiences and help individuals internalize these feelings, influencing their behavior (Gallo, 2016). Therefore, there is a constant need for stories that inspire and encourage people to take action.

Storytelling conveys ideas through narratives, aiming to inform, shed light on, and shape situations or events. It plays an essential role in society, helping people informally adopt and comprehend cultural norms and values. Storytellers narrate events that have happened, could happen, or might happen in the future. Storytelling is deeply embedded in a community's experiences and shared memory, becoming a "broad way of thinking" through the reciprocal exchange of experiences (Sütçü, 2013). Therefore, storytelling has become a form of communication through which people share personal experiences, often to entertain or to bring attention to certain facets of reality (Eck, 2006). Storytelling, one of the oldest forms of education, helped ancient communities bond by explaining the world's origins, the meaning of life, and concepts of the afterlife.

Recently, storytelling has become a powerful tool for businesses in fields like marketing and branding, extending far beyond its literary origins. The idea that brands can create a stronger emotional bond with people through storytelling, fostering lasting relationships, has become increasingly popular (Deniz, 2018). Similarly, stories add value by providing experiences and identity possibilities, emotionally enriching the brand and making it more attractive and engaging for customers. The defining feature of impactful stories is their originality; they act as brand narratives that foster trust and resonate with their target audience.

This study will examine the common traits of brand stories, their lasting influence, their role in successful brand development, and the

strategies for achieving impactful brand engagement through storytelling. In doing so, it establishes a link between brand building and the art of storytelling.

This study explores *Benetton*, a global brand with worldwide operations, through the perspective of story and storytelling. The study was conducted in 2024 using a one-on-one interview format as a qualitative method, during which the Manager of Benetton Group Turkey and the Middle East addressed questions focused on storytelling.

Storytelling, Communication, And Brand Building

Storytelling has become a vital tool in human communication and is now widely adopted by companies to convey their values and establish trust and connection with both employees and customers. By breaking down complex messages, storytelling makes it easier for audiences to engage with them. Unlike conventional informational or instructional communication, which often leads to counter-arguments, storytelling is more likely to motivate people to take action on their initiative (Hermansson & Na, 2008).

In this context, numerous studies in the literature highlight that businesses can enhance scenarios like implementing a new business model, fostering cultural change, or executing a strategic shift through storytelling, which in turn offers advantages to their brands (Fog, et, al,2005; Denning,2006; Mc Lellan,2006; Woodside,2010; Chiu, et,al,2012; Sundin, et, al,2018).

Brand stories that engage customers also offer businesses a competitive edge. To craft a compelling story, essential elements must invite the customer into the narrative. Storytelling, now a cornerstone of marketing, has become a factor that enhances consumer preference. Products with a story that resonates are shown to heighten purchase intentions toward the brand. Furthermore, storytelling, which fosters seamless communication between businesses and customers, serves as a cornerstone of successful branding (Çetinkaya,2021)

Approaching storytelling as a strategic tool naturally advances traditional brand thinking. This perspective highlights the significance of established brand values and the role of fostering an emotional connection between consumers and the brand. When the traditional brand concept is infused with storytelling principles, the brand's value is conveyed through a

central narrative. The brand derives its strength from this story, using it as its primary means of communication. Without this, values remain as mere words lacking true substance. Consequently, there is a shift from abstract values to a core story that brings them to life. The message within a company's core story also embodies the lesson or moral of the narrative, conveying the company's perspective on what it considers right or wrong (Fog,et al, 2005). When the connection between a brand and its stories feels genuine, impactful narratives raise expectations for the brand and evoke positive emotions (Mucunorfeanu, 2018).

Brand

The term "brand," derived from the Italian word meaning sign or stamp (Çifci & Cop, 2007), symbolizes both the functional and emotional attributes of a product for consumers. It aids in identifying the product, facilitates memory retention, and plays a crucial role in the purchasing decision process (Erciş et al., 2009).

A brand can be described as a collection of tangible and intangible qualities crafted to generate awareness, establish identity, and build the reputation of a product, service, individual, location, or organization (Bonnici,2015).

The brand serves as the primary engine of the business and represents its identity within the market. For the producer, the brand embodies the product's unique attributes, helping to maintain its integrity. Additionally, a brand that can offer customers memorable and impactful experiences fosters lasting recall (Petrella, 2018).

Brands are best understood as distinct "logical structures" that shape consumer perceptions. As names tied to experiences, brands function similarly to metaphors, allegories, or visual imagery, providing a framework for why products and services resonate with consumers. The primary role of a brand is to create meaning, with numerous approaches to bring this meaning to life. In essence, the branding process and a brand's "strength" rest on a unique "logic" tailored to each brand (Kay, 2006).

Benetton Group and Storytelling

The Benetton Group is an Italian company specializing in producing and distributing clothing, undergarments, footwear, cosmetics, and

accessories. United Colors of Benetton was established in 1965 by siblings Luciano, Giuliana, Carlo, and Gilberto Benetton. Luciano, a clothing worker, had been selling sweaters handmade by his sister Giuliana to stores around Treviso since 1955. In 1965, Carlo and Gilberto joined the venture, and the Benetton family opened their first factory (Brundage, 2019). The first store opened in 1969 and was an instant success. In the same year, they ventured abroad by launching a similar store in Paris. Unlike many small producers who chose the broadest possible distribution, they decided to create a network of exclusive distributors and use subcontractors. The chain quickly expanded worldwide, establishing strong brand value. The company is listed on the stock exchanges in Milan, London, Frankfurt, New York, Toronto, and Tokyo (Ganesan, 2002). By the 1980s, sales had extended across Europe, as well as to the United States and Japan (Favero, 2006). As of 2001, it was operating in approximately 120 countries through more than 7,000 retail stores (Ganesan, 2002). Additionally, the company began offering jeans, velvet trousers, shirts, and T-shirts, enabling customers to find a coordinated selection of clothing within its stores in the same era. Through these versatile collections, Benetton played a significant role in shaping Italian casual fashion (Favero, 2006).

The Benetton brand was founded on three core principles: family, comfort, and vibrant color. As a family-owned business, Benetton positioned itself as warm and approachable in contrast to large corporations. Its products were designed to be soft and comfortable, adding to their appeal. However, what truly set Benetton apart was its United Colors theme, symbolizing diversity and inclusivity. This gave the brand a unique, playful image, distinguishing it from competitors that often seemed more traditional and reserved (Brundage,2019).

In addition to its strong reputation and high-quality products, United Colors of Benetton is well-known for its frequently polemical advertising strategies. While these controversial advertisements have ignited discussions in society, they have also received acclaim for highlighting important social and political issues globally (Muljadi et al,2022). Benetton employed "shock value" and realistic imagery to capture viewers' attention and ensure their brand name remained memorable (Ganesan,2002)

The family's journey in building the business, which started in challenging conditions, has led to diverse narratives and viewpoints expressed

through advertising strategies aimed at promoting peace, especially through the impactful photographs employed.

The key elements that define the brand include color, international presence quality, culture, social responsibility, and freedom of expression.

To clarify, the brand is at the forefront with its *color* character. When thinking of the Benetton Group, the first thing that comes to mind is color in all its forms. The vibrant knits that transformed the fashion industry symbolize a joyful and optimistic outlook on life, honoring the brand's Italian roots.

In terms of *internationality*, The Benetton Group has always adopted a global perspective, extending beyond mere business considerations. Their vision encompasses a world where ethnic, cultural, and religious differences are transcended in the pursuit of global citizenship.

The Benetton Group is dedicated to attaining the highest standards across all its products, processes, and services. This dedication is deeply embedded in the heritage of the Italian textile industry and is driven by the passion and commitment of the Group's employees, influencing all of the company's initiatives in terms of *quality*.

In terms of *culture*, the Benetton Group has engaged in dialogue with some of the most notable international figures in the cultural sphere since its inception. This engagement has enabled the company to develop new methods for understanding and interpreting the contemporary world, as knowledge is essential for the success of any organization.

In a continuously changing landscape, the Benetton Group recognizes the importance of taking tangible steps to foster the growth of individuals and communities while ensuring the protection of human rights on a global scale, embodying its commitment to *social responsibility*.

The Benetton Group is unreserved in its beliefs. They firmly believe that societal progress can only occur when individuals can access the necessary tools and the freedom to express their opinions. This openness fosters a wealth of ideas, encourages dialogue, and promotes tolerance, particularly towards those with differing viewpoints, reinforcing the importance of *freedom of expression* (Benetton & Gianmaria Padovani, 2022).

METHOD

In 2024, I conducted a one-on-one interview as a qualitative research method with the General Manager of Benetton Group Turkey and the Middle East. During the interview, the General Manager responded to eight questions designed around the theme of storytelling.

Question 1: **What initiatives does the BENETTON GROUP undertake to showcase the story and essence of the BENETTON brand? Which departments are actively involved in these efforts?**

Founded in 1965, United Colors of Benetton has become one of the most recognized fashion brands worldwide, known for its vibrant colors, high-quality products, and presence in key global markets. Benetton stands out as a company that actively shapes the future with a commitment to the environment, human rights, and an evolving society.

Benetton's identity has long been linked to knitwear, bold colors, and quality craftsmanship. Additionally, it has established itself as a leader in sustainability, promoting this core value through over three decades of communication campaigns that advocate for human rights, transparent business practices, and environmentally conscious principles. The company emphasizes ethical operations and responsible recruitment practices throughout its supply chain.

The story of Benetton is rooted in respect for people and the planet, celebrating diversity of color, thought, and belief. While it pioneered social and environmental advocacy in earlier years, Benetton now seeks to be a globally responsible brand that grows alongside the communities it engages with. Across all its departments—from design and product development to marketing, e-commerce, and administration—the company operates with this purpose in mind. Similarly, Benetton collaborates closely with suppliers and business partners who share this same philosophy.

Question 2: To what extent is the BENETTON brand story known in the Turkish market?

Benetton was one of the earliest foreign brands to enter the Turkish market in 1985. Known for its iconic ‘color story,’ the brand has made a lasting impression in the fashion industry and media. This vibrant identity, reinforced through its stores and product lines, has cultivated a strong

connection with customers. Benetton's past advertisements emphasizing 'color – diversity – inclusivity' were instrumental in shaping this distinct brand perception. Additionally, Benetton is widely recognized for its use of organic cotton, high-quality linen, and commitment to sustainability, making it one of the first brands that come to mind for eco-conscious consumers.

Question 3: To positively impact branding, how and when should a good brand story be told? At what intervals is the story of the BENETTON brand communicated to your customers?

A brand's story should be consistently conveyed in every space it inhabits, maintaining unity and alignment at all times. To build lasting recognition across generations and make its logo and core values memorable, it's crucial that every aspect of communication, from product design to marketing, speaks in a single, cohesive voice. This narrative originates with the product itself and extends into all visible media, resonating throughout the consumer's social landscape.

The brand's commitment begins with creating a "quality product," paired with a fitting retail environment to make a powerful first impression. When customers enter a store, they step into the brand's story; when they interact with its communications or wear its products, they experience this narrative firsthand. Consistently delivering the same message and experience at every touchpoint is essential for building an enduring and meaningful brand story.

Question 4: **From a brand communication strategy perspective, stories offer brands the opportunity to create an emotional bond with their target audience, enhance memorability, and increase the effectiveness of their message. Has the BENETTON story engaged in such an interaction with its target audience?**

Benetton integrates the core themes of its brand story into its communications, connecting with its target audience and strengthening brand perception. To highlight and reinforce the concepts of "inclusiveness and diversity" embedded in Benetton's DNA, the brand engages with thousands of people through special events for children on April 23, National Sovereignty and Children's Day, a day dedicated each year to celebrating and uplifting children.

Benetton also amplifies its message by collaborating with opinion leaders, prominent celebrities, and influencers. As part of the sustainability-focused Green B project, a global initiative led by Benetton, products are shared with these influencers to promote the brand's sustainable practices and projects.

Through the recent "Play in the Museum" initiative, Benetton further underscores its commitment to inclusivity by uniting diverse groups around art. The project encourages children and their parents to engage in art and play together, fostering awareness and appreciation for inclusivity among future generations.

Benetton also remains in close contact with its audience on social media, using posts and interactions to reinforce and share its brand story continuously.

Question 5: What are the reflections of Benetton's brand story on its products and services??

Benetton is a renowned fashion brand that integrates an ethical production approach and a sustainable philosophy into every aspect of its work. This commitment to ethical production is evident in each Benetton product, with sustainability deeply embedded in the brand's identity and reflected across its product range. For years, consumers have associated Benetton with its iconic items: organic cotton T-shirts, collections crafted from natural linen, and cardigans and sweaters made from premium, enduring merino wool. These timeless pieces remain some of Benetton's most recognizable and impactful products.

Question 6: What are the storytelling strategies of BENETTON on digital platforms?

With the rise in mobility, digital platforms have become an integral part of daily life. To effectively connect with their target audience, Benetton creates media plans that leverage platforms like Meta channels, YouTube, and niche channels with strong local followings. Content for these platforms is either adapted or newly created to align with each platform's unique characteristics, ensuring that the brand's story resonates with each specific audience.

Question 7: How does BENETTON use storytelling as part of its marketing strategies?

Benetton emphasizes the importance of integrating its historical brand narrative across all marketing communication channels, employing comprehensive 360-degree strategies. The brand enhances its innovative image by effectively utilizing new communication tools.

Last season, the global "We Are Family" campaign was featured on platforms like YouTube and Instagram. They localized the campaign and conducted successful influencer collaborations, ensuring the message reached audiences not just through campaign videos, but also by embedding it into their daily lives via social media.

Moving forward, Benetton plans to present products with compelling stories through innovative media, transforming them into engaging narratives through strategic and creative campaigns. As part of this approach, the brand will continue to convey the core concepts that define its identity in imaginative ways across various media platforms.

Question 8: What are BENETTON's plans and goals for storytelling in the future?

The brand envisions children as the future leaders of its community and will maintain its focus on creativity-driven interactions through events and innovative marketing campaigns tailored to young audiences. It aims to enhance connections with both potential and current customers through targeted communication initiatives. Looking ahead, the brand plans to leverage the creative and interactive capabilities of digital media in its campaigns. Benetton will continue to share its brand narrative by adapting it across various platforms with a comprehensive communication strategy.

CONCLUSION

Storytelling plays a crucial role in building an emotional bond between a brand and its audience, establishing a unique and memorable identity. Well-crafted stories make the brand more human-centered and memorable. By sharing a meaningful story, a brand offers consumers an experience that connects them with its values and culture, going beyond simply promoting products or services. This approach strengthens customer loyalty and distinguishes the brand from its competitors.

For brands like Benetton, storytelling infused with social messages reinforces a strong and purposeful image. Benetton's narrative, which includes challenging biases, celebrating diversity, and addressing social issues, highlights these principles. This approach elevates the brand from merely selling clothing to embodying a social responsibility, making it more significant in the eyes of consumers. Through this approach, Benetton develops a brand identity that transcends fashion, aiming to foster social awareness, with storytelling serving as a core element of this identity.

To conclude, storytelling helps a brand secure a lasting presence in people's minds, build customer loyalty, and create a sustainable impact.

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CHAPTER 5

THE IMPACT OF INNOVATION ON DOMESTIC INVESTMENT IN NORTH AFRICA AND TURKEY: PANEL ARDL

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1. INTRODUCTION

Understanding how innovation affects domestic investment in North Africa and Turkey is critical for understanding the dynamics of economic growth and technical advancement in these countries. The Global Innovation Index (GII) provides a useful lens through which to investigate how innovation effects domestic investment. Innovation stimulates economic growth by increasing productivity, encouraging entrepreneurship, and promoting the acceptance of new technology. In North Africa and Turkey, where economic growth is dependent on recruiting investments and fostering local companies, the link between innovation and domestic investment is especially important. In these areas, creating an atmosphere that supports innovation can result in higher domestic investment. Innovative efforts, such as R&D projects and the use of innovative technology, can help these countries attract local investors. The GII is a comprehensive measure of innovation capabilities, taking into account criteria like as R&D investment, technical preparedness, and the quality of innovationoutputs. By investigating how innovation impacts domestic investment in North Africa and Turkey, we get insight into the policies and tactics required to utilize innovation for economic growth. This research assists policymakers in identifying areas where innovation investments can have the greatest impact on increasing domestic investment and encouraging long-term economic growth.

Overall, The study used a Panel ARDL model to examine the impact of innovation on domestic investment (DI) in North Africa and Turkey. It aims to better understand the link between innovation and domestic investment (DI) across both short and long periods, with a focus on investment patterns in Morocco, Algeria, Tunisia, Egypt, and Turkey from 2011 to 2022. This study is crucial for understanding the economic difficulties in these areas and providing policymakers with guidance on how to design effective measures. It employs creative approaches to tackle issues including unemployment, poverty reduction, and investment promotion.

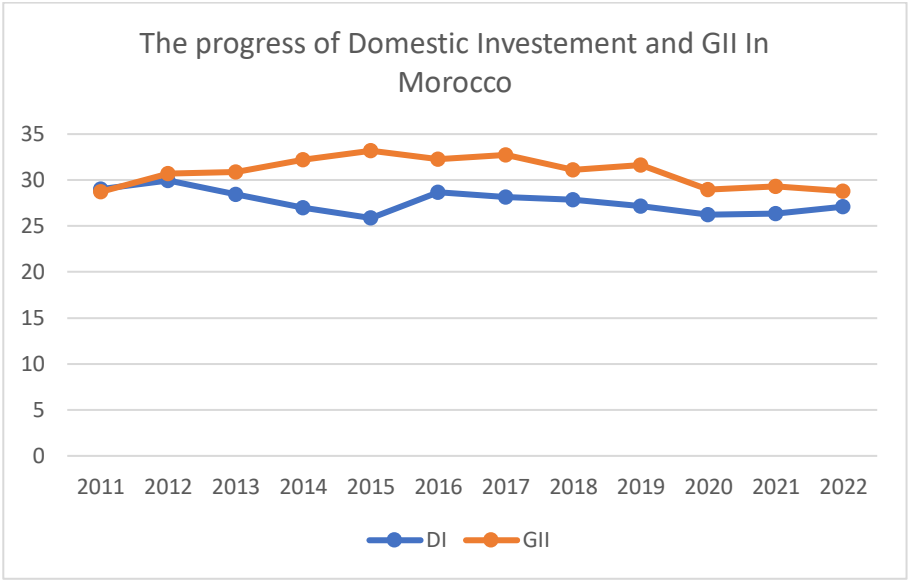

Figure 1: The progress of Domestic Investment and GII In Morocco

The data given illustrates changes in Domestic Investment (DI) and the Global Innovation Index (GII) between 2011 and 2022. DI ranged between 25.87 and 29.95, whereas GII fluctuated between 28.73 in 2011 and 32.72 in 2017, before falling to 28.8 in 2022.

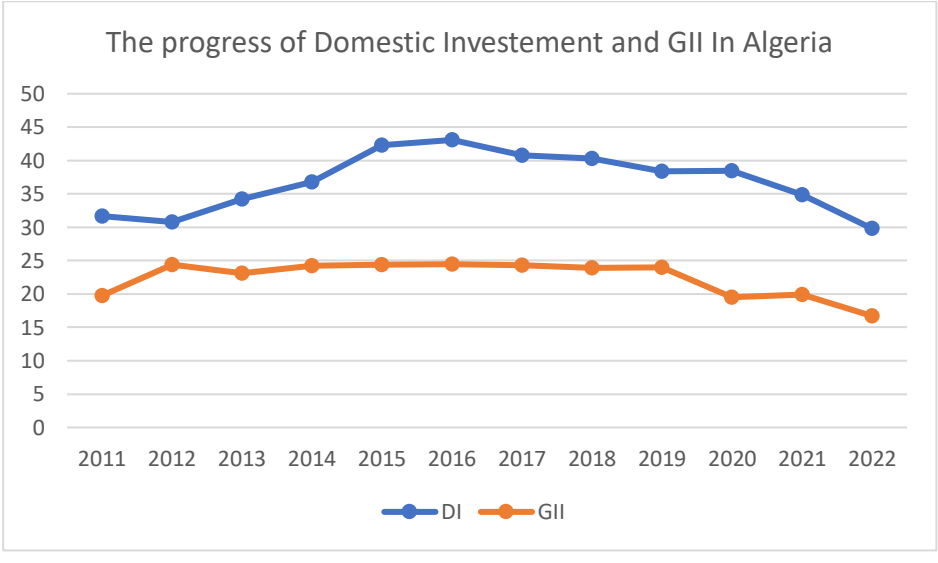

Figure 2: The progress of Domestic Investment and GII In Algeria

The statistics show the patterns in domestic investment (DI) and the Global Innovation Index (GII) from 2011 to 2022. DI varied, peaking at 43.07 in 2016 and falling to 29.80 in 2022. In contrast, GII remained reasonably constant, peaking at 19.79 in 2011 and steadily falling to 16.7 by 2022.

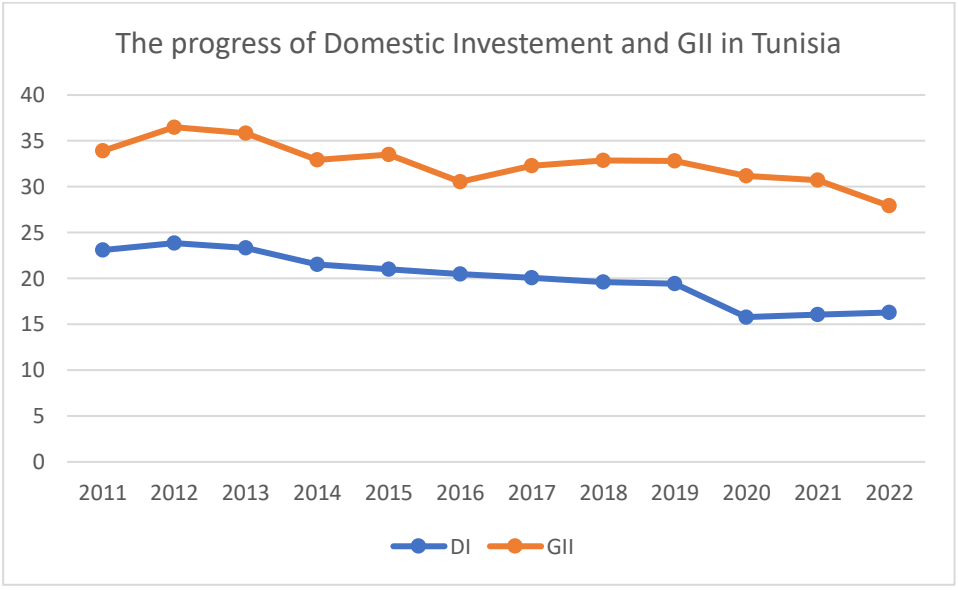

Figure 3: The progress of Domestic Investment and GII In Tunisia

The supplied data depicts the patterns in Domestic Investment (DI) and the Global Innovation Index (GII) from 2011 to 2022. DI readings have gradually decreased over time, beginning at 23.11 in 2011 and falling to 16.31 by 2022. Similarly, the Global Innovation Index (GII) values have decreased from 33.89 in 2011 to 27.9 in 2022.

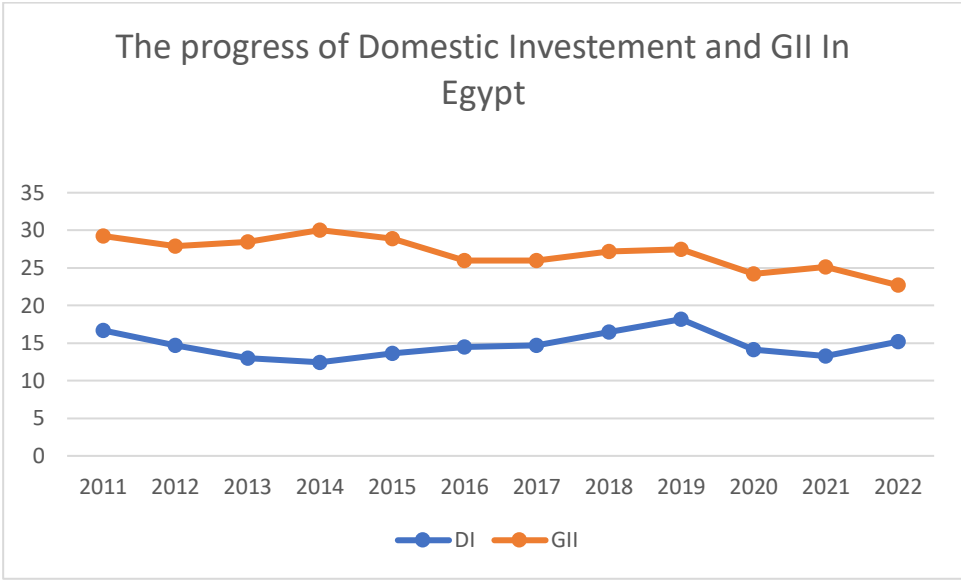

Figure 4: The progress of Domestic Investment and GII In Egypt

Domestic Investment (DI) and the Global Innovation Index (GII) trends in Egypt fluctuate between 2011 and 2022. Domestic investment fell steadily from 2011 to 2014, then increased somewhat in 2015, fell again in 2016, and remained pretty constant afterward. Meanwhile, the GII swings throughout the time, peaking in 2011 and 2014, then gradually declining until 2016, when it becomes reasonably constant. Despite these changes, there does not appear to be a clear continuous relationship between DI and GII in Egypt over the study period.

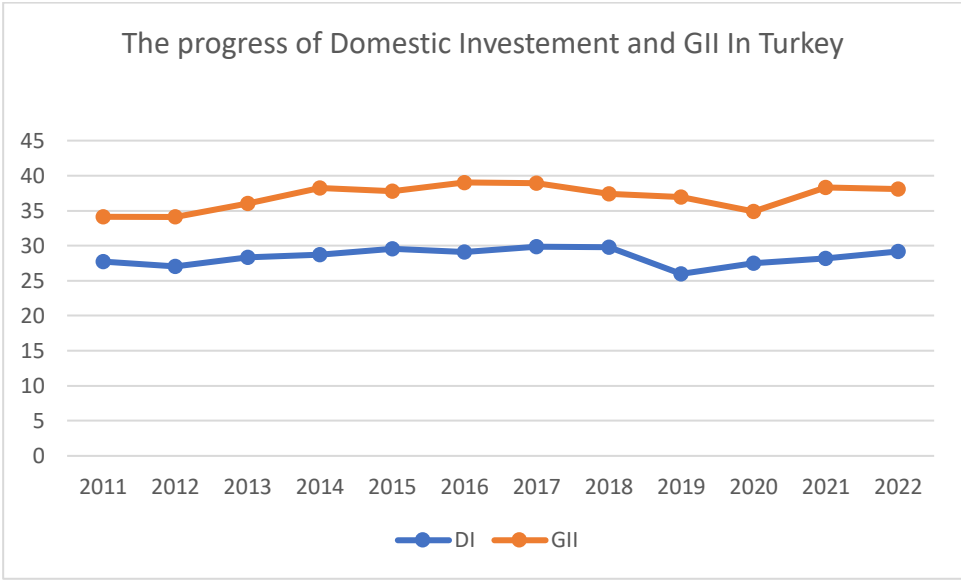

Figure 5: The progress of Domestic Investment and GII In Turkey

The statistics illustrate trends in Domestic Investment (DI) and the Global Innovation Index (GII) from 2011 to 2022. DI remained pretty steady, beginning at 27.74 in 2011 and peaked at 29.86 in 2017, before dropping to 29.16 by 2022. In contrast, GII values changed more dramatically, beginning at 34.11 in 2011 and peaking at 39.03 in 2016, before stabilizing in the mid to high 30s range, reaching 38.1 in 2022.

2. Literature review

Domestic investment is a crucial engine of economic growth since it creates jobs, increases output, stimulates innovation, and contributes to a region's or country's overall economic development. These investments can be made by domestic or international enterprises and can take several forms, including equity, debt, fixed assets, research and development (R&D), and marketing expenses. Domestic investment promotes innovation by supporting research and development initiatives, resulting in technical improvements and the production of new products or services that contribute to economic growth. On the other side, innovation is critical to economic growth because it creates new business possibilities, increases productivity, and boosts competitiveness. Innovative organizations are better positioned to develop new goods and enter new markets, increasing market share and profitability through improved production efficiency, lower costs, and higher product

quality (Bakari, El Weriemmi, & Yedder, 2023). It is crucial to highlight that, because we have not discovered any study that evaluates the influence of innovation on domestic investment, we will only look at studies that use the Global Innovation Index (GII) to measure innovation.

Thus, The Global Innovation Index (GII), a crucial indicator for evaluating innovation, is presented in our study. The Global Innovation Index (GII) assesses countries on their ability to innovate and how well they do in a number of areas, such as institutional frameworks, human capital, infrastructure, market sophistication, and technological advancements. The GII gives businesses and governments the ability to make well-informed decisions that promote economic growth and advancement by offering a worldwide overview of innovation trends (WIPO, 2023).

Previous academic articles that used the GII index in their research have investigated a variety of topics of innovation. For instance, the GII index has been a useful analytical tool for assessing the efficacy of countries' government initiatives. İn this regard, Kawabata and Camargo Junior (2020) assert that the efficiency of government administration and the quality of regulations are key factors influencing a country's institutional quality in relation to innovation activities. Correspondently , Suzuki and Demircioglu (2019) claim that countries with greater degrees of impartial and professional public administration have much higher national levels of innovation outputs. Additionally, (Hoa, Xuan, & Thu, 2024) analysis confirms the critical role that renewable energy plays in moderating the link between innovation and economic growth. İn the same way, Dempere, Qamar, Allam, and Malik (2023) suggest that government initiatives supporting the GII and its constituent variables may have a good economic impact, accompanied by a decrease in self-employment, but have no significant effect on FDI. Also, The Global Innovation Index (GII) and Gross Domestic Product (GDP) were shown to have a positive and substantial association, with Foreign Direct Investment (FDI) performing as a mediator in this relationship (Çemberci, Civelek, & Cömert, 2022), Moreover, Leitão, Dos Santos Parente, Balsalobre-Lorente, and Cantos Cantos (2023) confirm that Innovation plays a critical role in encouraging the acceptance and growth of renewable energy consumption. It includes the widespread use of renewable energy technology. Similarly Mohamed, Liu, and Nie (2021) discovered a strong negative relationship between innovation and long-term economic growth in Egypt. In addition, Correa (2012) study looked at the link between competition and

innovation in US businesses and found conflicting results: although there was a positive association from 1973 to 1982, there was no significant relationship from 1983 to 1994. Similarly, Girma, Gong, and Görg (2009) found a positive link between foreign direct investment (FDI) at the business level and inventive activity, but a negative correlation with inward FDI at the sector level. In a comparable manner (Huan & Qamruzzaman, 2022) discovered a statistically significant positive association between innovation in the technological, financial, and environmental aspects and FDI.

Previous research has repeatedly confirmed the validity of utilizing the GII index as a trustworthy indicator for assessing innovation. This adds credence to its inclusion in the present examination of the link between innovation and Domestic Investment (DI).

3. Methodology and data

This section uses STATA to evaluate the influence of innovation on domestic investment (DI) in North African nations (Morocco, Algeria, Tunisia, and Egypt) and Turkey. Our goal is to figure out if innovation has a beneficial or detrimental impact on DI in these nations. In addition, we make recommendations based on the observed link between innovation and DI.

Furthermore, we use the Panel Autoregressive Distributed Lag (ARDL) technique to analyze the impact of innovation on domestic investment in North Africa and Turkey from 2011 to 2022. The ARDL model allows you to test for long-run equilibrium linkages between innovation (GII), DI, and other independent variables.

To recap, we use the ARDL panel model to examine both short-term and long-term relationships between independent and dependent variables, accounting for integrated order (0) and order (1) variables. The ARDL model includes three estimating methods: pooled mean group (PMG), mean group (MG), and dynamic fixed effects model (DEF). Given the heterogeneity in nations' responses to economic shocks and policies, we use the "Pooled Mean Group" (PMG) model. This approach enables us to estimate short-term variables in a specific way while keeping long-term structural coefficients reasonably consistent across nations (Pesaran, Shin, & Smith, 1999).

The following function can be used to analyze the relationship between **domestic investment (DI) and innovation**:

Table 1: Data source and variable definition

Variables	The definition	Source
DI	Gross fixed capital formation (% of GDP)	World development indicator
FDI	Foreign direct investment, net inflows (% of GDP)	World development indicator
Pop	Population growth (annual %)	World development indicator
JOB	Unemployment, total (% of total labor force)	World development indicator
GII	Global Innovation Index	World Intellectual Property Organization (WIPO)

DI = f(GII, POPG, FDI, JOB,)

We have selected "DI" as our dependent variable, representing Domestic Investment and encompassing Gross Fixed Capital Formation. Additionally, we have identified five independent variables, as detailed earlier. The structure of our model is outlined below:

$$\mathbf{DI} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\mathbf{GII} + \boldsymbol{\alpha_2}\mathbf{POPG} + \boldsymbol{\alpha_3}\mathbf{FDI} + \boldsymbol{\alpha_4}\mathbf{JOB} + \boldsymbol{\mu}$$

Thus, the model is designed as follows:

Model Specification:

$$\Delta y_{it} = \theta_i\left(Y_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \, \Delta(Y_i)_{t-j} + \sum_{j=1}^{p-1} \delta_y^i \, \Delta(X_i)_{t-j} + \mu_i + \varepsilon_{it}$$

4. Empirical results

Table 2: Descriptive statistics

Variable	Obs	Mean Std. Dev.	Min	Max
DI	60	25.52687 8.028878	12.44601	43.07444
FDI	60	1.622846 .8129527	-.3240122	3.285189
Pop	60	1.474229 .4293687	.7569049	2.343793
JOB	60	11.85677 2.973897	6.397	18.629
GII	60	29.95183 5.428571	16.7	39.03

The dataset shows major economic variables such as domestic investment (DI) at 25.53, foreign direct investment (FDI) at 1.62, population (Pop) at 1.47, unemployment rate (JOB) at 11.86, and global innovation index (GII) at 29.95. These measurements provide insights into economic dynamics, facilitating extensive study and interpretation.

4.1. Unit root test

After ensuring that our panel is strongly balanced, and before running the ARDL test or any other test, a very important test, the unit root test, should be performed. In this test, we will investigate the model's stationarity, or whether the model is stable or unstable. If the model is not stable, we acknowledge that the estimated regression model we have in hand is inadequate, resulting in an inaccurate regression. There are several tests available to assess model stationarity; however, the most well-known are the IPS (Im-Pesaran-Shin test) and LLC (Levin-Lin-Chu test). As a result, we will utilize the IPS and LLC to assess our model's stationarity. it is worth mentioning that according to these tests:

- Null hypotheses: All panels contain unit roots

The alternative hypotheses: Some panels are stationary

Table 4: Levin-Lin-Chu unit-root test

Variables	Levin-Lin-Chu unit-root			
	At level		At First Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
DI	-2.3824***	- 2.4381***	- 2.7686 ***	-3.2789 ***
FDI	-1.5437*	-2.7842***	-3.5813***	-3.8169 ***
POP	-0.3913 (no)	-4.0018 ***	-3.3392 ***	-5.4227 ***
JOB	-1.1346 (no)	-3.6891***	-3.4466 ***	-2.7265 ***
GII	1.5781 (no)	-1.7950 **	-1.5699 *	-0.6277 (no)

Notes:
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
b: Lag Length based on SIC
c: Probability based on MacKinnon (1996) one-sided p-values.

Variables	Im-Pesaran-Shin unit-root			
	At level		At First Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
DI	-1.5600 (no)	-1.9881 (no)	-2.8541***	-3.1672***
FDI	- 2.8672***	-3.6741***	-4.5653***	-3.9783***
POP	0.2800 (no)	-2.2246 (no)	-2.7836**	-2.4254*
JOB	-1.0481 (no)	-2.1782 *	-2.5897**	-2.5188**
GII	-1.1541 (no)	-2.2421*	- 3.8896 ***	-4.9320 ***

Notes:
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
b: Lag Length based on SIC
c: Probability based on MacKinnon (1996) one-sided p-values.

-

In both the Im-Pesaran-Shin and Levin-Lin-Chu unit-root tests, the variables exhibit varied degrees of relevance in reaching stationary behavior. Domestic Investment (DI) and Foreign Direct Investment (FDI) tests consistently show statistical significance, implying stationarity after differencing. Population (POP) yields mixed findings, with significance detected in the first difference tests but not consistently at the level in both tests.Unemployment (JOB) is statistically significant in various tests, especially the initial difference tests.

The Global Innovation Index (GII) has varied degrees of significance throughout the tests, indicating statistical significance after differencing but not consistently at the level.

4.2. Pedroni's cointegration tests

Table 5: Pedroni's cointegration tests

Test Stats.	Panel	Group
v	-.67	.
rho	1.371	2.164
t	-1.265	-1.718
adf	-1.146	-2.012

This table displays Pedroni's cointegration test, and we utilize the V-statistic to investigate cointegration and long-term correlations between the independent and dependent variables. It is crucial to note that if the V-Statistic

is less than the test statistics for rho, t, and adf, we reject the null hypothesis that no cointegration exists; but, if the V-Statistic is greater than the other test statistic, we do not reject the null hypothesis. Because the V-Statistic (-0.67) is clearly lower than the other values in both the panel and the group, we can apply Pedroni's cointegration test to reject the null hypothesis of no cointegration. This shows a long-term link between our variables.

4.3. Hausman test

The Hausman test, on the other hand, may be used to determine if PMG and MG differ considerably. The null hypothesis for this test states that there is no significant difference between the PMG and MG values. If the nulls are not rejected, they are not significantly different.

Table 6: HAUSMAN TEST

Coefficients -	--			
(b)	(B)	(b-B)	sqrt(diag(V_b	V_B))
mg	pmg	Difference	S.E.	
FDI -3.4658	.0133547	-3.479155	50.3869	
Pop 57.59945	11.15436	46.44509	454.0407	
JOB -1.741624	-1.068365	-.6732586	36.75559	
GII -1.443027	.4581485	-1.901176	17.59651	

b = consistent under Ho and Ha; obtained from xtpmg
B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.47
Prob>chi2 = 0.9763

The null hypothesis of homogeneity was established by using the Hausman test and comparing the mean group (MG) and pooled mean group (PMG) estimators.

If the p-value is less than 0.05, we dismiss the bull hypothesis. As a result, our P-value exceeds 0.05.

The homogeneity null hypothesis cannot be rejected. The model therefore supports the PMG estimator.

Table 7: Long-run estimation

Variables	Coef.	Std. Err.	z	P value
FDI	.0133547	.3375096	0.04	0.968
Pop	11.15436	3.69827	3.02	0.003
JOB	-1.068365	.2313206	-4.62	0.000
GII	.4581485	.1841976	2.49	0.013

The investigation sheds light on the long-term link between several variables and domestic investment(DI).

The coefficient for Domestic Investment (DI) is 0.0133547, with a p-value of 0.968, suggesting that there is no statistically significant long-term relationship with the variable under consideration.

In contrast, the findings show a substantial long-term link between population (Pop) and domestic investment (DI), with a coefficient of 11.15436 and a p-value of 0.003. This implies a favorable relationship between population and domestic investment (DI).

Similarly, unemployment (JOB) has a strong negative long-term relationship with domestic investment (DI), as shown by a coefficient of -1.068365 and a p-value of 0.000. This suggests that greater unemployment rates lead to lower levels of domestic investment (DI).

Furthermore, with a correlation of 0.4581485 and a p-value of 0.013, the Global Innovation Index (GII) and Domestic Investment (DI) show a statistically significant long-term link. This implies that, over time, higher levels of innovation are related to bigger inflows of domestic investment (DI).

Table 7: Short-run estimation for each country

Morocco			
Variable	Coefficient	Std. Error	P-value
ECT	-.2848023	.12898474	0.027
FDI	-.7365169	.396388	0.063
Pop	25.4892	8.826281	0.004
JOB	-1.097279	.3226625	0.001
GII	-.5770889	.2103549	0.006
C	3.727883	1.705207	0.029
Algeria			
Variable	Coefficient	Std. Error	P-value
_ECT	-.4061416	.2268982	0.073

FDI	1.322515	1.156745	0.253
Pop	12.0363	32.99277	0.715
JOB	1.207679	.6581944	0.067
GII	-.5373453	.3447012	0.119
C	7.436484	3.739047	0.047
Tunisia			
Variable	Coefficient	Std. Error	P-value
ECT	-.8003236	.2631557	0.002
FDI	2.174044	.6036853	0.000
Pop	-32.64563	9.966098	0.001
JOB	.5703411	.3079243	0.064
GII	-.6443681	.2532152	0.011
C	6.752581	3.32311	0.042
Egypt			
Variable	Coefficient	Std. Error	P-value
ECT	-.3250933	.0264487	0.000
FDI	1.103479	.0550033	0.000
Pop	-7.646887	1.34256	0.000
JOB	-1.493394	.1058159	0.000
GII	-.1059565	.0398352	0.008
C	-4.406815	.5880465	0.000
Turkey			
Variable	Coefficient	Std. Error	P-value
ECT	-.1948775	.1234429	0.114
FDI	.8218504	.6349087	0.196
Pop	-2.623908	2.015732	0.193
JOB	-.7740783	.2535149	0.002
GII	.0797924	.1790803	0.656
_C	1.904116	1.213823	0.117

In Morocco, the Error Correction Term (ECT) coefficient is negative and very significant, indicating that the country is rapidly adjusting to long-run equilibrium at 28.48%. The coefficient for FDI indicates a negative link, which is not statistically significant at the usual level, showing a weak association. Population (Pop) has a statistically significant positive association with Domestic Investment, implying that a larger population leads to more domestic investment. Unemployment (JOB) has a strong negative association with domestic investment, implying that greater unemployment rates reduce domestic investment. The Global Innovation Index (GII) indicates a marginally significant negative connection, implying that higher innovation levels are associated with lower domestic investment.

In Algeria, the Error Correction Term (ECT) coefficient is noticeably negative and very significant, indicating a speedy 40.61% adjustment to long-term equilibrium. However, the FDI coefficient, while positive, does not reach statistical significance, indicating that there is no substantial relationship between FDI and domestic investment. Notably, both population (Pop) and unemployment (JOB) have a positive relationship with domestic investment, meaning that larger populations and greater jobless rates encourage more domestic investment. Nonetheless, the significance of the Population coefficient has not been observed. Furthermore, the coefficient for the Global Innovation Index (GII) is negative but not statistically significant, implying an ambiguous link between innovation and domestic investment in Algeria.

Tunisia's Error Correction Term (ECT) coefficient is negative and extremely significant, suggesting that the country is rapidly adjusting to long-run equilibrium at an 80.03% pace. FDI has a significant positive association with domestic investment, implying that more FDI leads to increasing domestic investment. Population (Pop) and unemployment (JOB) both have substantial positive associations with domestic investment, implying that greater population and unemployment rates lead to more domestic investment. The Global Innovation Index (GII) coefficient is negative and significant, showing that greater levels of innovation lead to lower domestic investment.

Egypt has a negative and extremely significant Error Correction Term (ECT) coefficient, suggesting a 32.51% rate of adjustment to long-run equilibrium. FDI has a significant positive association with domestic investment, implying that greater FDI leads to more domestic investment. Population (Pop) and unemployment (JOB) both have statistically significant positive associations with domestic investment, implying that greater population and unemployment rates lead to more domestic investment. The Global Innovation Index (GII) coefficient is negative and significant, showing that greater levels of innovation lead to lower domestic investment.

In Turkey, the Error Correction Term (ECT) coefficient shows a negative trend (albeit it is not statistically significant), indicating a potential but unclear adjustment toward long-run equilibrium. The coefficient for Foreign Direct Investment (FDI) is positive but not statistically significant,

indicating a possible link between FDI and domestic investment. Population (Pop) has a negative connection with domestic investment, although it is not statistically significant. However, the Unemployment (JOB) coefficient is negative and highly statistically significant, implying that greater levels of unemployment may result in increased domestic investment in Turkey. Furthermore, the coefficient for the Global Innovation Index (GII) is positive but not statistically significant, demonstrating a weak link between innovation and domestic investment in Turkey.

5.Diagnostic tests

4.4. Correlation

Correlation is defined as the existence or absence of a relationship between two models of values generated from the same issue. The correlation coefficient quantifies this link by establishing the sign of the correlation (positive or negative) as well as the intensity of the link. The degree of connection is graded on a scale of 0 to 1, as we'll see later.

Table 8: Correlation

	DI	FDI	Pop	JOB	GII
DI	1.0000				
FDI	-0.3819	1.0000			
Pop	0.0257	-0.2694	1.0000		
JOB	-0.2359	-0.1340	-0.2718	1.0000	
GII	-0.1498	0.3641	-0.5711	0.1243	1.0000

The correlation statistics between explanatory variables are less than 80%, indicating that the variables have a non-linear connection. These correlation coefficients suggest that while there are some relationships between the variables, they are not strongly linearly related.

4.5. Serial correlation

Autocorrelation enables the detection of regularities and repeating patterns in a signal, such as a periodic signal affected by a lot of noise, or a fundamental frequency of a signal that does not really include this fundamental but includes it with many of its harmonics.

Table 9: Serial Correlation

Variable	HR-stat	p-value	N	maxT	balance?
DI	+ 1.14	0.256	+ 5	12	+ balanced
FDI	+ 1.61	0.108	+ 5	12	+ balanced
Pop	+ -2.18	0.029	+ 5	12	+ balanced
JOB	+ 1.02	0.308	+ 5	12	+ balanced
GII	+ 0.47	0.637	+ 5	12	+ balanced

The table displays the outcomes of the first-order serial correlation test conducted on the variables Domestic Investment (DI), Foreign Direct Investment (FDI), Population (Pop), Jobs (JOB), and Global Innovation Index (GII).

In essence, after examining the HR-statistic and associated p-values, no noteworthy first-order serial correlation is detected within the dataset for any of the variables DI, FDI, Pop, JOB, and GII. This indicates that our model is not affected by serial correlation problems, as all p-values for the variables exceed 5%.

4.6. Multicollinearity test

If all VIFs are equal to 1, there is no multicollinearity, but if some VIFs are greater than 1, the predictors are correlated. There is no consensus on the value beyond which we must consider that there is multicollinearity. Some authors, like Paul Allison, say they look more closely at variables with VIF greater than 2.5. Others only worry about 5. There is no statistical test that would tell if there is collinearity or not.

Table 10: Multicollinearity test

Variable	VIF	1/VIF
Pop	1.61	0.621407
GII	1.60	0.625929
FDI	1.22	0.819576
JOB	1.14	0.879407
Mean VIF	1.39	

The table shows the findings of the Variance Inflation Factor (VIF) study for the variables Population (Pop), Global Innovation Index (GII), Foreign Direct Investment (FDI), and Jobs (JOB). Overall, the mean VIF for all variables is 1.39, indicating that the model's independent variables are not highly multicollinear. This implies that the

independent variables do not overduplicate each other's explanatory power and are appropriate for inclusion in the regression analysis.

CONCLUSION

At last, the analysis of the relationship between Domestic Investment (DI), Foreign Direct Investment (FDI), population (Pop), unemployment (JOB), and the Global Innovation Index (GII) in Morocco, Algeria, Tunisia, Egypt, and Turkey reveals nuanced dynamics influencing domestic investment behavior in these countries.
The unit-root tests reveal varying degrees of stationarity and statistical significance between the variables. While DI and FDI remain significant after differencing, POP and GII show inconsistent results, indicating that their associations with DI are influenced by different behaviors.
Cointegration tests indicate a long-term relationship between the variables, with stable correlations between independent and dependent elements. The Hausman test prefers the pooled mean group (PMG) estimator, which indicates coefficient homogeneity across the nations tested.

In the long run, population (Pop) has a positive connection with DI, highlighting the importance of demographic variables in promoting investment. Unemployment (JOB) has a negative correlation with DI, indicating the influence of labor market circumstances. Furthermore, the Global Innovation Index (GII) is positively related to DI, demonstrating that innovation has a long-term impact on domestic investment inflows.

In the short run, each country exhibits distinct dynamics. In Morocco, the Error Correction Term (ECT) emphasizes quick adaptations to long-run equilibrium, with a substantial positive relationship found between population (Pop) and DI, implying that bigger population numbers promote higher DI. Higher unemployment rates (JOB) are associated with lower DI, although the Global Innovation Index (GII) indicates a minor negative relationship with DI.In Algeria, the FDI coefficient is statistically negligible, showing an insignificant link between FDI and DI. Notably, both population (Pop) and unemployment (JOB) have positive relationships with DI, although the GII coefficient suggests a no significant link with DI.

Tunisia's considerable negative ECT coefficient indicates quick adjustment to equilibrium, with FDI showing a significant positive association with DI, meaning that increasing FDI leads to increased DI. Population (Pop)

and unemployment (JOB) have significant positive relationships with DI, however the GII coefficient indicates a negative link with DI. Egypt's ECT coefficient indicates a considerable rate of adjustment to long-run equilibrium, with FDI having a significant positive association with DI. Furthermore, population (Pop) and unemployment (JOB) have statistically significant positive relationships with DI, but the GII coefficient shows a negative link with DI.

Turkey's ECT coefficient indicates a potential adjustment toward long-run equilibrium, but not statistically significant. The positive but modest FDI coefficient indicates a probable relationship with DI. Notably, unemployment has a highly statistically significant negative link with DI, but the GII coefficient has a slight positive relationship with DI.

Diagnostic tests corroborate the regression model's dependability, indicating low multicollinearity among independent variables. Correlation analysis indicates nonlinear correlations between variables, emphasizing their intricate interactions.

Overall, these findings are useful for policymakers seeking to boost domestic investment through focused policies addressing demographic, labor market, and innovation-related issues unique to each country's economic setting. Further study might look at other characteristics and linkages to inform more specific policy approaches and improve investment climates in these countries.

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CHAPTER 6

THE RELATIONSHIP BETWEEN RESPONSIBILITY ACCOUNTING AND SUSTAINABILITY

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1. INTRODUCTION

Responsibility accounting involves a method in accounting to evaluate and manage the effectiveness of departments in a company by tracking costs and revenues according to each department's responsibilities for improved performance assessment and decision making by managers. In contrast as, per Brundtland (1987) sustainable development refers to development that satisfies generations requirements without jeopardizing generations capability to fulfill their own needs. To ensure the long-term success of a business enterprise it is essential to manage and balance its prosperity, with environmental responsibility and social impact.

Lately the significance of integrating sustainability practices into businesses has seen an increase. Within this framework responsibility accounting has emerged as a strategy in attaining sustainability objectives. By utilizing responsibility, accounting businesses can actively manage their social obligations thus contributing to the enhancement of long-term value creation processes. This approach plays a part in mitigating environmental effects and promotes societal wellbeing, through ethical business conduct (Schaltegger and Burritt 2000).

When sustainability is combined with responsibility accounting, in businesses operations it allows them to evaluate their sustainability achievements at the time. This enhances transparency and responsibility which fosters trust among stakeholders (Gray, 2002). Additionally, sustainability. Responsibility aid businesses in executing their sustainability plans efficiently resulting in the attainment of long term objectives (Adams and Frost 2008).

In summary responsibility accounting plays a role in reaching sustainability objectives by aiding companies in lessening environmental and social effects while fostering lasting value generation. The following segment will explore the integration of responsibility accounting with sustainability practices and its advantages, for businesses.

2. THE CONNECTION BETWEEN ACCOUNTABILITY, in ACCOUNTING and SUSTAINABILITY

Responsibility accounting is a form of management accounting that assesses the effectiveness of departments or responsibility centers by allocating costs and revenues to each one. This approach aids in monitoring

the performance of units within an organization facilitating managers in overseeing and managing outcomes (Anthony and Govindarajan 2007). By utilizing this technique responsibility accounting determines which departments have achieved the companys goals and which ones require enhancement.

This method offers an approach to evaluating managers performance by assessing their results against set goals within a timeframe. Many organizations create their accountability reporting frameworks based on designated responsibility areas within the company, outlining the duties of managers concerning aspects, like expenses management and investment returns (Çalış and Altınsoy 2014).

Companies commonly classify responsibility accounting into groups such as cost centers, revenue centers, profit centers and investment centers. Each division is assigned targets regarding expenses or earnings. It is assessed based on their achievements. According to Otley (1999) responsibility accounting holds significance in evaluating performance and controlling management since outlining and assessing the accomplishments of these divisions are crucial, for attaining objectives. In addition, that system motivating departments to achieve their goals and improve the companys performance while also ensuring resource utilization (Drury, 2018).

The concept of sustainability revolves around meeting needs while safeguarding the future for generations to come by considering conservation and social equity, alongside economic progress as outlined in Brundtlands report from 1987.

Finding harmony between economic strategies can also enhance frameworks. To achieve sustainability entails community involvement; social sustainability centers, on preserving a steady economic foundation; and environmental sustainability stresses safeguarding natural resources to fulfill human necessities and enhance quality of life (Tosun, 2009).

Businesses also understand the importance of sustainability in their operations today well; when they implement methods and strategies, in their practices they can help preserve our natural resources minimize harm to the environment and meet their social obligations (Elkington, 1997).

The relationship between responsibility accounting and sustainability highlights how this accounting approach aids companies in reaching their

sustainability objectives by enabling them to monitor and disclose their impact, alongside social and economic performance (Burritt and Schaltegger, 2010).

When it comes to environmental responsibility accounting in a company setting the main focus is, on keeping track of and sharing information about the impact a company has on the environment. This includes looking at factors like carbon emissions, energy usage and waste handling (Schaltegger and Burritt 2000). On the hand social responsibility accounting involves assessing how a company upholds its obligations towards issues like employee rights, workplace safety, community involvement and ethical business conduct (Gray, 2002). Furthermore economic responsibility accounting plays a role in helping businesses reach their operational objectives linked to cost effectiveness efficient resource utilization and term financial stability (Epstein and Roy 2001).

3. CHALLENGES and SOLUTIONS in RESPONSIBILITY ACCOUNTING

Implementing responsibility accounting poses a challenge when it comes to integrating this system within an organization's framework. The task of gathering data, on the costs and revenues of individual departments or responsibility centers can prove to be daunting. Especially for larger corporations, with intricate structures (Bhmani and Langfield Smith 2007).

Ensuring data accuracy and reliability poses another challenge, in this context of responsibility accounting as it heavily relies on collecting data; decisions based on incomplete or erroneous data may be compromised (Chenhall, 2003).

Barriers related to culture and organization can hinder the implementation of responsibility accounting practices well. Hierarchical setups and cultural expectations play a role in shaping employees' sense of accountability and their readiness to assume responsibility. In environments with high power distance norms in place, for instance frontline staff may encounter obstacles in delivering feedback to top level management ultimately limiting the efficiency of the system. Moreover, insufficient communication within the organization and centralized decision-making structures can have effects on these procedures. These obstacles are particularly noticeable in corporations, with layers of management.

Navigating these obstacles might call for an understanding of cultures and tactics to enhance communication, within the organization (Tsui, 2001).

Resistance from managers and employees towards implementing an accounting system at the level poses a notable challenge. It is common for individuals to resist change which in turn hinders the introduction of accounting systems (Burns and Scapens 2000). Moreover, integrating responsibility accounting practices, with structures and procedures proves to be a time intensive and intricate process (Anthony and Govindarajan 2007).

Utilizing progressions plays a role, in the implementation of responsibility accounting; nevertheless effectively incorporating and utilizing these advancements can pose certain difficulties as well. Cutting edge technologies, like data analytics and artificial intelligence can improve the collection and analysis of data; however, their successful integration demands resources and specialized knowledge (Granlund and Malmi 2002).

Utilizing methods is essential when applying responsibility accounting principles in practice. According to Drury (2018) integrating accounting practices into responsibility accounting might entail the adoption of fresh approaches that could lead to adjustments and improvements, in current operational frameworks.

4. THE INTERSECTION of SUSTAINABILITY and ACCOUNTING

The United Nations established the Sustainable Development Goals (SDGs) in 2015 to address challenges such as poverty eradication and environmental protection while promoting peace and prosperity worldwide.

The Sustainable Development Goals (SDG) have significantly influenced businesses by motivating them to reassess their strategies and operations to align with these objectives better. Many companies now integrate the SDG into their term planning and sustainability reporting practices (KPM G, 2017).

5. EXPLORING THE IMPACT of ENVIRONMENTALISM and SOCIAL RESPONSIBILITY on PRACTICES in ACCOUNTING

ESG factors pertain to the standards employed in assessing a company's sustainability practices split into three categories usually.

Environmental considerations encompass the utilization of resources and waste disposal methods, as part of a company's efforts toward energy efficiency and reduction of its carbon footprint in a sustainable manner to combat issues such, as climate change and resource scarcity (Eccles et al., 2014).

Social Aspects of Business; Employee rights and welfare considerations are among the concerns in a business setting as they impact the community and customer relationships significantly according to studies, by Cantele and Zardini (2018).

Factors related to governance include the structure of the board of directors, as ethical standards and auditing procedures that uphold shareholder rights and transparency within companies (Bhagat and Bolton in 2008).

6. SUSTAINABILITY REPORTING STANDARDS and FRAMEWORKS

Numerous guidelines and models have been created to facilitate the practice of sustainability reporting. The GRI Standards are widely recognized as the go-to guidelines, for companies when it comes to sustainability reporting. They offer guidance for businesses to disclose their performance as well as environmental and social responsibilities (Global Reporting Initiative 2016).

The Sustainability Accounting Standards Board (or SASBs) offers a structure that centers around sustainability matters that're financially significant in sectors. They furnish sector details regarding sustainability to keep investors informed about critical sustainability concerns (SASB report, 2018).

The Task Force on Climate related Financial Disclosures (TCFD) offers guidance on how to disclose information related to climate impacts and opportunities, in business operations according to the TCFD framework introduced in 2017.

7. EXPLORING the CONNECTION BETWEEN RESPONSIBILITY ACCOUNTING and SUSTAINABLE PRACTICES

Responsibility accounting serves as a management accounting method utilized for assessing and gauging the effectiveness of responsibility centers through the tracking of costs and revenues respectively. This approach enables organizations to oversee and disclose the achievements of each department or responsibility center separately. On the hand sustainability underscores the importance of harmonizing environmental and social aspects to foster enduring value creation.

The connection between responsibility accounting and sustainability illustrates how these ideas work together harmoniously and reinforce one another objectives. The use of responsibility accounting assists organizations in reaching their sustainability targets by allowing them to assess and document the impact, alongside the economic aspects of each division or department. This methodology offers a dependable evaluation of a company's sustainability efforts (Bebbington and Larrinaga) aiding businesses in the successful execution of their sustainability strategies and achievement of their objectives (Adams and Frost, 2008).

Responsibility accounting plays a role in helping businesses make decisions, about sustainability efforts. It aids in managing aspects like cost effectiveness and optimal resource utilization (Schaltegger and Burritt, 2000). By utilizing responsibility accounting data companies can assess the expenses and advantages of their sustainability projects to drive choices (Epstein and Roy, 2001).

Moreover, responsibility accounting is crucial, for companies as it promotes transparency and accountability in sustainability reporting Sustainability reports which utilize responsibility accounting data provide stakeholders with insights, into a company's governance performance thus building transparency and trust among stakeholders (Gray, 2002; KPMGI, 2017)

The connection between responsibility accounting and sustainability helps businesses reach their goals of creating long term value by balancing cost efficiency and resource efficiency (Burritt and Schaltegger, 2010). This enables businesses to enhance both their results and their overall sustainability performance over time (Eccles et al. 2014).

8. THE INFLUENCE of ACCOUNTABILITY ACCOUNTING on PRACTICES

Responsibility accounting is essential for businesses to reach their sustainability objectives by overseeing and communicating their environmental impact reports on social and economic performance levels.

Businesses use environmental responsibility accounting to monitor and report their impact by tracking natural resource usage and waste management practices well as measuring their carbon footprint. This method enables companies to assess their performance and create strategies. As stated by Schaltegger and Burritt (2000) environmental accounting permits businesses to incorporate expenses and advantages in their statements to balance cost effectiveness with meeting environmental obligations. Moreover, incorporating accounting aids in enhancing the management of risks and assists companies in attaining their sustainability objectives (Burritt and Schaltegger, 2010).

9. SOCIAL RESPONSIBILITY ACCOUNTING

Businesses that practice social responsibility accounting report, on their activities like employee rights protection and ethical business practices to achieve sustainability goals in the community they operate in and beyond well, as to fulfill their social duties and maintain trust with stakeholders effectively by managing social risks. Companies can showcase their dedication to society and employees in a manner through the practice of social responsibility accounting (Gray, 2010).

9.1. Financial Accountability in Business

Monitoring and reporting a company's performance is the focus of economic responsibility accounting which aids businesses in reaching objectives associated with cost effectiveness and resource utilization, for financial growth over time (Epstein and Roy, 2001). This accounting technique enables companies to assess their progress by considering sustainability aspects. By aligning choices, with social impact economic responsibility accounting promotes enduring value generation activities (Eccles et al., 2014).

10. RESPONSIBILITY ACCOUNTING and SUSTAINABILITY PRACTICES, ACROSS INDUSTRIES

In sectors like energy and natural resources sector manufacturing and production sector and service sector responsibility accounting and sustainability are applied differently due, to their dynamics and sustainability needs.

10.1. Resources in the Natural Sector

The energy and natural resources industry is essential, for promoting sustainability by managing impacts responsibly and sustainably using resources wisely and monitoring performance closely through responsibility accounting practices specific to this sector. One important aspect of responsibility accounting in this field involves energy companies using it as a tool for tracking and disclosing their environmental impact data such as carbon footprints and water consumption. Sustainability efforts within the energy sector are centered around utilizing energy sources while prioritizing energy efficiency and implementing measures for protecting the environment. Sustainability initiatives are backed by responsibility accounting to assist businesses in reducing their footprint (Schaltegger and Burritt 2000).

10.2. The field of manufacturing and production industries

The manufacturing and production industry plays a role in promoting sustainability efforts and taking responsibility for their impact and actions. Within this industry, responsibility accounting is utilized to monitor aspects such as material usage, energy consumption, waste management and emissions. Manufacturing firms utilize responsibility accounting to track and improve their social performance in line with their sustainability objectives (Epstein and Roy 2001). Furthermore, this sector embraces practices such as managing supply chains and conducting product life cycle analyses. Keeping track of responsibilities is crucial, for assessing and communicating how well these methods are working (Chenhall, 2003).

10.3. Industry of services

In the service industries the realm of sustainability and accountability practice lie characteristics to consider closely. Within this domain of business operations and services provision there lies an emphasis placed upon social responsibility accounting. Key focal points in this area encompass aspects

such as safeguarded employee rights ensured health and safety standards, meaningful community contributions and adherence, to business conduct (Montabon et al., 2007). Companies operating within the service sector diligently. Disclose their environmental endeavors through the lens of responsible accounting practices. This approach serves to cultivate trust among stakeholders and align business activities with objectives. "Moreover immigration accounting plays a role in improving day to day performance and backing up eco initiatives, within the service industry (Gray, 2002).

Considering the challenges and requirements, in every sector it is crucial to tailor responsibility accounting practices accordingly to address these specific needs effectively. Such adjustments offer businesses benefits in attaining their sustainability goals.

11. POSSIBLE FUTURE ADVANCEMENTS in PRACTICES

This section explores developments, like the shift to digitalization, advancements in intelligence technology, the use of data analytics and changes, in global policies.

11.1. The evolution of technology and Its impact on ecological preservation

Businesses undergo transformation by utilizing technologies to reshape their processes and offerings for improved efficiency and effectiveness, in the modern era. The intersection between transformation and sustainability is found in the technological solutions that assist companies in achieving their sustainability targets. Through digital transformation practices businesses can enhance energy efficiency levels. Refine waste management strategies while making use of available resources (Geissdoerfer et al., 2017). An illustration of this is how Internet of Things) and sensor technologies empower organizations to monitor and regulate data promptly which aids in optimizing energy consumption and minimizing waste (Wang et al., 2015). Moreover the use of technology improves visibility, in the management of supply chains simplifying the oversight of eco practices (Swan, 2015).

11.2. The field of Artificial Intelligence and Data Analytics

Artificial intelligence (AI) and data analytics serve as aids, for sustainability efforts by analyzing data sets to enhance sustainability outcomes effectively and efficiently. For example, machine learning

algorithms can pinpoint energy usage trends to boost productivity and minimize waste (Zhong et al. 2017). Data analytics is essential for monitoring advancements in achieving sustainability objectives and providing updates regarding those advancements. Leveraging big data analytics empowers organizations to gain insights into their societal footprints and implement strategic measures to address them thoughtfully. Wamba et al. In 2015 research highlights the benefits of data analysis, for businesses looking to improve sustainability practices and minimize their impact on the environment.AI and data analysis are crucial, in enhancing supply chain efficiency promoting resource utilization and fostering the creation of eco products (Wamba et al.,2015).

11.3. Current Global Shifts in Policy

Global patterns and governmental adjustments greatly impact sustainability and ethical accounting methods in a way. In detail the global push to address climate change and meet development objectives is leading to shifts in rules and standards (United Nations, 2015). Global pacts such as the Paris Agreement and the European Green Deal urge businesses to lessen their carbon emissions and embrace behaviors. These rules frequently mandate that companies disclose their sustainability initiatives and enhance their performance (European Commission, 2019).

Moreover, it is observed that the current worldwide sustainability patterns have led to investors giving importance to impact and social responsibility when evaluating companies, for investment decisions (Eccles and Klimenkos 2019).

12. CASE STUDY: Y WIND ENERGY COMPANY

The Y Wind Energy Company is involved in generating and distributing energy using accounting methods to achieve its sustainability targets.

12.1. Company Goals

Let’s cut down on carbon emissions by 10%.

Enhance energy efficiency by 15%.

Make sure to set 800K in the budget each year for social responsibility initiatives.

12.2. Data on Performance

The annual carbon emissions of the company total 100000 tons of CO_2 equivalent.

The company generates 2 megawatt hours of energy each year with peak efficiency.

12.3. Social Data on Performance

Employee happiness at work is currently high, at 80%, based on the results of our surveys.

Community Contributions include an expenditure of 450000 Lira, on social responsibility initiatives.

12.4. Economic Data on Performance

The company makes about 50 million TL in revenue each year.

Annual operational expenses total 40 million Lira in a year.

The organization's yearly net income amounts to 10 million Liras.

12.5. Management of Responsibilities and Performance Metrics

It's important to have responsibility centers in place to monitor how the company is doing in meeting its goals efficiently. By using data from responsibility accounting Y Wind Energy Company can assess how it's doing and decide what steps to take to enhance its sustainability efforts.

Responsibility Center	Performance Indicator	Target	Achieved	Change
Solar Energy Production Facility	Carbon Emissions (tons CO2)	20% reduction (80,000 tons)	85,000 tons	15% reduction
Wind Energy Production Facility	Energy Efficiency (KWh)	15% increase (2,300 KWh)	2,200 KWh	10% increase
Corporate Social Responsibility	Social Spending (TL)	800,000 TL	640,000 TL	80%

12.6. Annual Performance Evaluation of the Company

The carbon emissions reduction target of 20% was not fully realized because the company attained only a 15% reduction. This deficiency indicates further needs for improvements in energy efficiency as well as operational processes. Energy efficiency also improved by 10%, failing to reach the 15% target. This stresses the importance of better utilization of innovative technologies and energy management systems. Moreover, social spending reached a level of only 80% of the planned 800,000 TL, which shows that social responsibility projects were not properly planned or budgeted for.

The carbon reduction goal of the company in general was not met, and this still calls for increased investment in renewable energy, as well as efficiency improvements. Social responsibility spending was close to the target; however, better resource allocation and improvement in project impact are still needed. Economic performance was, however, still strong in the company to keep supporting its progress toward sustainability.

12.7. Plans for Next Year

It aims to decrease carbon emission by an additional 10% with new energy efficiency projects during the next year. Besides, this firm increases the annual budget for social responsibility projects to 1.000.000 Turkish Liras and invests in advanced technologies to improve the efficiency of energy production. These steps will provide an opportunity for the firm to move considerably toward its sustainability goals.

13.CONCLUSION

The relationship between responsibility accounting and sustainability is very significant in light of the long-term perspective in business success and meeting objectives set in a sustainable manner. From the experience with Y Wind Energy Company, it has been realized that responsibility accounting provides a system of accountability for the company's environmental, social, and economic performance. Responsibility accounting aids a business in implementing sustainability strategies and supports the creation of long-term value.

Through responsibility accounting, companies maintain the ability to maximize their economic-financial performance as well as that of their impact on the environment and society. Y Wind Energy Company applies

responsibility accounting to account for and report on its sustainability regarding carbon emission reduction, energy efficiency, and social spending. Not all targets were fully achieved; for example, a 20% reduction in carbon emission was only able to achieve a 15% reduction in emissions. This therefore underlines the growing need for much greater emphasis on energy efficiency and operational improvements.

Social performance does show that this company achieved only 80% of its target in social responsibility spending, which insinuates that the planning and budgeting for such projects still needs refinement. On the economic axis, the company had been doing fairly well in striving to meet their set challenges with regard to financial sustainability.

The company aims, in the upcoming period, at a further reduction in carbon emissions by 10%, increasing the budget for social responsibility projects up to 1,000,000 TL, and making investments in new technologies which will contribute to an increase in the efficiency of its energy production. In this respect, all these activities will enable the company to make more substantial progress regarding the sustainability objectives.

In short, responsibility accounting and sustainability complement each other to give companies scope over their environmental, social, and financial responsibilities. Firms could achieve improvements in integrative performance and long-term value creation by effectively incorporating responsibility accounting with sustainability objectives.

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CHAPTER 7

THE IMPACT OF INNOVATION ON FOREIGN DIRECT INVESTMENT IN NORTH AFRICA AND TURKEY: PANEL ARDL

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1. INTRODUCTION

In today's global economy, knowing how innovation affects Foreign Direct Investment (FDI) is critical for countries seeking to enhance economic growth. The Global Innovation Index (GII) is a fundamental metric in our investigation, allowing us to understand how innovation and FDI interact (Dutta, Lanvin, & Wunsch-Vincent, 2019). Innovation, which entails developing and implementing new ideas and technology, is a potent factor propelling economic growth. It boosts productivity, fosters entrepreneurship, and pushes technical improvements (Broughel & Thierer, 2019). Foreign direct investment (FDI) happens when a foreign corporation invests in another country's commercial activities, allowing cash and skills to be transferred across borders (Alfaro & Chauvin, 2016). The GII's viewpoint reveals a complicated link between innovation and FDI. Innovations in fields such as technology and healthcare might attract foreign direct investment by providing enticing investment prospects (Khakimovna, 2024) . In contrast, FDI may encourage innovation by contributing resources and experience to local enterprises(Chen, Jiang, Liang, & Pan, 2022). However, this link is modified by a number of factors, including rules, market circumstances, and technical capabilities.

In summary, the connection of innovation and foreign direct investment (FDI) in North Africa (Morocco, Algeria, Tunisia, and Egypt) and Turkey is critical for the region's socioeconomic growth. We intend to investigate how creative practices affect FDI trends using the Global Innovation Index (GII). This study aims to shed light on the complex link between innovation (as assessed by the GII) and FDI, giving vital insights to stakeholders navigating a path to long-term economic advancement and prosperity.

An Overview Of FDI And GII In The Studied Countries

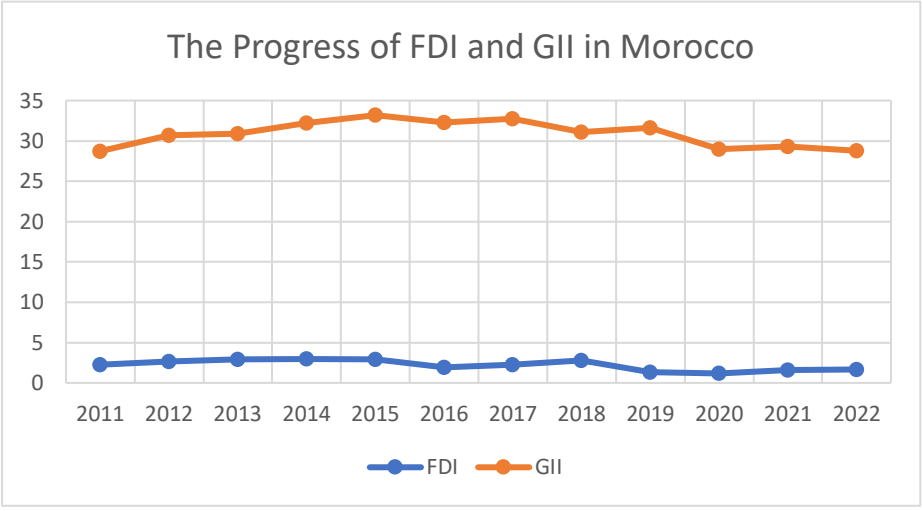

Figure 1: The Progress of FDI and GII in Morocco

Morocco's Foreign Direct Investment (FDI) and Global Innovation Index (GII) rankings fluctuated between 2011 and 2022. FDI inflows peaked in 2014 but fell sharply from 2016 to 2019 before recovering slightly in recent years. Meanwhile, Morocco's GII ratings grew gradually from 2011 to 2015, signifying growth in innovation performance, but have subsequently decreased, hitting a low in 2022.

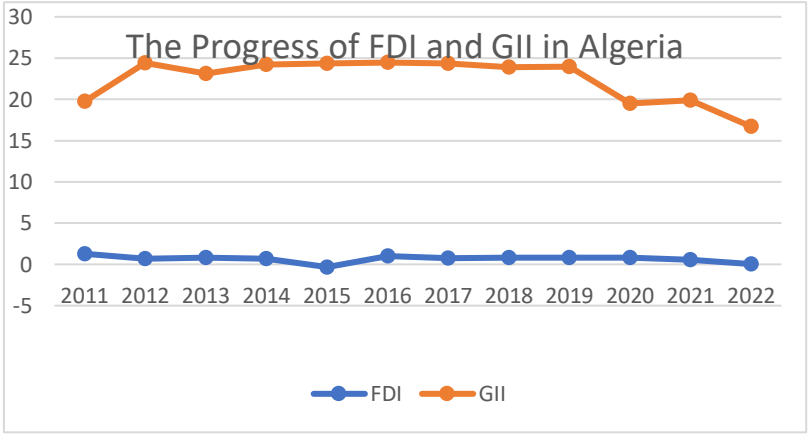

Figure 2: The Progress of FDI and GII in Algeria

Algeria's FDI percentages have shown mixed results, with changes over time but typically reflecting modest increase. However, the negative FDI % in 2015, followed by relatively low percentages in succeeding years, shows that there were periods of economic uncertainty or diminished investor confidence. In terms of innovation, Algeria's GII scores have remained in the low to mid-20s for the majority of the period. We can also see a significant drop in GII scores from 19.9 in 2021 to 16.7 in 2022, indicating a need for increased investment in R&D and technological adoption to drive innovation-driven growth.

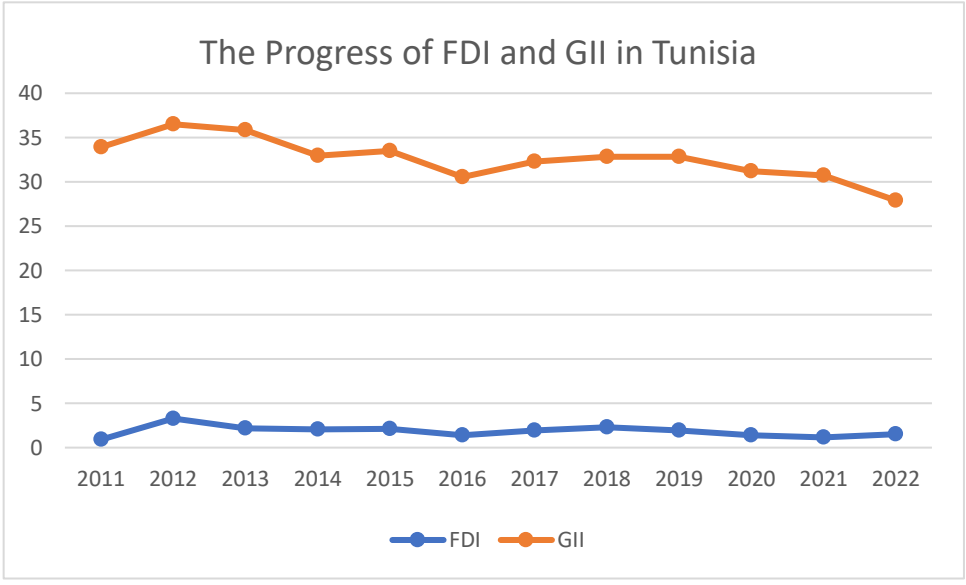

Figure 3: The Progress of FDI and GII in Tunisia

FDI levels have fluctuated over time, peaking at 3.29 in 2012 and thereafter fluctuating in the 1-2 range. This implies considerable volatility in foreign investment inflows into Tunisia's economy. Meanwhile, GII scores have been lowering, from 33.89 in 2011 to 27.9 in 2022.

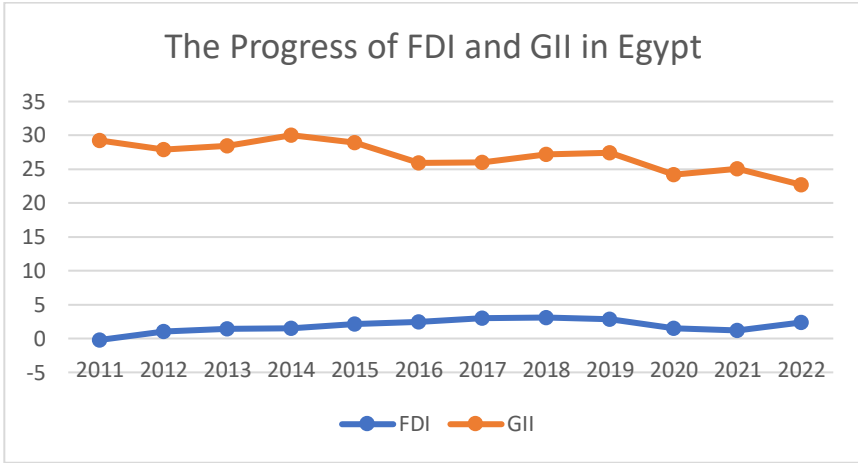

Figure 4: The Progress of FDI and GII in Egypt

Foreign Direct Investment (FDI) levels have seen overall positive development over this time, with considerable gains beginning in 2016 and peaking at 3.10 in 2018. This growing trend indicates increased investor confidence and interest in Egypt's economy. However, the Global Innovation Index (GII) scores reflect a contrary trajectory, declining from 29.21 in 2011 to 22.7 in 2022.

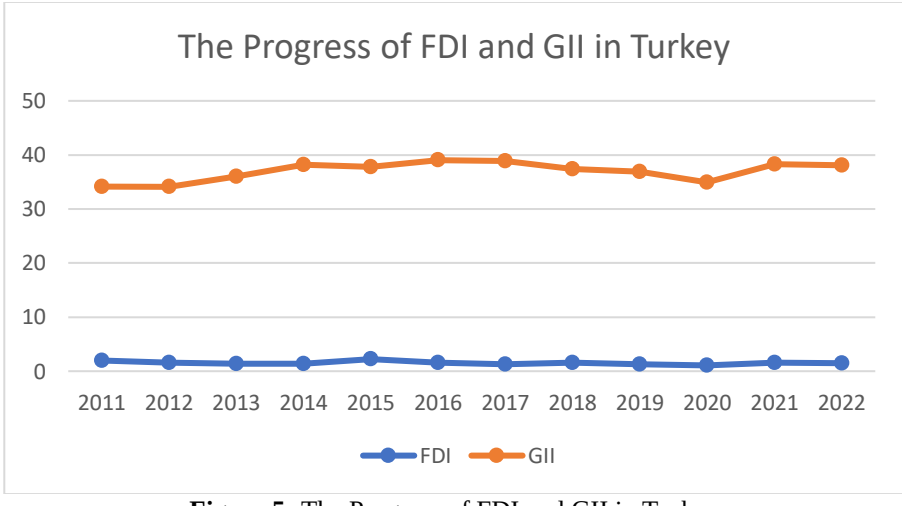

Figure 5: The Progress of FDI and GII in Turkey

FDI levels have fluctuated over time, with peaks in 2011 (1.93) and 2015 (2.23), showing rising foreign investment interest in Turkey's economy.

However, FDI levels have steadily declined in subsequent years, falling to 1.07 in 2020. Meanwhile, Turkey's GII scores have been very stable, staying around the mid to upper 30s, with a peak of 39.03 in 2016.

2. Literature review

Under academic communities devoted to innovation research, discussions over how to evaluate innovation are still under progress (Arundel & Huber, 2013; Cinar, Simms, Trott, & Demircioglu, 2024). Academics are at disagreement about the best method for assessing the effectiveness of innovations at the national level. Prior research had a number of major shortcomings, including a propensity to use restrictive metrics for innovation, including as spending on R&D or patents (Suzuki & Demircioglu, 2019). These measures are narrow in scope, with a strong emphasis on business performance and a primary focus on inventions. It is true that patent or trademark applications mainly document cases of invention or product innovation, ignoring a wider range of inventive endeavors and results (Daizadeh, 2021). Instead of depending just on a small number of particular innovation indicators, our study adopts a more comprehensive strategy by looking at a larger range of innovation-related activities carried out by both public and private organizations.

The Global Innovation Index (GII), a crucial indicator for evaluating innovation, is presented in our study. The Global Innovation Index (GII) assesses countries on their ability to innovate and how well they do in a number of areas, such as institutional frameworks, human capital, infrastructure, market sophistication, and technological advancements. The GII gives businesses and governments the ability to make well-informed decisions that promote economic growth and advancement by offering a worldwide overview of innovation trends (WIPO, 2023).

Previous academic articles that used the GII index in their research have investigated a variety of topics of innovation. For instance, the GII index has been a useful analytical tool for assessing the efficacy of countries' government initiatives. İn this regard, Kawabata and Camargo Junior (2020) assert that the efficiency of government administration and the quality of regulations are key factors influencing a country's institutional quality in relation to innovation activities. Correspondently , Suzuki and Demircioglu (2019) claim that countries with greater degrees of impartial and professional public administration have much higher national levels of innovation outputs.

Additionally, (Hoa, Xuan, & Thu, 2024) analysis confirms the critical role that renewable energy plays in moderating the link between innovation and economic growth. İn the same way, Dempere, Qamar, Allam, and Malik (2023) suggest that government initiatives supporting the GII and its constituent variables may have a good economic impact, accompanied by a decrease in self-employment, but have no significant effect on FDI. Also, The Global Innovation Index (GII) and Gross Domestic Product (GDP) were shown to have a positive and substantial association, with Foreign Direct Investment (FDI) performing as a mediator in this relationship (Çemberci, Civelek, & Cömert, 2022), Moreover, Leitão, Dos Santos Parente, Balsalobre-Lorente, and Cantos Cantos (2023) confirm that Innovation plays a critical role in encouraging the acceptance and growth of renewable energy consumption. It includes the widespread use of renewable energy technology. Similarly Mohamed, Liu, and Nie (2021) discovered a strong negative relationship between innovation and long-term economic growth in Egypt. In addition, Correa (2012) study looked at the link between competition and innovation in US businesses and found conflicting results: although there was a positive association from 1973 to 1982, there was no significant relationship from 1983 to 1994. Similarly, Girma, Gong, and Görg (2009) found a positive link between foreign direct investment (FDI) at the business level and inventive activity, but a negative correlation with inward FDI at the sector level. In a comparable manner (Huan & Qamruzzaman, 2022)discovered a statistically significant positive association between innovation in the technological, financial, and environmental aspects and FDI.

Previous research has repeatedly confirmed the validity of utilizing the GII index as a trustworthy indicator for assessing innovation. This adds credence to its inclusion in the present examination of the link between innovation and Foreign Direct Investment (FDI).

3. Methodology and data

In this part we investigate the effect of Innovation on north African countries (Morocco, Algeria, Tunisia, and Egypt) and Turkish' FDI using STATA, that to figure whether Innovation has a positive or negative effect on those counties' FDI, as well as we give some recommendation in the case, we find a positive or negative relationship between the dependent and in dependent variables mentioned down below.

Brief, we endeavor to examine whether FDI contributes to the investment of North Africa and Turkey between 2011-2022 using Panel ARDL, it's worth mentioning that the Panel ARDL is used to test long-run equilibrium relationships among İnnovation (GII) and FDI, and other independent variables.

To put it succinctly, the approach utilized in this study is based on an estimate utilizing the ARDL panel model, which allows for the analysis of both the short- term and long-term connection between independent and dependent variables with both order (0) and order (1) variables integrated. An ARDL model has three estimating methods: Pooled Mean Group (PMG), Mean Group (MG), and Dynamic Fixed Effects model (DEF). Given that nations differ in their short-term sensitivity to financial crises and external shocks, as well as monetary and stabilization policies, we use the "Pooled Mean Group" (PMG) model because it allows us to estimate the short-term variables in a specific fashion, although the structural coefficients of the variables are fairly similar across countries in the long run (Pesaran, Shin, & Smith, 1999).

The relationship between **Foreign direct investment (FDI)-innovation** can be assessed by the following function:

Table 1: Data source and variable definition

Variables	The definition	Source
FDI	Foreign direct investment, net inflows (% of GDP)	World development indicator
GDPK	GDP per capita growth (annual %)	World development indicator
DI	Gross fixed capital formation (% of GDP)	World development indicator
OP	Trade (% of GDP)	World development indicator
GII	Global Innovation Index	World Intellectual Property Organization (WIPO)

FDI = f(GII, GDPK, DI, OP,)

We have chosen a dependent variable "FDII" as an indicator of Foreign direct investment and four independent variables as mentioned above. Thus, the model is designed as follows:

$$\mathbf{FDI}=\alpha_0 + \alpha_1\mathbf{GII} + \alpha_2\mathbf{GDP} + \alpha_3\mathbf{DI} + \alpha_4\mathbf{OP} + \mu$$

Thus, the model is designed as follows:

Model Specification:

$$\Delta y_{it} = \theta_i\left(Y_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \Delta(Y_i)_{t-j} + \sum_{j=1}^{p-1} \delta_y^i \Delta(X_i)_{t-j} + \mu_i + \varepsilon_{it}$$

4. Empirical results

Table 2: Descriptive statistics:

Variable	Obs	Mean	Std. Dev.	Min	Max
FDI	60	1.622846	.8129527	-.3240122	3.285189
GDPK	60	1.616064	3.31528	-9.660708	10.4294
DI	60	25.52687	8.028878	12.44601	43.07444
OP	60	65.53145	21.12634	29.85697	110.7399
GII	60	29.95183	5.428571	16.7	39.03

These descriptive statistics provide insights into the distribution and characteristics of the variables:

- FDI (Foreign Direct Investment): The mean FDI value is approximately 1.62 with a standard deviation of about 0.81, indicating moderate variability around the mean. The values range from approximately -0.32 to 3.29.
- GDPK (Gross Domestic Product Per capita Growth): The mean GDPK is approximately 1.62 with a relatively high standard deviation

of 3.32, suggesting considerable variability. The values span from approximately -9.66 to 10.43.

- DI (Domestic Investment): The mean DI value is around 25.53 with a standard deviation of about 8.03, indicating moderate variability. DI values range from approximately 12.45 to 43.07.
- OP (Openness): The mean openness value is approximately 65.53 with a standard deviation of about 21.13, indicating substantial variability. Openness values range from approximately 29.86 to 110.74.
- GII (Global Innovation Index): The mean GII value is about 29.95 with a standard deviation of approximately 5.43, suggesting moderate variability. GII values range from approximately 16.7 to 39.03.

4.1. Unit root test

After making sure that our panel strongly balanced and before running the ARDL test or any other test a very significant test ought to be run, that is unit root test, in this test we head to investigate the stationarity of the model, in other words, this test aim to examine whether the model is stable or unstable. If the model is not stable, we admit that the estimated regression model we have in hand is unacceptable, hence we have an incorrect regression. In fact, many tests exist to test the model stationarity; however, the most prominent tests are IPS (Im-Pesaran-Shin test), and LLC (Levin-Lin-Chu test). Consequently, in order to test the stationarity of our model, we will use the IPS and LLC it is worth mentioning that according to these tests:

- Null hypotheses: All panels contain unit roots

The alternative hypotheses: Some panels are stationary

Table 3 : Im-Pesaran-Shin unit-root test

Variables	Im-Pesaran-Shin unit-root			
	At level		At First Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
FDI	- 2.8672***	-3.6741***	-4.5653***	-3.9783***
GDPK	-3.3305***	-3.5672 ***	-4.7848 ***	-4.5224 ***
DI	-1.5600 (no)	-1.9881 (no)	-2.8541***	- -3.1672***
OP	-1.0662 (no)	-1.1320 (no)	-1.6611 (no)	-5.6567***
GII	-1.1541 (no)	-2.2421*	- 3.8896 ***	-4.9320 ***
Notes:				

a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
b: Lag Length based on SIC
c: Probability based on MacKinnon (1996) one-sided p-values.

-

Table 4: Levin-Lin-Chu unit-root test

Variables	Levin-Lin-Chu unit-root			
	At level		At First Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
FDI	-1.5437*	-2.7842***	-3.5813***	-3.8169 ***
GDPK	-1.9033 **	-3.1355 ***	-3.5882 ***	-3.5269 ***
DI	-2.3824***	- 2.4381***	- 2.7686 ***	-3.2789 ***
OP	-1.6988**	-4.0034***	-9.0149***	-11.7372 ***
GII	1.5781 (no)	-1.7950 **	-1.5699 *	-0.6277 (no)

Notes:
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
b: Lag Length based on SIC
c: Probability based on MacKinnon (1996) one-sided p-values.

After differencing and at their respective levels, the Im-Pesaran-Shin and Levin-Lin-Chu tests offer information on the stationarity of variables. - Results that are statistically significant at the 1% level in both tests suggest that FDI and GDPK exhibit stationarity at their respective levels. With statistically significant results in the Levin-Lin-Chu test and indicates in the Im-Pesaran-Shin test, DI exhibits probable stationarity at its level. - The Levin-Lin-Chu test indicates that the variable is stationar, whereas the Im-Pesaran-Shin test indicates that OP exhibits non-stationarity at its level.

- All variables show stationarity after differencing, with statistically significant results in both tests at the 1% level.

- In both cases, GII exhibits stationarity upon differencing.

As a whole, the data point to the majority of the variables reaching stationarity upon differencing, indicating integration of order one (I(1)). This suggests that the variables have a consistent, long-term connection.

4.2. Pedroni's cointegration tests

Table 5: Pedroni's cointegration tests

Test Stats.	Panel	Group
v	-1.086	.
rho	1.357	2.358
t	-2.761	-5.019
adf	1.6504	-1.3075

Pedroni's cointegration test is shown in this table, and we use the V-statistic to look for cointegration and long-term correlations between the independent and dependent variables. It is important to note that if the V-Statistic is less than the test statistics for rho, t, and adf, we reject the null hypothesis that there is no cointegration; however, if the V-Statistic is larger than the other test statistic, we do not reject the null hypothesis. Because the V-Statistic (-1.086) is obviously lower than the other values in both the panel and the group, we can use Pedroni's cointegration test to reject the null hypothesis that there is no cointegration. This suggests that there is a long-term relationship between our variables.

4.3. Hausman test

The Hausman test, on the other hand, may be used to see if PMG, MG and DFE are significantly different. This test's null hypothesis is that there is no significant difference between the PMG, MG and DFE values. If the nulls are not rejected, they are not significantly different;

Table 6: HAUSMAN TEST (PMG-MG)

mg	pmg	Difference	S.E.
GDPK	-4.17279	.0092454 -4.182035	82.55751
DI	2.12119	.058997 2.062193	38.55681
OP	-.346774	.0241543 -.3709283	4.326328
GII	-.2163355	.0866046 -.3029401	4.913382

Test: Ho: difference in coefficients not systematic
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.06
Prob>chi2 = 0.9996

b = consistent under Ho and Ha; obtained from xtpmg
B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

Using a Hausman test and a comparison of the mean group (MG) and pooled mean group (PMG) estimators, the null hypothesis of homogeneity was established.

If the p-value is less than 0.05, we reject the bull hypothesis. Because of this, our P-value is higher than 0.05. It is not possible to reject the homogeneity null hypothesis. The PMG estimator is thus supported by the model.

Table 6: HAUSMAN TEST (PMG-DFE)

pmg	DFE	Difference	S.E.
GDPK	.0092454	.068412 -.0591666	.2733055
DI	.058997	.0915345 -.0325375	.1924169
OP	.0241543	-.0029503 .0271045	.054502
GII	.0866046	.0244134 .0621912	.2104188

b = consistent under Ho and Ha; obtained from xtpmg
B = inconsistent under Ha, efficient under Ho; obtained from xtpmg
Test: Ho: difference in coefficients not systematic
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.57
Prob>chi2 = 0.9662

According to table 6 results support the PMG estimator again

Table 7: Long-run estimation

Variables	Coefficient	Std. Error	z	P-value
GDPK	.0092454	.0213472	0.43	0.665
DI	.058997	.015205	3.88	0.000
OP	.0241543	.0044241	5.46	0.000
GII	.0866046	.0170107	5.09	0.000

The findings provide unique insights into the link between several factors and Foreign Direct Investment (FDI).

The data for GDP per capita growth (GDPK) show no statistically significant long-term link with FDI, with a coefficient of 0.0092 and a p-value of 0.665.

In contrast, the analysis finds a statistically significant long-term association between domestic investment (DI) and foreign direct investment (FDI), with a coefficient of 0.059 and a p-value of 0.000. This shows that when domestic investment rises, so does foreign direct investment. Similarly, openness (OP) has a substantial long-term link with FDI (coefficient = 0.0242, p-value = 0.000). This shows that more economic openness leads to larger FDI inflow.

Furthermore, the Global Innovation Index (GII) has a statistically significant long-term link with FDI, as shown by the coefficient of 0.0866 and p-value of 0.000. This suggests that higher levels of innovation are related with increasing FDI inflow. This shows that nations with higher levels of innovation attract more foreign direct investment over time.

Table 8: Short-run estimation for each country

Morocco			
Variable	Coefficient	Std. Error	P-value
ECT	-0,601162	0,121576	0,0159
GDPK	0,005301	0,000810	0,0073
DI	-0,135639	0,019551	0,0061
OP	-0,008496	0,000743	0,0014
GII	0,095254	0,019321	0,0160
C	-2,407136	1,818753	0,2775
Algeria			
Variable	Coefficient	Std. Error	P-value
ECT	-0,759784	0,041515	0,0004
GDPK	0,038511	0,003637	0,0018
DI	-0,107103	0,002157	0,0000
OP	-0,053390	0,001900	0,0001
GII	-0,071710	0,003943	0,0004
C	-3,858552	1,022753	0,0326
Tunisia			
Variable	Coefficient	Std. Error	P-value
ECT	-1,398864	0,004232	0,0000
GDPK	-0,016517	0,000151	0,0000

DI	-0,020680	0,002969	0,0061
OP	-0,017581	6,42E-05	0,0000
GII	0,021134	0,000666	0,0001
C	-6,114985	0,512981	0,0013
Egypt			
Variable	Coefficient	Std. Error	P-value
ECT	-0,658053	0,001273	0,0000
GDPK	-0,117276	0,001506	0,0000
DI	0,227299	0,000556	0,0000
OP	0,046924	1,86E-05	0,0000
GII	-0,135334	0,000222	0,0000
C	-1,223118	0,044248	0,0001
Turkey			
ECT	-0,884368	0,089019	0,0022
GDPK	0,001122	0,000547	0,1327
DI	0,013034	0,004207	0,0534
OP	-0,055552	0,000830	0,0000
GII	0,023793	0,003889	0,0088
C	-4,187530	2,021740	0,1301

In Morocco, the research provides fascinating insights into the short-term dynamics of numerous variables and Foreign Direct Investment (FDI). Beginning with Gross Domestic Product Per capita Growth (GDPK), the data show a statistically significant positive link with FDI in the short term. With a coefficient of 0.0053 and a p-value of 0.0073, a one-unit rise in GDP per capita growth corresponds to a 0.53% increase in FDI.

Moving on to Domestic Investment (DI), a noticeable short-term link develops that is statistically significant. The coefficient of -0.1356 and the p-value of 0.0061 show that a rise in domestic investment is associated with a drop in FDI. Similarly, the study shows a strong short-term relationship between openness (OP) and FDI. With a coefficient of -0.0085 and a p-value of 0.0014, increased openness is associated with lower FDI inflow.

Also, the study found a statistically significant short-term association between the Global Innovation Index (GII) and FDI. The coefficient of 0.0953

and p-value of 0.016 indicate that a 1% increase in innovation results in a 0.095% rise in FDI inflow. Furthermore, the equilibrium correction coefficient of -0.6012, with a very significant p-value of 0.0159, shows that the system is rapidly adapting to long-run equilibrium at a rate of 60.12 percent.

In Algeria, Gross Domestic Product Per capita Growth (GDPK) has a statistically significant positive connection with FDI in the near term. With a coefficient of 0.0385 and a p-value of 0.0018, it appears that a one-unit increase in GDP per capita growth resulted in a significant 3.85% rise in FDI. Similarly, there is a considerable short-term link between domestic investment (DI) and foreign direct investment. The coefficient of -0.1071 and p-value of 0.0000 show that an increase in domestic investment leads to a reduction in FDI.

Furthermore, the study found a substantial short-term relationship between openness (OP) and FDI. With a coefficient of -0.0534 and a p-value of 0.0001, increased openness is associated with lower FDI inflow. Additionally, the Global Innovation Index (GII) shows a statistically significant short-term correlation with FDI. The coefficient of -0.0717 and p-value of 0.0004 indicate that higher levels of innovation are linked to lower FDI inflow.

In addition, the equilibrium correction coefficient of -0.7598, with an exceptionally significant p-value of 0.0004, suggests that the system adjusts to long-run equilibrium at an impressive rate of 75.98 percent.

In Tunisia, GDP per capita growth (GDPK) has a statistically significant negative connection with FDI in the near term. With a coefficient of -0.0165 and a p-value of 0.0000, this indicates that a 1 unit rise in GDP per capita growth results in a significant 1.65% drop in FDI.

Similarly, a considerable short-term association exists between domestic investment (DI) and FDI. The correlation is -0.0207, and the p-value is 0.0061, indicating that an increase in domestic investment leads to a drop in FDI.

Furthermore, a significant short-term relationship exists between openness (OP) and FDI. With a coefficient of -0.0176 and a p-value of 0.0000, increased openness is associated with lower FDI inflow. Likewise, the Global

Innovation Index (GII) shows a statistically significant short-term correlation with FDI. The coefficient of 0.0211 and p-value of 0.0001 indicate that higher levels of innovation are associated with increasing FDI flows. Also, the equilibrium correction coefficient of -1.3989, with an extraordinarily significant p-value of 0.0000, shows a 139.89 percent rate of adjustment to long-run equilibrium.

In Egypt, gross domestic product per capita growth (GDPK) has a statistically significant negative connection with FDI in the short run. With a correlation of -0.1173 and a p-value of 0.0000, this suggests that a 1 unit rise in GDP per capita growth results in an 11.73% drop in FDI.

Furthermore, there is a statistically significant short-term association between domestic and foreign direct investment. The coefficient of 0.2273 and the p-value of 0.0000 indicate that a rise in domestic investment corresponds to an increase in FDI.

Similarly, there is a considerable short-term association between openness (OP) and foreign direct investment. Higher openness is connected with increased FDI flows (coefficient = 0.0469, p-value = 0.0000). Global Innovation Index (GII) shows a statistically significant short-term correlation with FDI. The coefficient of -0.1353 and the p-value of 0.0000 show that higher levels of innovation are associated with lower FDI flows. Furthermore, the equilibrium correction coefficient was -0.6581, with an extraordinarily significant p-value of 0.000.

In Turkey, the coefficient of 0.0011 and p-value of 0.1327 indicate an insignificant positive association between FDI and GDP per capita growth. In terms of domestic investment (DI), the coefficient of 0.0130 and p-value of 0.0534 reveal a marginally significant positive correlation. While the link is not statistically significant at the conventional level, it does indicate a possible positive relationship between domestic investment and FDI. However, there is a statistically significant association between openness (OP) and foreign direct investment. The coefficient of -0.0556 and p-value of 0.0000 suggest a substantial negative link between trade openness and FDI in the near term. In Turkey, Global Innovation Index (GII) indicates a statistically significant positive link with FDI. Higher levels of innovation in Turkey are connected

with increasing FDI flows, according to a coefficient of 0.0238 and a p-value of 0.0088. Demonstrates that a 1% increase in innovation results in a 0.024% boost in FDI inflow. Further, the negative equilibrium correction coefficient of -0.8844, with a significant p-value of 0.0022, shows that Turkey's system is adapting to long-run equilibrium at an 88.44 percent rate.

5. Diagnostic tests

4.4. Correlation

Correlation is defined as the existence or absence of a relationship between two models of values generated from the same issue. The correlation coefficient quantifies this link by establishing the sign of the correlation (positive or negative) as well as the intensity of the link. The degree of connection is graded on a scale of 0 to 1, as we'll see later.

Table 9: Correlation

	FDI	GDPK	DI	OP	GII
FDI	1.0000				
GDPK	0.2910	1.0000			
DI	-0.3819	0.0006	1.0000		
OP	0.1642	-0.0965	0.0502	1.0000	
GII	0.3641	0.3034	-0.1498	0.3333	1.0000

The correlation statistics between explanatory variables are less than 80%, indicating that the variables have a non-linear connection. These correlation coefficients suggest that while there are some relationships between the variables, they are not strongly linearly related.

4.5. Serial correlation

Autocorrelation enables the detection of regularities and repeating patterns in a signal, such as a periodic signal affected by a lot of noise, or a fundamental frequency of a signal that does not really include this fundamental but includes it with many of its harmonics.

Table 10: Serial Correlation

Variable	HR-stat	p-value	N	maxT	balance?			
FDI	+	1.61	0.108	+	5	12	+	balanced
GDPK	+	-0.75	0.454	+	5	12	+	balanced
DI	+	1.14	0.256	+	5	12	+	balanced
OP	+	1.26	0.206	+	5	12	+	balanced
GII	+	0.47	0.637	+	5	12	+	balanced

The table presents the results of the first-order serial correlation test for the variables FDI, GDPK, DI, OP, and GII.

In summary, based on the HR-statistic and p-values, there is no significant first-order serial correlation observed in the data for any of the variables FDI, GDPK, DI, OP, and GII. İn other words, our model doesn't suffer from serial correlation, since p-values are more than 5%

4.6. Multicollinearity test

If all VIFs are equal to 1, there is no multicollinearity, but if some VIFs are greater than 1, the predictors are correlated. There is no consensus on the value beyond which we must consider that there is multicollinearity. Some authors, like Paul Allison, say they look more closely at variables with VIF greater than 2.5. Others only worry about 5. There is no statistical test that would tell if there is collinearity or not.

Table 11: Multllinearity test

Variable	VIF	1/VIF
GII	1.34	0.746822
OP	1.20	0.833446
GDPK	1.16	0.859193
DI	1.04	0.960850
Mean VIF	1.19	

The table presents the results of the Variance Inflation Factor (VIF) analysis for the variables GII, OP, GDPK, and DI.

Overall, the mean VIF for all variables is 1.19, indicating low multicollinearity among the independent variables in the model. This suggests

that the independent variables do not redundantly explain each other and are suitable for inclusion in the regression analysis.

CONCLUSION

Ultimately, this study sheds light on the long-term influence of innovation on Foreign Direct Investment (FDI) in North African nations (Morocco, Algeria, Tunisia, and Egypt), as well as Turkey. We used the Panel ARDL/PMG model with data from 2011 to 2022 to study the link between innovation, FDI, and other key factors including GDP growth and trade openness. Our findings demonstrated strong long-term relationships between domestic investment, economic openness, innovation, and FDI inflows in the countries that we examined.

In the long run, while GDP per capita growth had no significant relationship with FDI, domestic investment, economic openness, and innovation levels emerged as significant factors of FDI inflows. Higher levels of domestic investment, economic openness, and innovation were found to be positively connected to higher FDI inflows over time.

The short-term dynamics of FDI were thoroughly explored for each nation. In Morocco and Algeria, GDP per capita growth was positively correlated with FDI, but domestic investment and economic openness were all negatively correlated with FDI, however, In Morocco, the Global Innovation Index (GII) is positively correlated with Foreign Direct Investment (FDI), whereas in Algeria, the relationship is the opposite. In Tunisia, higher GDP per capita growth (GDPK) is related with lower FDI, whereas increasing domestic investment (DI) and economic openness (OP) both contribute to lower FDI. However, higher levels of innovation (GII) are positively related to FDI. Rising GDP per capita growth in Egypt is connected with lower FDI, but greater domestic investment and openness are associated with higher FDI. However, higher levels of innovation are associated with lesser FDI.

In Turkey, whereas GDP per capita growth has an insignificant positive relationship with FDI, domestic investment (DI) has a significant positive correlation. Conversely, trade openness (OP) has a strong negative relationship with FDI. However, the Global Innovation Index (GII) demonstrates a considerable positive relationship with FDI, demonstrating the importance of innovation in attracting FDI.

The equilibrium correction coefficients indicate rapid adjustments to long-run equilibrium across all countries.

Diagnostic tests to check the model's validity revealed no significant first-order serial correlation, indicating that the model is strong. Furthermore, the minimal multicollinearity among independent variables and the stationarity of variables after differencing contribute to the findings' reliability.

Overall, the study sheds light on the complex interplay between innovation and FDI, with practical implications for policymakers and stakeholders seeking to attract foreign investment and promote economic growth and development in the investigated regions.

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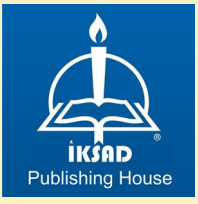

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