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Role of Innovation and Impact on Economic Development in MENA Countries

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Theses guidelines

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1. Aarle V., B., Weyerstrass, K., and Jaenicke, J., 2008. *Spillovers from economic reform. Economic Spillovers, Structural Reforms and Policy Coordination in the Euro Area*, pp 129-154.
2. Abd Razak, A., and Saad, M., 2007. The Role of Universities in The Evolution of The Triple Helix Culture of Innovation Network: The case of Malaysia, Intellect Ltd [Online]. Available <DOI: 10.1386/IJTM.6.3.211_1> [Accessed: April 23, 2023]
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ABSTRACT

Economic growth in MENA countries is advancing due to innovative measures despite the prevailing instability. Developing new opportunities through the diversification of industries and innovation is crucial. The research will assess the factors that drive innovation in the MENA region and propose ways to enhance them. The objective is to scrutinize the impact of innovation on economic development in countries within MENA by studying their innovation milieu and providing suggestions based on outcome evaluation.

KEYWORDS

Economic Development, Innovation and MENA Countries.

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LIST OF THE ABBREVIATIONS

ADB Asian-Pacific et al. Bank

AfDB African Development Bank Group

AI Artificial Intelligence

CAM Center for Advanced Materials

CCT Creative Accumulative Technological

CDT Creative, Disruptive Technological

CVC Cooperate Venture Capital

ECLAC Economic Development Division of the Economic Commission for Latin America and the Caribbean

ERDF The European Union's Regional Development Fund

EU European Union

FDI Foreign Direct Investment

GCC Gulf Cooperation Council

GDP Gross Domestic Product

GSMA Groupe Speciale Mobile Association

HDI Human Development Index

ICT Information and communication technologies

IDB Inter-American Development Bank

IMF International Monetary Fund

Interreg C Interregional Cooperation

ITU International Telecommunication Union

IoT Internet of Things

MENA Middle East and North Africa region

MITT MENA Innovation Technology Transfer Summit

MFF Multiannual Financial Framework

NIS National Innovation System

OECD The Organization for Economic Cooperation and Development

OLS Ordinary Least Squares

OPEC Organization of the Petroleum Exporting Countries

PPP Public-Private Partnership

QSTP Qatar Science and Technology Park

R&D Research and Development

RCPC Regional Competitiveness Performance Cube

SDF	Social Fund for Development
SDG	Sustainable Development Goals
SGI	Sustainable Governance Indicators
SMEs	Small and Medium-Sized Enterprises
STEM	Science, Technology, Engineering and Math
UAE	United Arab Emirates
UK	United Kingdom
UNDP	The United Nations Development Programme
US	United States of America
VC	Venture Capital

INTRODUCTION

MENA acronym represents the Middle East and North Africa region. It refers to groupings of countries in Africa's middle and north belts. The region comprises 19 countries, according to the United Nations. However, the World Bank identifies 21 countries as belonging to MENA in the recent publications of their 2020 demography report. Currently, the region makes up about 6% of the world's population. OPEC outlines that this region holds about 50% and 40% of global oil and natural gas reserves, respectively.

The MENA region is a centre of attention for scholars, policymakers and business leaders concerning economic development. The economy in this region has been influenced by various factors such as political turmoil, resource exploitation, urbanisation, and rapid climate change, which results in water shortage, high food importations and conflict. Despite the difficulties encountered over time in achieving prosperity comparable to other regions worldwide, innovation has emerged as an essential catalyst for sustainable development within this area. Innovation refers to inventing new products, services, or ideas while enhancing efficiency via creative thinking catering to market demands. Innovative ideas have significantly uplifted economic growth across numerous industries worldwide, like technology and manufacturing corporations. By continuously improving their processes through innovative problem-solving methods fostering entrepreneurship, these industries attract foreign investments resulting in job opportunities on a global scale.

This thesis delves into how innovation is crucial in promoting economic development throughout MENA states, within technology-driven firms and manufacturing enterprises exhibiting notable success due to innovative strategies. The thesis statement argues that innovation is essential in leading towards positive change amounting to increased productivity, human development and GDP growth rates and adding up to foreign investment inflows, eventually improving conditions favourable for sustained economic development throughout MENA nations.

Although the MENA region has drawbacks to progress and economic development, the area has long been through racking problems. However, the importance of innovation in advancing growth must be addressed. It is becoming increasingly crucial and is apparent from its favourable effects on industries such as technology, entrepreneurship, and manufacturing. One way to view this thesis statement is that innovative ideas and technologies can catalyse economic development in MENA countries. Also, by introducing unique concepts into traditional markets, nations can produce value-added products that appeal locally and internationally.

Moreover, this study aims to evaluate the role of innovations in driving economic development within a designated MENA region. Additionally, an examination will identify the factors influencing innovation in select countries. The outcome of this analysis will encompass an impact

assessment and potential suggestions for enhancing the current circumstances.

The Organisation of the Study.

The thesis is divided into five key sections, commencing with the introduction, which provides a summary of the MENA countreis and articulates the objectives of this study. Chapter 1 examines the theoretical bases for regional development, while Chapter 2 evaluates the literature on innovation's role in regional development. The 3rd chapter of the thesis gives a comprehensive discussion of the characteristics of MENA countries. Chapter 4 contains a case analysis exploring the MENA region's countries. It assesses inter-country relations, comparisons, and their current state of innovation and its effects on economic growth. This section also addresses significant challenges encountered during regional development in MENA countries and suggests various interventions to bridge critical gaps. Finally, Chapter 5 summarises findings from previous chapters and provides recommendations for policy tools available for regional development.

1. REGION

A "*region*" is difficult to explain since it involves several interrelated factors. In Contel's (2015) words, regions are more than just theoretical constructs; they exist as tangible entities that offer people a defining sense of place. However, merely describing the physical environment fails to distinguish one region from another. Kuhter's (2012) research on Nigeria emphasises that social and economic contexts play critical roles in shaping each area within national or continental borders. Accurately describing an area requires recognising and analysing these variables since subtle variations such as language or religious beliefs can create unique sub-regions within more significant geographic boundaries. At the same time, economic factors like industries or trading patterns significantly impact regional identities. Klapka et al.'s (2013) findings deepen geography's fundamental nature in influencing cultural practices and highlighting differences between distinct communities: natural barriers like mountains or rivers often separate different groups. Thus, understanding what defines a region demands careful examination of all its interconnected elements instead of focusing solely on one aspect (Kuhter, 2012). The complexity involved necessitates considering multiple facets when attempting an authentic characterisation. However challenging this task may be, there are many rewards for those undertaking it with equal consideration for all aspects involved (Klapka et al., 2013). On the other hand, experts' perspectives might diverge because historical context or political motivations could lead them towards conflicting conclusions concerning any given region (Contel, 2015). In brief, comprehending the meaning behind the term "region" reaches across various dimensions, requiring extensive analysis involving geographic settings, complex socio-cultural-economic traditions, and historical/political contexts leading researchers through unexpected twists but resulting in fruitful outcomes if appropriately explored (Klapka et al., 2013).

Hence, each definition gives us different perspectives on how spaces connect, from historical territories to functional areas or administrative divisions. Moreover, studying regions plays an immense role in understanding global dynamics and local development. By examining regional variations in income distribution, infrastructure accessibility or environmental influence, policymakers can develop more effective policies to address specific requirements and challenges.

1.1 Development

Development is a multifaceted concept comprising economic, social, and environmental progress. Economists have played an instrumental role in comprehending development dynamics for a considerable period, providing valuable insights into identifying the key drivers, challenges and strategies for sustainable and comprehensive development.

Economists emphasize that long-term economic growth heightened productivity, and reduced poverty rates are pivotal to overall development. Daron Acemoglu, James Robinson and Paul Romer suggest that institutions, property rights and innovation are essential factors that promote economic development by investing in human and physical capital and encouraging entrepreneurship (Acemoglu et al., 2019; Romer, 1990). In addition to this, Amartya Sen believes that human capabilities and freedoms are integral to the developmental process (Sen, 1999). Therefore, efforts should be made towards improving access to education and healthcare services alongside other essential social amenities necessary for augmenting individuals' abilities to lead fulfilling lives. Further scholars advocate how education fosters human capital development leading to long-term economic growth (Hanushek and Woessmann, 2021).

Environmental sustainability is also essential for comprehensive development outcomes since the correlation between economic advancement and ecological conservation can impact future generations positively. Nicholas Stern underscores the significance of implementing sustainable practices incorporating expenses linked to environmental ruin (Stern, 2007). Experts advise implementing eco-friendly resource management techniques alongside regulations promoting green energy alternatives for fostering both economic expansion and ecological preservation (Arrow et al., 2004; Dasgupta, 2021).

Economists have formulated various strategies towards driving developmental progress, such as Rostow's modernization theory emphasizing industrialization combined with technological advancements as critical factors driving progress (Rostow, 1960). However, critics argue that these theories often overlook addressing social inequalities while ensuring equitable distribution of development benefits (Frank, 1967). In contrast to these approaches, economists like Amartya Sen and Martha Nussbaum advocate for the capability approach that prioritizes human well-being and social justice alongside economic growth as a primary objective of development (Nussbaum, 2011; Sen, 1999).

Economic indicators like GDP, HDI, FDI and Gini Coefficient play a crucial role in assessing a country's advancement towards sustainable and comprehensive development.

Significant insights into the economic performance, social welfare and income distribution patterns of the country are provided by these metrics.

For the analyses on this thesis, economic development (dependent variable) would be measured by GDP, HDI and labour participation rate.

1.1.1 Regional Development

Regional development is a multi-dimensional and comprehensive concept encompassing numerous societal, economic, and political improvements unique to specific regions. The paramount

objective of regional development is to enable well-balanced development across various geographic regions leading to increase wellbeing of the populace while minimising disparities among them, Ministry for Regional Development of the Czech Republic, 2006, page 7. This ultimately enhances the quality of life for inhabitants. Notably, "regional" pertains to smaller municipalities or counties and includes vast geographical areas such as states sharing similar attributes. With globalisation-related issues and sustainable environmental concerns gaining more attention in recent years, preserving cultural diversity has become increasingly vital. Achieving this requires ensuring equal opportunities for everyone.

The art of advancing growth in a regional context is intricate and calls for attention to many facets. This encompasses uplifting economic, social, and environmental habitats in particular geographic areas. However, self-sustaining development alone cannot suffice; it is crucial for the comprehensive progress of an economy. According to Jackson et al.'s (2019) research, policymakers must prioritise numerous critical factors while developing efficient regional policies. They need to resolve challenges related to enhancing infrastructure, education, and healthcare access expansion alongside job opportunities while considering the unique features of different regions - this is vital for success. In today's connected world, where transport systems or supply chains are widespread, understanding how regions are interconnected has become imperative. Reinforcing ties between regions with complementary strengths and weaknesses will result in resilient economies that are not dependent on any industry. However, we can take entrepreneurship fueled by innovation up a notch by forming research institutions that produce novel ideas coupled with technologies benefiting local communities whilst advancing their competitiveness at a broader scale. For instance, technology transfer from academia can prompt industrial sectors towards commercialising products/services based on research outcomes. For efficient promotion in regional development, cooperation among stakeholders, including governments at all levels, alongside private-sector actors working together effectively is significant. Region-specific collaborative partnerships are essential so effective resource allocation can be promoted amongst various sectors keeping the sustainability perspective under consideration throughout the policymaking process.

In today's rapidly evolving global economy, adopting effective and sustainable methods that promote business growth in regional areas is vital. To achieve this objective, planners must take a systematic approach to policymaking while creating an enduring environment for businesses within specific regions. A multifaceted strategy should be implemented to ensure that urban and suburban areas thrive despite the complexities of our current economy. As Miller (1987) suggests, policies should not just sustain existing economic centres but also create new growth hubs such as market towns and rural service hubs – crucial components of economic infrastructure. The critical factor is

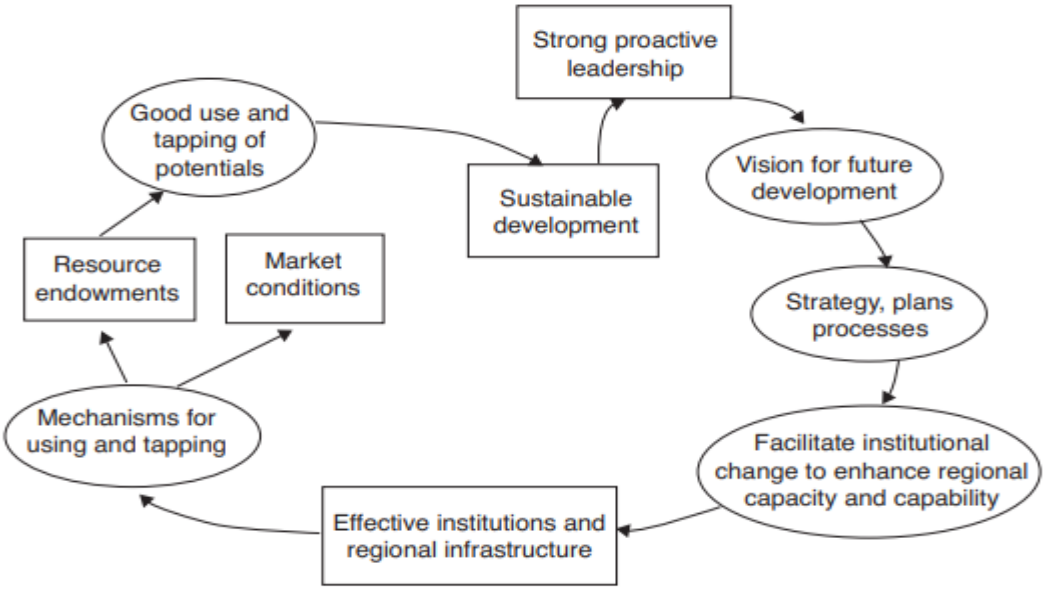
understanding each region's unique requirements - from local companies to their communities. Decision-makers must collaborate with stakeholders across different levels, like small-scale entrepreneurs and community leaders, to develop customised solutions tailored explicitly to address each group's distinct challenges. Innovation plays a pivotal role in achieving favourable outcomes through strategic planning and policy implementation, according to Miller (1987). Policymakers must leverage technology and data analysis tools such as marketing research and networking opportunities among organisations that aim for long-term prosperity, sustainably benefiting all parties involved. Most importantly, policymakers who engage with local communities are better placed to deliver consistent results beneficially affecting everyone over time- job creation prospects and ecological protection targets achieved. Therefore, we must work towards building thriving market towns or rural service hubs by implementing sound strategies focused on strengthening community development initiatives while supporting established entrepreneurial opportunities too.

To promote economic progress and close the gap between different geographic areas, it is crucial to prioritise regional development. However, accomplishing this objective requires comprehensive investment and strategic planning considering critical areas such as healthcare accessibility, innovation, education, and infrastructure. To advance progress throughout diverse communities in the country, empowering skilled labour must be given the utmost priority. Gennaioli's research has demonstrated that human capital significantly impacts developmental differences observed within varying localities. As a result of these findings, governments are responsible for implementing effective policies promoting private-public collaborations aimed at targeted investments while mindful of public institutions' inclusion.

Moreover, engaging with residents at grassroots levels is essential since their input directly influences allocation decisions concerning everyday life. Human capital plays an instrumental role in determining critical factors behind disparities highlighted by Gennaioli's study; thus, its consideration is vital for successful planning across all phases leading towards ownership over projects geared towards balanced economic growth with high-quality life standards in each region - including urgent attention required for other critical elements such as education alongside improvements in healthcare access and infrastructure development mentioned earlier.

The Virtuous Circle model connects regional development's economic, social, and environmental aspects for a sustainable approach to address global challenges. For that reason, it was employed in the thesis, Figure 1 depicted below. This was done to provide a more detailed explication of regional development.

Figure 1 The Virtuous Circle for Sustainable Regional Development



Source: Stimson, Robson, Stough and Salazar, 2003.

The Virtuous Circle for Sustainable Regional Development proposed by Stimson et al. (2003), is a concept that involves the interplay between economic growth, social development, and environmental protection.

The main ideology of the Virtuous Circle for Sustainable Regional Development is that.

•Economic Development focuses on economic growth, entrepreneurship, innovation and investment.

• Social Development emphasizes human capital development, education, healthcare and poverty reduction.

• Environmental Sustainability stresses the need to protect natural resources, promote sustainable practices and mitigate environmental risks.

• Governance and Institutions highlights the role of effective governance structures rule of law for regional development.

• Positive interactions between these elements create a self-reinforcing cycle of development.

Stimson et al.'s Virtuous Circle can aid MENA nations' economic, social, and environmental development. United Nations Regional Commissions have been critical in driving this success by designing regional policy approaches, mobilizing political will and technical resources, monitoring progress, and adapting to emerging challenges (Ban Ki-moon, 2012). By implementing the

virtuous circle approach proposed by Stimson et al., MENA countries can address various issues hindering sustainable development. For example, one significant challenge these nations face is achieving **SDG 3**: Good Health and Well-being. Interlinkages between energy consumption patterns and health outcomes are well established (United Nations, 2021). Ensuring access to clean energy sources is essential while promoting public awareness regarding healthy lifestyles. Another issue affecting MENA countries is the proliferation of small arms and light weapons introduced into underprivileged populations desperate for security (Finlay et al., 2012). Implementing this framework can create a cycle of economic growth, social development, and environmental preservation for future generations.

1.2 Policies of Regional Development.

As our world becomes increasingly connected, it has become vital to have regional development policies that can help address economic disparities and boost growth across various regions. We can create jobs, better infrastructure, and more investment opportunities by adopting these policies. According to research by Jackson et al. (2019), Regional development policies are essential for addressing economic disparities and promoting growth across different regions. This covers various subjects, including regional networks, land usage, migration patterns, and specialisations unique to each region. Policymakers can use analytical tools found in regional science research to make informed decisions that will ultimately benefit their local economies. The European Union's Regional Development Fund (ERDF) is an excellent example of successful policy implementation for boosting economic growth within underprivileged areas throughout Europe through investments in programs to increase competitiveness while upgrading infrastructure. With this program came numerous employment opportunities within various sectors contributing significantly towards sustainable long-term success in local economies. Countries worldwide must prioritise effective regional development initiatives tailored to fit their target demographic. The primary aim is solutions-based rather than a generic approach applicable all around - one size does not fit all. Successful programming and design catered around specific needs invariably lead towards attracting investments into developing industries that provide jobs locally--contributing immeasurably toward sustainable prosperities (Jackson et al., 2019).

In the modern-day world that is constantly changing, regional development policies must incorporate cooperation among stakeholders, including government agencies, businesses, and community organisations. Collaboration is crucial to bring about change and progress, as pointed out by Maarten Keune (2001). Interregional development programs require a coordinated effort between local governments, private enterprises and civil society organisations via a central

planning agency to benefit the country. Collaboration can help identify common objectives and establish shared goals that ultimately lead to greater efficiency in resource allocation resulting in more impactful outcomes. It brings diverse perspectives into policy formulation processes enriching decision-making with essential contextual understandings that may have been overlooked otherwise. Successful collaborative efforts could create new funding opportunities empowering smaller communities that would otherwise struggle to attract investment alone. Despite complex bureaucratic structures at every level of government making it challenging to implement effective regional development policies, collaboration among government agencies, businesses, and community organisations is vital to achieving successful results, as emphasised in Article Sample cited by Maarten (2001). By uniting towards common goals, we ensure enduring benefits for everyone involved- fostering growth and well-being across regions while respecting local needs and contexts alike. Ultimately such collaborative efforts will be instrumental in creating sustainable futures for our societies -one region at a time. Recent years have highlighted the increasing importance of environmental sustainability. Policies prioritising sustainable development and environmental protection are needed to ensure long-term prosperity and resilience in regions. As Miller (1987) indicated, such policies can help achieve this goal by promoting economic growth while balancing social equity and environmental preservation. While some believe these policies could impede short-term economic gains, their implementation is essential for sustained progress. Two potential strategies Miller (1987) suggests for achieving regional development are mobilising resources and adopting the growth pole concept. Both approaches promote balanced growth across various industries while considering resource limitations. Mobilising resources involves investing in sectors with high job creation potential and being mindful of their environmental impact. Focusing on sustainable development policies is crucial as they ensure long-term prosperity and resilience in regions. Strategies like mobilising resources or adopting the growth pole concept can effectively balance economic progress, social equity, and environmental conservation without sacrificing short-term benefits. By pursuing such policy interventions over time, we could pave our way towards a brighter future where all three aspects coexist harmoniously together into perpetuity.

1.2.1 Regional Development Policies in MENA and European Countries

Much attention has been given to regional development policies by the MENA countries. These countries have initiated various strategies to boost economic growth, reduce poverty levels, and improve social outcomes. According to O'Sullivan et al. (2011.), these policies have yielded different results and offer valuable lessons for policymakers. From the implementation of these regional development policies, a crucial lesson learned is that structural political change must be

accompanied by further economic reforms (O'Sullivan et al., 2011.). This means that political reform alone can only satisfy citizens' demands if it improves living standards.

Furthermore, Mills and Alhashemi (2018) state that spatial inequalities in the region contribute significantly to resource regionalism and social fragmentation. Despite numerous challenges encountered while implementing these regional development policies across MENA nations, like limited funding and inadequate coordination between government agencies, some countries are still recording some level of success. For instance, Tunisia's industrialisation strategy has consistently resulted in sustainable economic growth over several decades (Dahi and Demir, 2008). Also, Morocco's Plan Emergence has experienced significant investments mainly focused on infrastructure projects such as high-speed rail lines alongside renewable energy initiatives. In addition, some countries promote entrepreneurship through microfinance programs like those implemented by Egypt's Social Fund for Development (SFD). The SFD provides small loans at low rates primarily aimed at people who desire to start or expand their businesses (O'Sullivan et al., 2011). Although many regional development policies focus on minimising poverty levels across MENA nations, it has been observed from specific situations that they had varied achievements: Jordan's National Agenda targets explicitly lower-income areas but shows limited success due to insufficient funding; Iraq's Humanitarian Response Plan sought assistance from NGOs after internal displacement following conflict but faced issues related to coordination between government agencies; Lastly, Iran was able to decrease poverty despite international sanctions thanks through targeted subsidies transferred directly into bank accounts instead of distributing essential goods directly (Dahi and Demir, 2008).

Regional development policies in the European Union have been instrumental in promoting economic growth and social progress across various regions. The EU's Multiannual Financial Framework (MFF) for 2021-2027 has a budget of €373 billion reserved for regional development. This funding can be utilized to reinforce policies that support sustainable development, decrease inequalities, and boost competitiveness, as stated by the European Commission in 2018. Interreg C programmes have played an essential role in addressing disparities and inequalities across Europe by facilitating cross-border cooperation between regions. Although the programme area is not required for Interreg C programmes, they aim to complement and synergize with other funding programmes and instruments (Interreg Europe, 2021). The lessons learned from past experiences are also considered while implementing these programmes. The European Urban Initiative has identified urban innovation as a key objective towards achieving sustainable urban development. This initiative encourages cities to develop innovative solutions addressing environmental issues such as air pollution, energy efficiency, waste management, etc., promoting sustainability while

enhancing their competitive edge (European Urban Initiative, 2020.). Moreover, the Publications Office of the European Union highlights how natural environment changes impact economic activities across various sectors. These changes require policymakers to seek innovative ways of mitigating their impacts on businesses and communities while maintaining ecological balance (Publications Office of the European Union 2015).

In conclusion, Regional Development Policies in the European Union and MENA countries have significantly contributed to economic growth and social progress across different regions. These budget allocations for regional development provides an opportunity to strengthen these policies to achieve sustainable development goals while reducing disparities among different areas within Europe and the MENA region.

1.3 Goals and Features of Regional Development

The success and well-being of a region rely heavily on various factors that define regional growth. These components include economic, social, as well as environmental elements. Jackson et al. (2019) suggest a balanced, sustainable development to meet community needs and preserve natural resources for the future. As Miller (1987) pointed out, effective regional development involves employing different strategies like rural service centres and growth poles - a concept proposed by Perroux that has gained attention in driving regional progress. This highlights the significance of adopting tailored approaches based on each region's unique characteristics and goals.

Furthermore, comprehensive regional development boosts economic growth and enhances social and cultural progression at the national level - a point Kuklinski (1967) emphasises. However, this goal can only be achieved through interregional developmental plans aligned with broader national developmental aspirations. When identifying appropriate strategies for individual regions' contexts, it is crucial to consider both internal and external conditions affecting such areas. For instance, resource-rich regions may prioritise resource management over infrastructure investments compared to those without similar abundance. Moreover, policymakers must recognise potential trade-offs between short-term gains versus long-term sustainability when implementing policies to promote economic progress in struggling economies or those with limited resources (Jackson et al., 2019). Therefore, inclusive planning involving input from various stakeholders representing diverse sectors will yield targeted interventions suited for specific contexts. Ultimately holistic advancement aligned with sustainable objectives comes from considering multiple aspects like socio-economic initiatives alongside environment protection measures without compromising impending challenges ahead. Regional development has significantly influenced the advancement of economic and social growth around the globe. Miller (1987) posits that this phenomenon

emerged as an essential factor aided by geography, natural resources, and human ingenuity. The process involves mobilising resources, location theory, central place systems, national urban hierarchy, hierarchical diffusion, and diffusion to hinterland areas. Regional development involves various fields, including economics, geography, urban planning, and public policy. This area aims to understand the factors leading to economic and social imbalances within regions while developing strategies for promoting sustainable growth across these areas. Cingano (2014) highlighted how inequality may harm economic growth. This necessitates collaboration among various fields to address this issue comprehensively. Therefore, regional development focuses on identifying the root causes of progress disparities while acknowledging inequalities within and between regions.

Further supporting this stance is Keune's (2001) emphasis on the significance of geography while highlighting vital aspects like natural resources and human innovation necessary for successful regional development globally. Creating dynamic industry clusters leads towards sustainable socio-economic growth patterns over time.

1.4 Tools for Regional Development.

Several research studies have highlighted that the appropriate utilisation of tools and methods for regional development, such as investment in infrastructure, advancement in technology and collaborations between public and private sectors, are crucial elements in achieving sustainable economic growth and improving the standard of living for communities residing within the region. Jackson et al. (2019) asserted that these tools could generate social cohesion within a community, which is crucial for long-term gains. Moilanen's article (2001) sheds light on this idea by discussing how novel regional development instruments have surfaced. These methods intertwine competition and alliance into one framework with the efficient allocation of limited resources towards innovation and developmental sectors to ensure sustainability amid global competition while preserving inclusivity, including networks and zones. According to Moilanen, utilising these ultra-modern devices is essential to guaranteeing durability. The analysis carried out by Ibyatov et al. (2019) validates this argument with empirical evidence that highlights the criticality of infrastructure investment in promoting economic growth at a regional level due to its positive impact on productivity rates, decreased transportation costs which stimulates business activity leading to increased foreign investments thus creating more employment opportunities for locals.

Moreover, PPP models allow private entities and government agencies to work together effectively towards common goals such as reducing poverty rates or developing job opportunities across specific regions or industries. As highlighted by Jackson et al., this collaboration reduces risks

linked with large-scale investments while providing essential services that are not feasible through traditional financing mechanisms. Technological innovation has an equally significant role when it comes to facilitating sustainable economic growth at a regional level, according to all three articles cited above; investing in research programs targeted at renewable energy sources creation or introducing innovative technologies aimed at increasing efficiency levels across various industries goes a long way in cost-saving measures benefiting businesses' bottom line while contributing positively toward environmental conservation efforts mentioned earlier. Implementing strategies associated with infrastructure improvement coupled with technological innovations leads to considerable benefits for local communities regarding sustainable economic growth, improved quality of life for residents and better social cohesion. Therefore, regional development tools are ideal for a community's well-being but also the long-term prosperity of its people.

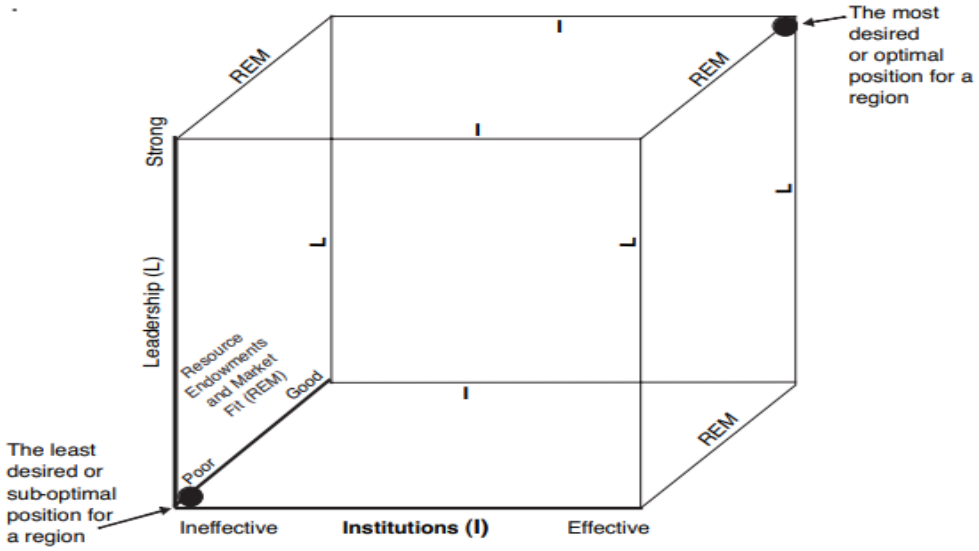
The effective utilisation of various tools such as innovation, education, and infrastructure development are essential for promoting sustainable regional development in Europe. Regional development plays a critical role in the overall economic growth of any country. As per Bachtler, Méndez and Vironen (2014), innovation and education are key drivers of regional development and must be supported by adequate infrastructure development. Innovation has been identified as one of the most critical factors driving economic success today. Innovation can lead to new products or services that meet evolving consumer needs, create jobs and promote entrepreneurship. According to Struyk and Cooley (2000), effectively utilising innovative tools is necessary for promoting sustainable regional development in Europe. Education is another crucial tool for fostering regional development. Education provides people with skills needed for employment opportunities available within their region, which leads to economic growth, according to Pasikowska-Schnass and Widuto (2022).

As economist Paul Krugman notes in his book, "The Age of Diminished Expectations," these tools include tax incentives and infrastructure investments that help regions facing significant structural challenges to retrieve past dynamism or improve prosperity for their residents (Diemer et al., 2022). One such tool is limited regional disparities – national competitiveness policy, as Bachtler, Méndez, and Vironen (2014) noted. This policy aims to reduce regional disparities within a country by promoting national competitiveness through targeted investment.

Furthermore, education can also help reduce income inequality among regions since it creates more job opportunities through increased human capital. Infrastructure Development helps facilitate trade between regions, enabling businesses within different regions to interact effectively. According to Bachtler et al., 2014. good transportation networks make it easier for individuals and goods to move freely from one place to another, thus enhancing productivity across multiple

regional sectors. Pasikowska-Schnass and Widuto (2022) suggest that culture can play an instrumental role in revitalising disadvantaged areas faced with post-industrial challenges through creative industries like music festivals or art exhibitions leading towards attracting tourists into these areas, thereby increasing investment potential while boosting local economies at the same time. As The Urban Institute explains, "The nonpartisan Urban Institute publishes studies, reports, and books on timely topics worthy of public consideration", implying that issues related to regional developments require attention from all stakeholders involved, including policymakers who have a responsibility towards ensuring that infrastructures are developed adequately so as not only to foster economic growth but also reduce regional disparities. A model that can be discussed under this section of the thesis is the Regional Competitiveness Performance Cube (RCPC). The RCPC is crucial for regional development as it assesses a region's competitiveness, identifies advantages, informs policy formulation, and fosters stakeholder engagement. It enables regions to pursue sustainable and inclusive development strategies. Figure 2 below is a diagram of the RCPC.

Figure 2 The Regional Competitiveness Performance Cube (RCPC).



Source: Robert J. Stimson and Roger Stough 2004. p 6

Stimson, Robson et al. (2003;2004) present a rationale which postulates that proficient leadership and exemplary performance on the L parameter in the RCPC have a direct impact on the efficient or inefficient performance of institutions—the I parameter—which are instrumental in distinguishing between a high-performing region and one that is heading towards sub-optimal performance. The authors suggest that optimal performance can be achieved by positioning a region at the top-right-hand corner of the cube based on its performance on all three dimensions—L, I, and REM—in the RCPC. Therefore, it is crucial to formulate an economic development

strategy tailored to each region's needs and implement appropriate plans and mechanisms to advance its position within the RCPC for sustainable development outcomes.

Furthermore, shocks such as global financial crises can alter the relative influences of exogenous and endogenous processes in regional development (Stimson 2012). Therefore, it is imperative that we have tools like RCPC to assess how one region may be affected differently than another due to external events outside their influence.

1.5 Regional Development Financing.

Sponsoring regional development financially is pivotal for the growth of regions, which minimises regional disparities and improves the inhabitants' welfare. Such financing provides financial resources for infrastructure development, entrepreneurial activities, public services, and other initiatives. As Griffith-Jones et al. (2008) point out in their study on the role of regional development financing in promoting economic growth and reducing regional disparities, this type of funding can drive economic activity by creating jobs through investments in infrastructure such as roads and bridges. In line with these findings, ECLAC (2021) highlights that closing the internal and external financing gap requires international financial institutions to scale up the availability of liquidity commensurate with the financing needs of Latin America and Caribbean countries. Due to insufficient government budgets, urgent investment is needed in underfunded sectors, including education and healthcare. Infrastructure development significantly stimulates economic activity within regions by providing basic amenities like water supply systems or power grids for businesses to operate effectively (Inter-agency on Financing for Development 2017). Investments in transportation networks also increase connectivity between different regions allowing people to access job opportunities outside their immediate area while attracting new businesses looking for better logistics options. Entrepreneurial activities are another essential element in driving economic growth within regions. The provision of funds targeted at entrepreneurs helps them develop innovative ideas to create employment opportunities within their communities while developing products or services locally and globally relevant (Griffith-Jones et al., 2008). Public services are vital in enhancing social welfare through access to quality healthcare facilities; educational institutions equipped with modern teaching aids; clean drinking water supplies; safe housing units (ECLAC 2021). Developing countries often lack adequate funds allocated towards this sector, leading their citizens into dire conditions- therefore, using Regional Development Financing becomes imperative.

Regional Development Financing is critical in promoting economic growth, reducing regional disparities and enhancing social welfare. With increased investment into infrastructure

development, entrepreneurial activities and public services within these areas, regions can transform their economies from being stagnant to dynamic ones with sustainable job creation opportunities that improve the quality of life for all citizens (Inter-agency Financing for Development 2017).

One cannot overemphasise the significance of regional development financing in Europe, as numerous scholars acknowledge its crucial role in encouraging economic growth, decreasing regional disparities, and ensuring sustainable development. Kroll et al. (2018) state that the European Union's Cohesion Policy is an essential driver of regional development financing by providing financial support for infrastructure investments, innovation projects, and human capital development to decrease socio-economic imbalances among regions. Bachtler et al. (2020) contend that regional policy has become increasingly significant due to globalisation trends and changing demographic patterns. They suggest a growing recognition of the need for more place-based policies that account for local conditions and promote customised solutions to specific challenges faced by different regions. In addition to these broader arguments about the importance of regional policy to promote sustainable European growth, several authors have also spotlighted specific examples funded through successful initiatives under various forms of regional development financing schemes. For instance,

Similarly, Carragliu et al. (2019) note Smart Specialization Strategies' ability to help regions identify their unique assets to concentrate on building competitive advantages around them through innovative policies. Nonetheless, it should be mentioned that while success stories are associated with various forms of developmental finance across Europe- from EU Structural Funds up to national-level investment programs - potential downsides or limitations associated with such approaches have been raised by some scholars who caution against overly simplistic assumptions about what constitutes "regional competitiveness" or "economic growth." Instead, Oosterlynck et al. (2020) suggest nuanced understandings considering social inclusion objectives alongside economic goals. Moreover, studies imply that certain types or combinations may be more effective depending on context/needs. For example, Sotarauta et al. (2018) argue that multi-level governance structures involving public and private actors' collaboration at various levels can ensure effective coordination of regional development. Overall, regional developmental financing has become an increasingly effective tool for promoting sustainable growth while reducing European disparities. By providing targeted support to local communities, businesses, and other stakeholders over the long term, such policies lay the foundations for a more prosperous and equitable future across the continent.

When examining how to raise funds for regional development in the MENA nations, it is vital to recognise their respective challenges. According to Assi Okara (2020), political instability can hamper foreign investments and aid, making it difficult for these governments to acquire the funds required for developmental projects. Notwithstanding these obstacles, various authors have identified effective policies and international partnerships that could facilitate increased investment and aid in MENA countries. Similarly, Brixiova et al. (2020) suggest that diversifying funding sources beyond traditional donors would help mitigate risks from economic shocks. One promising approach towards increasing investment in MENA countries is partnering with international organisations like the World Bank or International Monetary Fund (IMF).

1.6 Institutions Associated with Regional Development

To enhance economic growth and social welfare, we must acknowledge the crucial role played by institutions focused on regional development. These establishments provide local communities with infrastructure, resources, and policies encouraging innovation and competitiveness. According to Keune (2001), one of the most significant ways institutions support regional development is by implementing technology transfer, inter-firm cooperation, training initiatives, and inward investment programs - all integral components in creating an environment conducive for businesses to prosper. These organisations enable companies to access necessary skills across sectors by facilitating knowledge transfer mechanisms and providing funding opportunities.

The United Nations Development Programme (UNDP) is a significant organisation in this field and works towards sustainably eliminating poverty while ensuring global sustainability. To achieve this goal, UNDP has implemented programs that enhance democratic governance, environmental stability, social inclusion, and crisis prevention and recovery management. Thus far, the contributions of UNDP have made substantial progress globally by reducing inequality. Furthermore, the European Commission supports sustainable development worldwide via several funding instruments like ERDF, ESF and Cohesion Fund, which offers financial aid for SDG proposals within EU member states. They also demonstrate their commitment to sustainability beyond borders by allocating an annual budget of €160 billion for research and innovation alongside climate action projects under Horizon 2020 program. The World Bank collaborates with governments worldwide, investing in infrastructural developments globally while nurturing small or medium-sized enterprise growth and promoting sustainable global development, creating economic opportunities for developed and developing countries.

Similarly, AfDB (African Development Bank Group), ADB (Asian-Pacific et al. Bank), and IDB (Inter-American Development Bank) all play crucial roles when contributing significantly toward

regional prosperity by meticulously collaborating and offering critical financing support respectively for African Pacific-Asian Latin American countries' infrastructure needs. Innovation is essential when addressing developmental challenges without compromising our planet's health or resisting unsustainable practices - OECD (Organization for Economic Cooperation and Development). It offers guidance concerning regulatory framework issues besides researching data related to strategies such as green economy transition, ultimately impacting SME growth positively worldwide. Overall, numerous organisations exist entirely committed towards sustainable development and reducing poverty globally, providing financial aid for innovation, infrastructure developments, and SME growth strategies to governments worldwide. These establishments' steadfast commitment towards sustaining extreme poverty and securing global sustainability has seen significant strides toward achieving SDGs while creating economic opportunities that benefit both developed and developing nations equally.

The strategic alliances formed between regions and their stakeholders have significantly impacted the advancement of regional development in Europe. The influential works of esteemed economists such as Michael Porter and Mariana Mazzucato exemplify this. Social economy organisations, which encompass an array of initiatives across various fields, including healthcare, education, housing, culture, and environment, are highlighted in,, The Weight of the Social Economy in the 28 EU Member States" (European Economic and Social Committee, 2016). These organisations work with local governments to promote job creation, community empowerment efforts and sustainable economic growth, thus aiding regional development. Begg (2021) highlights how the European Union has become a role model for global economic integration. Its success lies in its ability to generate collective public goods that promote continental prosperity among member states while focusing on collaboration between different regions leading to balanced growth throughout Europe. OECD (2016) asserts that international regulatory cooperation is vital in setting global rules for international agencies promoting regional development. Michael Porter's research supports this claim by showcasing how clusters - geographically proximate groups comprising interconnected firms within related industries - help enhance productivity through knowledge sharing and innovation diffusion, subsequently contributing to sustained competitiveness at region-specific levels and larger national economies. Moreover, Mariana Mazzucato argues for more significant investments into research and development activities geared towards building technological capabilities alongside measures aimed at supporting long-term sustainability goals whilst effectively collaborating with private entities/government bodies can fuel innovation whilst addressing societal challenges such as climate change or widening income inequality. Collaborative efforts remain critical drivers behind successful regional developments creating

resilient communities able to adapt quickly when faced with new challenges, ultimately enabling social mobility and leading toward stronger economies than ever without them.

2.Innovation’s Role in Regional Development

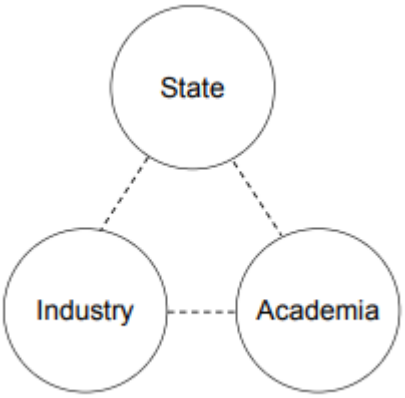
In modern economies, innovation is of utmost importance. The advancement and triumph of firms and the affluence of nations are crucial factors that impel enhancements in the living standards of consumers. To generate innovative ideas and vie for the future, investment in research and development (R&D) is indispensable for firms and countries, as Tellis et al. (2008) noted. Hausman and Johnston (2014) suggest that job creation, income generation, and long-term economic growth are some ways that innovation promotes a robust economy. Hence, policies and strategies for developed and developing countries should concentrate on procuring the ability to innovate since it lies at its core, as emphasized by Bizri (2017). Terzic (2017) explains how developing economies increasingly focus on innovation as it enhances competitiveness and economic progress, enabling them to catch up with their global counterparts. Naude et al. (2011) also underscore its implications for growth in a worldwide economy.

The examination of the literature on regional development and innovation shows that these two processes are deeply intertwined. López-Rubio et al. (2020) indicate that there has been a significant increase in attention towards this research field from scientific communities, public administrations, and international organisations. This suggests recognising the importance of regional development efforts within more significant economic and social frameworks. Furthermore, Chowdhury et al. (2023) argue that innovation hubs can play an essential role in attracting knowledge, expertise, and investors to regions through their activities and geographical location.

"Innovation" originates in the Latin verb innovare, which denotes revive. It encompasses the practical application of new ideas that introduce distinct commodities or amenities while enhancing existing ones. Defining innovation requires discussing novelty, enhancement and spreading of concepts or technologies. Innovation involves many enhancements, such as more effective products, processes, services, technologies, and artworks. This includes creating something entirely new (invention) and integrating something fresh into an already-existing domain (integration).

Henry Etzkowitz and Loet Leydesdorff developed the Triple Helix model in the 1990s which is a beneficial framework for regional development and innovation. The model highlights the significance of academia, industry, and governmental cooperation as key catalysts for development.

Figure 3 The Triple Helix Model



Source: Marina Ranga and Henry Etzkowitz, (2013) page 239.

The Triple Helix model mainly highlights that.

• Universities contribute to regional development through technology transfer, entrepreneurship support, and training of skilled professionals.

• Collaboration between universities, industry and government can address regional challenges and identify research priorities.

• The business sector catalyses innovation and economic growth in a region.

• Businesses bring commercialization capabilities, industry expertise, and market knowledge to the innovation ecosystem.

• Businesses can collaborate with universities and government entities to support research and development activities.

• Industry-academia partnerships can foster the creation of innovative products, processes, and services.

• Government plays a crucial role in creating an enabling regional development and innovation environment.

• Government formulates policies that facilitate collaboration between academia and industry.

• Government entities can support research initiatives, promote innovation hubs/incubators and provide financial incentives and infrastructure/resources for innovation.

The Triple Helix system, which involves the collaboration between universities, industry and government to drive innovation and growth in a country, has been recognized as a crucial factor in advancing economic development. Abd Razak and Saad (2007) explored the evolution of this

process within Malaysia, identifying several key drivers that have led to its success. These drivers include the commitment of stakeholders towards promoting innovation, establishing effective policies that support research activities across all sectors, and investing in education and training programs. Moreover, Osmuk (2019) points out how nations worldwide face similar challenges from an increasingly complex postindustrial society. Triple Helix systems play an essential role in responding to these challenges: they provide countries with the tools for responding effectively through collaborations that lead to mutual benefits. Kalenov and Shavina (2018) emphasize one critical aspect of the Triple Helix system -the interaction between government authorities- vital in creating an environment conducive to innovation. This environment helps create jobs while providing societal benefits through increased investments in education or infrastructure-building projects.

Furthermore, usage measures the extent to which individuals, businesses and governments use ICTs. This is crucial in ensuring effective service delivery in both private and public sectors (Abubakar, 2022). Indicators like internet penetration rates are vital for tracking progress towards achieving universal connectivity goals set by international organisations like ITU. The third component, impact, assesses how healthy countries leverage their existing technological capabilities to drive economic growth. A good example would be exploring ways through which developing countries can better utilise technology to promote entrepreneurship amongst youth populations, as it has been found that one-third of young people who have started enterprises were able primarily due because they had access to or knowledge about technology tools (Abubakar,2022). Moreover, the environment focuses on assessing policies put in place by governments with regards regulation relating intellectual property protection, data privacy regulations among others. The Innovation dimension covers research expenditure, venture capital investment levels, and patents registered. Accordingly, these two dimensions work hand-in-hand, creating enabling conditions for entrepreneurs. CVCs are becoming popular in MENA's investment ecosystem (**see Appendix 3**). They offer benefits, such as access to operational support and potential exit options. CVCs have an advantage over traditional VCs because they can leverage parent-company synergies and scale to attract promising start-ups. In 2015-2016, 12 new CVCs entered the MENA market, including Saudi Telecom's STC Ventures, which invested in ride-hailing unicorn Careem (Abdur-Rahim S. et al. 2018). Also, the Networked Readiness Framework is essential for assessing a country's readiness level concerning embracing new technologies such as artificial intelligence. It enables nations worldwide to make data-driven decisions on what areas require improvement when developing ICT-related policies (Mike Jensen and Amy Mahan, 2007).

Innovation indicators (independent variable for the thesis) that were used in analyses were patent

count, foreign direct inflows, internet penetration, trade openness, employment and government effectiveness. The increasing mobile phone penetration in the MENA country from 2010 to 2022 transforms the socioeconomic landscape by providing access to information, improving communication, and boosting economic growth. As per the vision of the GSMA, connectivity plays a critical role in enhancing people's lives, and industries' productivity and driving societal progress (GSM Association, 2022). Saudi Arabia stood in seventh position worldwide for the number of individual social media accounts in 2017, averaging seven accounts per person. Additionally, the country ranked first among MENA nations for Twitter and YouTube usage during that period (Northwestern University in Qatar, 2017).

The recognition of innovation's role in stimulating economic growth has become widespread. Dieter and Schmitt's research (2018) reveals that a company's innovation ability is crucial for its survival and a key determinant of competitiveness in today's rapidly evolving world. By examining renowned economists' viewpoints on innovative practices, businesses can gain significant insights into how they might foster development while remaining competitive. Encaoua et al.'s study (2000) claims that previous research has focused on analysing the impact of innovation on economic performance with an emphasis on collective learning contributing to business cycles. They propose endogenous growth theories as analytical tools for understanding technical progress and its global repercussions. Pictet Wealth Management supported The Economist Impact research program, which reviewed six decades of innovative activity across various technological sectors (Economist Impact, 2022). This approach employs extensive data analysis to interpret the language used in academic papers and patents; this provides more profound insight beyond mere measurement or citation counts alone.

Moreover, this literature review found diverse perceptions among economists regarding innovation depending upon their position towards market competition. Joseph Schumpeter suggested that disruptive innovations could lead industries towards monopoly power through creative destruction. At the same time, Michael E Porter argued that firms could attain sustainable competitiveness via incremental innovations aimed at continuous improvement. It was also discovered that there exists a direct correlation between R&D investment levels and successful product commercialisation rates (Rosenberg and Nelson, 1994); companies willing to invest more resources into Research and Development will achieve higher success rates when introducing new products or services than those unwilling to allocate adequate funding accordingly. By investigating economists' perspectives, it becomes evident that innovation is essential for fostering development while driving economic growth - creating novel products/services and increasing productivity levels boosting overall economic performance whilst allowing businesses to remain globally competitive.

The 2022 EU Industrial RD Investment Scoreboard is essential for analyzing and improving Europe's research and development investment landscape. The scoreboard highlights that Europe's industrial R&D investment lags behind the US and China, with most of the R&D expenditure concentrated in a few countries, such as Germany, France, Netherlands and Sweden (Archick, 2023). One area where increased investment could be particularly beneficial is sustainable technologies. As Sustainable Governance Indicators (SGI) (2022) noted, research and innovation policies effectively support innovations that foster the creation of new products while enhancing productivity.

Table 1 The Distribution of Companies and R&D by Country/Region.

EU countries	No. of Companies in 2021 (2022)	R&D (EUR bn)	Non-EU Countries	No. of Companies in 2022 (2021)	R&D (EUR bn)
Germany	114 (124)	91.03	US	822 (779)	439.7
France	57 (66)	28.78	China	678 (597)	195.9
Netherlands	38 (34)	24.08	Japan	233 (293)	113.8
Sweden	26 (34)	11.50	Switzerland	55 (57)	34.9
Ireland	24 (27)	8.28	South Korea	53 (60)	34.3
Denmark	25 (29)	7.15	UK	95 (105)	32.8
Finland	12 (15)	5.30	Taiwan	84 (86)	24.8
Italy	20 (21)	5.21	India	24 (25)	5.6
Spain	12 (14)	4.48	Canada	28 (26)	5.2
Belgium	12 (3)	3.11	Israel	22 (21)	4.1
Austria	13 (14)	2.04	Australia	10 (11)	3.1
Luxembourg	3 (4)	1.25	Singapore	7 (6)	1.6
Portugal	2 (2)	0.18	Norway	9 (11)	1.4
Hungary	1 (1)	0.17	Saudi Arabia	1 (1)	0.9
Slovenia	1 (1)	0.15	Brazil	4 (5)	0.5
Malta	1 (1)	0.06	Other 10 countries	14 (9)	2.5
Total EU	361 (401)	192.8	Total	2139 (2099)	901.1

Source: The 2022 EU Industrial R&D Investment Scoreboard, European Commission. Page 8

The United States continues to dominate Research and Development investments across countries and regions. Specifically, 822 such companies are operating within the US borders. Following closely behind is China, with 679 companies, while the EU ranks third with 361 companies. Japan comes in fourth place with 233 companies, whereas the UK has a respectable number of 95 top R&D investing firms. Taiwan follows with 84 enterprises, while Switzerland boasts 55 noteworthy R&D firms. South Korea came in ninth place with only 53 firms this year compared to Switzerland, which has overtaken it. Canada secured tenth place on this year's list by having only 28 notable R&D investing businesses, followed by India, which takes up 11th position with just 24 top companies dedicated to research and development initiatives. Regarding the MENA countries, Israel topped with 22 firms in Research and Development, followed by Saudi Arabia and Malta with only one opening each. It should be noted that except for Switzerland climbing above South Korea and taking its eighth position spot, all other countries/regions' rankings remained unchanged from last year's Scoreboard analysis.

Table 2 Index for Innovation in MENA and top 5 Countries in the World 2022.

Country	**Score**	**Global Ranking**	**Ranking in MENA**
Switzerland	64.6	1	-
United States	61.8	2	-
Sweden	61.8	3	-
United Kingdom	59.7	4	-
Netherlands	58.0	5	-
Israel	50.2	16	1
Malta	49.2	21	2
United Arab Emirates	42.1	31	3
Saudi Arabia	33.4	51	4
Qatar	32.9	52	5
Iran	32.9	53	6
Kuwait	29.2	62	7
Morocco	28.8	67	8
Bahrain	28.0	72	9
Tunisia	27.9	73	10
Jordan	27.4	78	11
Oman	26.8	79	12
Egypt	22.7	89	13
Algeria	16.7	115	14
Yemen	13.8	128	15
Iraq	11.9	131	16

Calculated by the author.

SOURCE: Global Innovation Index Database, WIPO, 2022. page 21

Table 2, The Global Innovation Index Report 2022 Summary highlights innovation's key role in driving economic growth and development. According to the report, Switzerland, the United States, and Sweden are among the top three innovation economies in the high-income group (Executive Summary - Global Innovation Index 2022; WIPO, 2022). With a score of 50.2, Israel spearheads innovation economies in the MENA countries.

Innovation has propelled Switzerland, the United States, and Sweden to leadership positions on the global stage. The accomplishment is attributed to their collaborative approach towards education, research, development infrastructure, and supportive business environments. Research conducted by the OECD in 2006 highlighted universities' fundamental role in promoting innovation by providing a conducive environment for cutting-edge research to be transformed into practical applications. Universities take centre stage in all three nations' innovative landscapes and maintain robust industry partnerships. Besides, education plays a pivotal role in these countries' success stories regarding innovation. According to Salge (2021), agility in thinking and action is critical for successful innovation. The three leading countries recognize this need for continuous learning and invest significantly in high-quality public and private educational institutions, from primary to tertiary education.

Additionally, since the beginning of human history, innovation has driven progress. Innovation has drastically changed every aspect of our lives, from discovering fire to inventing modern technology such as smartphones. However, its impact goes beyond personal convenience; it plays a pivotal role in economic development. Economists like Joseph Schumpeter and Paul Romer recognise this fact. Their research shows how new concepts lead to the creation of fresh markets and accelerate productivity growth. Schumpeter is famously known for his proposal of "creative destruction." This concept suggests innovative entrepreneurs disrupt established industries by producing new products or services. Romer's work in endogenous growth theory indicates that knowledge-based economies experience sustained economic expansion compared to those rooted in traditional capital accumulation or natural resources. He asserts that investing in education, research, and development can enhance innovation and economic development.

According to Lemanowicz (2015), innovation is crucial for driving economic growth since it creates new markets, enhances productivity growth, and improves the overall quality of life. While recognising its importance in the 1990s led to increased research on this topic, Greenstone and Looney (2011) argue that innovation drives economic development by improving productivity

growth and creating new markets that enhance people's everyday lives. Encaoua et al. echo these sentiments, stating that innovation is critical in facilitating market creation while spurring productivity growth. To entrepreneurs like Joseph Schumpeter, innovative activities disrupt existing markets leading to better products or services, ultimately raising industry standards across sectors (Lemanowicz, 2015). Similarly, Romer proposed endogenous technological change as a means through which economies could grow sustainably over time via investment into education and other intellectual capital, such as information technology infrastructure, thereby encouraging more invention activity to develop new consumer-friendly products (Greenstone and Looney 2011). Innovative activity is essential when discussing long-term sustainable growth within any economy (Encaoua et al.).

Moreover, policies relating to financing R&D projects should be explicitly tailored towards SMEs since they tend to have lower levels than large corporations and are often responsible for introducing disruptive technologies into existing production patterns. Moreover, economists recognise innovation's value and impact on fostering long-term sustainable economic development - Joseph Schumpeter and Paul Romer being among the key contributors whose work has boosted understanding of it all. Policymakers must develop policies promoting innovative activity across all sectors while ensuring financing mechanisms suit SMEs whose contribution must be recognised in bringing about industry-disruptive technologies. Though this is not a new concept, humanity's continuous progress in innovating over centuries has made it an increasingly critical factor in shaping our history (Spolaore, 2019). From discovering fire as Homo erectus to today's latest technological advancements, innovation has transformed society across various timelines and continues to do so. Experts like Joseph Schumpeter and Michael Porter recognise the significance of innovation in boosting economic growth and productivity while offering fresh opportunities for businesses and individuals alike (Han, 2018). For instance, intellectual property rights foster specialisation that contributes significantly to economic growth.

Moreover, venture capital investment also plays an essential role in advancing patenting activities towards enhancing economic growth prospects. However, fostering an environment that encourages innovative thinking is just one piece of the puzzle regarding regional development. Governments must initiate policies that incentivise investments in research and development activities through tax credits or other perks that lure high-tech industries with lucrative jobs within their borders Shelton, R. C., and Lee, M. (2019). The education system also holds immense importance by providing skilled employees capable of contributing toward long-term success. Educational institutions should focus on STEM subjects as they are fundamental elements from which most innovations arise- scientific research underlies advances across fields such as

healthcare delivery systems benefiting populations globally (Shelton, R. C., andLee, M. 2019). Innovation indeed plays a pivotal part in driving sustainable regional developments by ensuring higher productivity levels and increased employment opportunities while fueling economies through various means ranging from intellectual property initiatives to venture capital investments - all encouraging sustained prosperity at both individual/trim business levels throughout society.

2.1 The History of Innovation.

The concept of "innovation" has been a prominent feature in the business industry for a considerable duration. It is often promoted as the primary factor for gaining an edge over rivals and accomplishing sustainable prosperity. Nevertheless, what is the origin of this idea, and what makes it a crucial element of current financial expansion? Answering these questions necessitates diving into the past and studying works by renowned economists who have contributed significantly to our understanding of innovation. The review argues that innovation has driven economic progress throughout history, citing economists such as Schumpeter, Smith, and Keynes.

Firstly, we explore Joseph Schumpeter's theory of creative destruction- a groundbreaking concept highlighting how novel breakthroughs displace established firms, creating startup opportunities. Next is Karl Marx, who opines that technological progress results in greater labour exploitation and catalyses improvements towards equitable societal conditions. John Maynard Keynes' thoughts on technological unemployment suggest automation threatens mass job loss unless policies are in place to redistribute wealth. The contributions made by these scholars demonstrate that innovation goes beyond inventing fresh ideas or products; it entails generating value for customers and simultaneously spurring economic advancements.

Economists are interested in innovation's history. Their works suggest that innovation has critically driven economic growth throughout time. Radosevic and Yoruk (2016) stress how ideas have pushed economies forward and spurred progress across various sectors. From archaic steam engines to contemporary technology, innovations have stimulated change and created new business opportunities worldwide. Argues that innovation has become central in our popular imagination, media, public policy, and everyday vocabulary. Although we typically link it solely with technological advancements, Godin's research shows us how much broader "innovation" can be. Everett Rogers' book "Diffusion of Innovations" has revolutionised the understanding of how new ideas, products, and technologies spread throughout society. According to Rogers, several key factors influence the adoption and diffusion of innovation. One such factor is heterophily, which refers to the degree to which two or more individuals interact differently in specific attributes. One of the most specific problems in the diffusion of innovations is that participants are usually

heterophilous (Rogers, 2003). Another key factor identified by Rogers is compatibility. An idea that is compatible with an individual's values or norms will only be adopted as slowly as an innovation that aligns with these values (Robinson, 2009). Sahin (2006) supports these claims by arguing that such interactions create an environment where innovative ideas thrive because they bring together diverse perspectives from people who may not otherwise communicate regularly. Radosevic (2016), Godin (2008), Rogers (2003), and Sahin (2006) 's key literature give ample evidence supporting the thesis statement: Innovation has been a driving force behind economic growth throughout history. These scholars show how innovative thinking leads to adopting new technologies that propel economies forward while highlighting nuances associated with innovation that must leverage its full potential. The research suggests that those who innovate effectively over time will depend heavily on the future of economic growth and development.

2.2 Innovation Ecosystem

Innovation ecosystem theory is a rapidly developing research field, as Meng and Ma (2018) noted. An economist's viewpoint suggests that facilitating cooperation among essential stakeholders like the government, industry, and academia could boost economic development, improve efficiency, and generate fresh employment prospects. This collaboration is facilitated through innovation ecosystems that offer new insights into how firms and aggregate productive structures are structured. According to Fischer et al. (2022), this ecosystem perspective not only facilitates knowledge flows but also broadly appeals to individuals and organisations outside of academia. Sun et al. (2021) suggest that technological trajectory transition from the perspective of the innovation ecosystem can affect the innovation performance of latecomers in the market. The authors developed and tested a structural equation model with data collected from 366 firms in China to categorise technological trajectory transition into two types: creative accumulative technological trajectory transition (CCT) and creative, disruptive technological trajectory transition (CDT). The study found that firms' organisational learning ability positively affects their technological trajectory transition and innovation performance. However, network relationship strength negatively affects their technological trajectory transition while positively affecting their innovation performance. Governments' environmental concerns play a positive role in driving firms' technological trajectory transitions and their innovation performances; however, it was observed that firms' environmental concerns do not significantly impact either factor. Thus far, we see how important it is for governments to understand which aspects could help foster a robust, innovative environment for companies across different sectors to achieve goals related to economic growth or social welfare issues. From these findings, we can conclude that establishing

collaborative relationships between key players such as government entities responsible for policy-making processes, academic institutions conducting relevant research studies, and corporations working towards implementing innovative solutions within diverse industries - all play crucial roles in realising enhanced economic outcomes while simultaneously creating new jobs opportunities across various sectors. Therefore, it becomes essential for governments to take the initiative towards establishing policies to promote the establishment and growth of innovation ecosystems within their respective regions. Governments can stimulate economic growth and elevate productivity levels in multiple sectors by allotting funds for research and development and establishing inducements for corporations to invest in pioneering technologies.

The 2009 OECD report agrees that policymakers can utilise economists' knowledge to promote eco-innovation. Janicke (2008) adds another crucial aspect of eco-innovation: its positive spillover effects across various domains, leading to more comprehensive societal benefits beyond environmental ones. To gauge progress towards sustainability objectives at both national and global scales assessing the significance of metrics employed for evaluating eco-innovations are critical). Duricin (2022) notes further that investing in innovation often translates into improving knowledge held among staff involved in research projects. However, it could lead to losses during personnel turnover or changeover, emphasising its value.

2.3 The Importance for Innovation Ecosystems to The Revival of Economies

Reviving an economy requires enhanced productivity, leading to better living standards (Dutta S et al., 2022). The MENA region arguably is recognised as a global trade and commerce hub. However, the COVID-19 pandemic has severely impacted its economy, leading to significant economic contraction and job losses. To revive these economies, it is essential to prioritize and cultivate vital innovation ecosystems that foster entrepreneurship, collaboration, and investment in technology and infrastructure. According to The Economist Intelligence Unit Limited (2021), addressing gaps in the MENA region's technology ecosystem through policy solutions can strengthen the region's digital infrastructure. This strengthening would undoubtedly be critical in building a more resilient, diversified, sustainable economy in MENA. By prioritizing investments in innovative technologies such as AI - which is expected to be one of the primary drivers of economic growth according to The Economist Group (2022) – we will provide opportunities for businesses within this sector.

Furthermore, fostering an environment conducive to entrepreneurship requires initiatives promoting collaboration between entrepreneurs, public institutions, and academia from various countries worldwide. Such partnerships help build diverse skillsets entrepreneurs need today -

skills such as teamwork, critical thinking or creativity are all necessary when trying something new or dealing with complexity. Investments should not solely focus on building up technological infrastructures alone; they must go together with supporting human capital development programs that equip individuals with knowledge relevant across different industries while also introducing them to cutting-edge business models available globally like open innovation networks - where innovators work together instead of competing against each other. Finally, it is essential not only to invest resources into developing local talent but also attracting foreign investors looking at emerging markets like MENA since startups often require seed funding from angel investors or venture capitalists who bring much-needed finance along with their experience running successful businesses elsewhere around the world.

3 Characteristics of MENA Countries

The MENA region is full of stunning scenery and endless opportunities. The region spans from the Mediterranean's shores to the Arabian Peninsula's barren expanses. This immense and multifaceted area with over 580 million people. It is an ancient land steeped in history, where civilisations have come into being and modernised beyond memory. The MENA countries struggle on several fronts today: political instability strains their governments while economic disparities hold back progress.

The World Bank's definition of the MENA region in 2023 encompasses (21) twenty-one countries with significant differences in social, economic, and political characteristics. The classification serves as a crucial instrument for policymakers and economists attempting to understand the intricate dynamics within this diverse area. The countries that make up the MENA region comprise Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, West Bank and Gaza, and Yemen Republic.

Over the past fifty years, the Mena region has thrived on a bounteous stream of revenue from its great stores of natural resources-primarily oil and, more recently, natural gas. Nevertheless, contemporary times stand apart from yesteryears as governmental bodies and privately owned enterprises opt for an unparalleled course by channelling energy profits into building infrastructure and investing in capital projects to determine the trajectory of the area's financial future (White 2008).

Despite having a noteworthy GDP of $3.68 billion, the MENA region faces numerous economic challenges that impede its development (World Bank 2021). An essential factor required for economic growth through the 21st century is social sustainability, as asserted by Barron et al.

(2023). As highlighted in Cambodia: Social Protection Expenditure and Performance Review, the macroeconomic environment strongly influences labour productivity, wages, and social protection. Therefore, to ensure a robust economy while maintaining social sustainability, policymakers must find ways to improve current affairs. Despite containing some of the wealthiest nations in the world, like Qatar and Saudi Arabia, countries within this region experience substantial economic struggles that inhibit their growth and development. These hardships are multifaceted and arise from several factors, including political instability, corruption, lack of diversity in economies reliant on oil exports, high rates of unemployment among young people, insufficient financing for small businesses due to limited access to resources or capital investment opportunities; inadequate infrastructure development alongside weak legal frameworks contribute further difficulties. Violence had a more significant negative impact on the economy worldwide from 2020 to 2021. The Middle East and North Africa (MENA), and Russia/Eurasia felt it the most, with their economies being hit by 32% and 29%, respectively, (Global Peace Index, 2022, p. 41).

Nevertheless, these lands display incredible resilience and growth potential despite some regions' ongoing geopolitical conflicts and socio-economic hardships. McKee et al. (2017) state that MENA nations face substantial economic challenges due to their reliance on oil exports and insufficient diversification. Regrettably, this reality has led to developing trends and difficulties across the region, including high public debt levels, underperforming labour markets, and weak trade performance indicators (McKee et al., 2017). As shown in **Appendix 1,** Siham Matallah's (2022, p. 8) research found that most MENA oil-exporting countries, except UAE and GCC countries, need more economic diversification due to weak agriculture contributions and overreliance on oil revenues. The service sector has become more dominant as industrial activity declines, and structural reforms and innovation are required for developing profitable alternative industries beyond exporting primary petrochemical products.

Although there have been certain advancements in the MENA region, such as the integration of open-source software by Tunisia and the creation of incubators and innovation centres by Morocco, it still needs to catch up to other global regions regarding innovative practices. This is evident from the low rankings that several MENA countries received on The World Economic Forum's Global Competitiveness Index 2019 (Signé and Heitzig, 2022). Many governments across various MENA regions face significant challenges due to a lack of competitiveness and innovation. Signé and Heitzig (2019) highlight that only a few countries within MENA ranked among the top 50 in The World Economic Forum's Global Competitiveness Index 2019. Israel held the highest position at number 20 among 141 countries, while UAE ranked 25th, Qatar at 29th, Saudi Arabia at 36th and Bahrain at 43rd. These figures demonstrate that while efforts have been made towards

technological advancements like government services or initiatives bringing together startups with industry experts through incubators or hubs, these endeavours are insufficient.

The Economist Group (2022) claim that until peace prevails within the region,, political instability" will continue being an unwelcome guest who hinders sustained economic development; however, strategic initiatives aimed at rebuilding infrastructure coupled with increased resources dedicated to educating locals about new technology developments may offer some hope regarding improved conditions over time despite all odds working against them.

Some countries in the Middle East and North Africa (MENA) area have attracted foreign investment and made commendable progress concerning vital economic reforms while facing considerable difficulties. However, not all sectors of the economy share this uniform advancement as agriculture confronts its unique set of obstacles, hampering its growth potential. Nigatu and Motamed's study in 2015 revealed that MENA's growing population, coupled with rising incomes, has brought about higher demand for staple foods like significant food grains, feed grains, soybeans, cotton, and meats. Consequently, there is significant pressure on local agricultural production systems to meet these needs adequately. The most significant challenge confronting MENA's agricultural sector today is water scarcity due to arid land resulting from climate change effects such as droughts.

Figure 4 Map of the MENA region.

Source: http://www.greenprophet.com/2009/12/mena-solar-power/. Last viewed: 19 June 2023.

Table 3, Mena Regions Groupings Based on Two Distinct Factors

		Natural Resources	
		YES	**NO**
Labor Force abundant countries	**YES**	Algeria, Iran, Iraq, Azerbaijan	Jordan, Egypt, Israel, Lebanon, Tunisia, Turkey, Morocco, Yemen
	NO	Bahrain, Kuwait, UAE, Libya, Oman, Qatar, Saudi Arabia	Not defined

Source: Abdelwalid Rouag and Jan Stejskal (2014). Page 5

As put forth by O´Sullivan et al. 2011 The MENA region can be classified based on two factors from an economic perspective: the presence of available labour and natural resources like oil and gas. The table above shows this classification.

3.1 Growth and Development in MENA

The MENA region significantly transformed during the early 70s following increased petroleum prices. According to Dahi and Demir's (2008) research, this time marked a significant milestone for these economies as oil revenues surged, allowing nations in the area to invest profoundly in various sectors like education, infrastructure and healthcare systems. This resulted in rapid development and growth across different segments of their economies. It is important to note that not all countries under MENA enjoyed equal economic expansion during this period since some struggled with political instability or other factors that hindered their ability to take advantage of rising oil prices. Despite these disparities, there was an overall trend towards greater prosperity throughout the region. Although subsequent downturns have caused scholars to question whether this era represented an actual "golden age" for MENA economies (Dahi andDemir, 2008), it is still considered an essential part of the area's economic history. As we continue facing global energy challenges today-including issues related to climate change-understanding how past developments impacted diverse regions globally becomes increasingly crucial for charting a sustainable path forward.

Oil-exporting countries' economic growth has far-reaching effects beyond their borders, as evidenced by research from Smith, J. (2021). Investment and growth rates in oil-exporting countries expand through remittances and capital flows, spreading to other regions due to global market interconnectedness. When oil prices rise, these exporting nations see an influx of foreign currency, leading to higher investment levels and overall economic development. However, this prosperity does not remain confined within national boundaries; it spills over into neighbouring areas through various channels, such as increased capital inflows or remittances from migrant workers abroad. Non-oil-producing countries also benefit from financial flows generated by

resource extraction activities. Again, one country's success can positively affect its neighbours' economies through various financial channels like remittances or capital investments.

The accumulation of financial savings overseas has dramatically affected the global economy. One particular outcome that stands out is the expansion of Eurodollar markets, which occurred through the process known as petrodollar recycling. This involves oil-rich countries depositing their profits in Western banks and lending those funds to borrowers outside their home countries. Foreign currency deposits in offshore banks are increasing as a result. Experts suggest this phenomenon significantly created liquidity and facilitated cross-border transactions throughout the 1970s and 1980s (Smith). However, as with any economic system relying on debt financing, risks can lead to instability or crisis over time. Excessive borrowing and lending practices could fuel asset bubbles or inflationary pressures that threaten financial stability (Wang). Despite its potential problems, petrodollar recycling has undoubtedly helped boost economic growth and development for several decades.

The MENA region's economy faced several challenges that hindered its advancement and development during the 1980s and 1990s when oil prices dropped. Although some improvements have been made over time, MENA still needs to catch up to Latin America and East Asia regarding crucial indicators such as GDP per worker or total factor productivity - particularly glaring is its low ranking on UN Human Development Index. Despite various attempts at reviving their economies through measures like privatisation or increased foreign investment influx from abroad to generate job opportunities, among other goals- these efforts are yet to yield tangible results for MENA countries' long-term recovery processes.

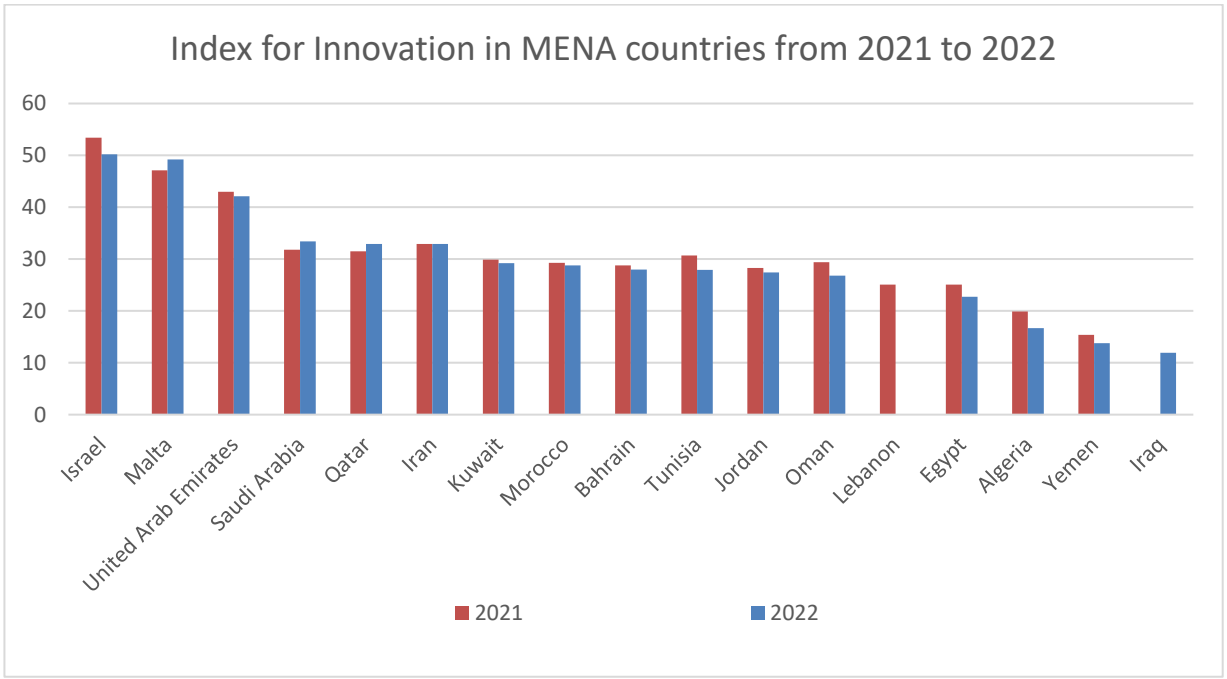
3.2 Exploration of selected countries and their innovation ecosystems in the Middle East and North Africa.

The MENA region has shown significant progress in global innovation, with several countries ranking above the median value for the world economies. According to the Global Innovation Index 2022, only a few economies have consistently delivered peak innovation performance (GII, 2022). Among these top-performing economies, Israel, Malta, United Arab Emirates (UAE), Tunisia, and Saudi Arabia (KSA) fall above the median value of 30.94 for the entire world's economies. It is worth noting that the UAE is one of these top innovators and ranks within the first 50 countries worldwide in both GII 2018 and GII 2020 reports. Additionally, two countries were featured on GII 2017 and three on GII 2016 - including Qatar and Saudi Arabia (KSA)- while maintaining their positions among other developing nations. Innovation is crucial for businesses' growth, this statement rings accurate globally and regionally. As highlighted by Nanda in his

article published in July of last year: Innovation is a driving force in today's economy, he emphasised its importance for companies to stay up to date with developments in this field (Nanda.,2020). This sentiment holds even more weight when considering emerging regions such as MENA. When measuring the innovation efficiency ratio among Arab MENA countries highlighted by WIPO (2022), Tunisia leads with an index rate of forty-nine while Morocco follows closely at fifty-seven (WIPO.,2022). Egypt also shows promising results regarding innovation output index rates alongside nine other Arab nations like Qatar and Jordan, who maintained their position from previous years despite tough competition from international players. It becomes clear that innovative ideas are vital factors contributing towards regional development throughout MENA. However, it would be unfair to compare various industries across different territories - especially given how varied they operate or what incentives governments provide them with so that research and development can thrive.

Moreover, MENA countries have come a long way regarding innovation. The Israel is leading the pack consistently on GII rankings in recent years, followed by other top performers such as Malta, UAE, Tunisia, and Saudi Arabia. This progress will undoubtedly help drive economic growth throughout the region. In addition, Tunisia's and Morocco's top-of-the-chart results regarding efficiency ratio demonstrate their commitment to enhancing research output within existing settings without compromising quality (WIPO.,2022).

Figure 5 MENA Countries Innovation Index



Source: Created by author from the Global Innovation Index 2021 and 2022 rankings.

3.2.1 Exploring Israel's Innovation Ecosystem.

The country's success can be attributed to an exceptional blend of elements such as assistance from the government, a culture of entrepreneurship, distinguished academic institutions, and astute partnerships. The Israeli experts' workshops identified "53 main anchors which the Israeli experts recognized as pillars of their Innovation system" (Frenkel et al., 2011). These essential pillars are crucial in creating an environment conducive to innovation. One pillar that stands out is Israel's strong emphasis on academic excellence. This strength is apparent in significant contributions made by Israeli universities toward scientific research and technological advancements worldwide (Drori, Gili S., 2013).

Moreover, among the key elements driving and fostering innovation are "26 processes that experts recognized" (Frenkel et al., 2011), including strategic partnerships between startups, venture capitalists (VCs), and large corporations. This interdependence fosters diverse market opportunities for innovative companies. Embracing failure has become a part of Israel's startup culture (Kapuler, 2015), allowing entrepreneurs to view setbacks not as failures but rather as learning experiences leading them closer to success. This resilience helps drive this dynamic process further.

Furthermore,, The changes caused by the development of innovative technologies globalization humanization greening process of digitalization" (Israeli and Blagorazumnaia, 2020) have presented new challenges for countries around the world, including Israel; however, its robust infrastructure supporting entrepreneurship at every level from education throughout funding stages ensures it remains successful in these changing times.

The transformation of Israel's economy from a military-focused one to an innovative ecosystem with diverse offerings has been crucial in propelling the country towards success, particularly in technology. This statement highlights essential factors pivotal in this shift, including government backing, a knowledgeable workforce, and a cultural disposition towards innovation. Israel invested heavily in research and development (R&D) efforts and lucrative incentives for companies striving for innovation. Substantial government support at multiple levels paved the way for startup ventures to thrive and prosper (Beatriz P., et al. 2008). One of the other significant contributing elements leading up to Israel's breakthrough was its competent workforce composed of highly qualified individuals holding advanced degrees mainly focused on STEM fields. With such an outstanding team armed with cutting-edge knowledge and expertise, it helped lay solid foundations for further developing innovative ideas across various domains. Finally, we must recognize Israel's culture, characterized by its entrepreneurial spirit that encourages experimentation without fearing potential failure or setbacks. These qualities are indispensable as they ensure the swift emergence and successful testing of new ideas; hence, they have contributed significantly towards Israel

becoming a frontrunner in developing new technologies (OECD (2016).

3.2.2Exploring Iran's Innovation Ecosystem

The United Nations Conference on Trade and Development (2021) has recognized that promoting innovation is a crucial driver of economic growth and development worldwide. By leveraging innovative solutions, critical global challenges can be effectively addressed. Iran, with its long-standing history of biotechnology development (United Nations, 2016), is a prime example of a nation that has fully embraced this concept. The Iranian government's prioritization of innovation has created an environment conducive to scientific and technological progress. As outlined by the Iranian Technology and Innovation Development Institute in 2019, continuous governmental support towards promoting innovative growth within the country through investments to steer it clear from relying solely on oil exports has led to remarkable achievements across various tech domains such as nanotechnology, renewable energy, information technology, and biotechnology. However, these achievements are not new phenomena but have their roots dating back centuries ago, during ancient Persian times when scholars made significant strides toward mathematics, chemistry, medicine astronomy, among other subjects. These early movements were fundamental in establishing contemporary science development foundations in today's country. According to ,,Timing counter-cyclical measures or targeting development?" published by the United Nations Conference on Trade and Development (2021), developing economies refer to all not specified above economies. This is worth noting because Iran's status as a developing economy underscores how far it can go regarding innovations given adequate resource allocation.

Moreover,, Science and Technology in Iran: A Brief Review" notes how Iran emerged as an international leader across several tech domains due to ongoing government investments towards driving research and development activities(RD) while also investing heavily in infrastructure—creating an ideal climate for groundbreaking technological advancements domestically whilst reverberating globally specifically via knowledge spillovers leading up-to job creation both locally and internationally hence boosting future economic developments both nationally and globally. Sustainable Development requires concerted policy efforts to improve education quality levels around STEM (Inter-agency Task Force on Financing for Development, 2021). The Iranian government prioritises innovation with investments in RD activities and infrastructural upgrades, which is consistent with the global push for sustainable development. Sustainable development necessitates reducing inequalities (Inter-agency Task Force on Financing for Development, 2021) and leveraging innovative solutions to tackle global challenges. In conclusion, Iran's remarkable achievements across various tech domains can be attributed to its rich history in scientific

advancements and the government's prioritization of innovation alongside continuous investment in R&D activities and infrastructure. These measures have created an ideal climate for groundbreaking technological advances domestically whilst reverberating globally via knowledge spillovers leading up to job creation both locally and internationally hence boosting future economic developments - both at home and abroad.

3.2.3 Exploring UAE's Innovation Ecosystem.

The UAE government's commitment to transforming the nation into a knowledge-based economy has been widely recognized as a remarkable success story. Kowalski (2018-2019) emphasizes that appropriate best practices in intellectual property management and technology transfer are crucial for building sustainable innovation-driven development. The government has invested significantly in technological infrastructure, providing various funding opportunities and mentorship programs through entities like Hub71 and the Ministry of Artificial Intelligence. As a result, the nation has emerged as one of the global leaders in shaping tomorrow's world. One notable example of such a vision is Dubai Silicon Oasis Authority, established exclusively as a free zone dedicated to technology-based industries in 2004. This initiative was part of the National Innovation Strategy to foster an innovative ecosystem by linking private, public, and government sectors (Kowalski, 2018-2019). Such investments have played an imperative role in propelling UAE to become a leading player globally. According to OECD (2016), digital technologies can transform education by preparing students for innovation. To keep advancing technologically while further nurturing creativity among its citizens, UAE also heavily invests in research across different fields. Investing resources into developing new tech tools that will positively shape several industries' future trajectories - including healthcare or transportation systems - ensures sustained economic growth within its borders.

Moreover, according to OECD's,, Business Insights on Emerging Markets 2021" report (OECD, 2021), EMnet fosters dialogue and analysis on economies' and also impact on global economic and social issues. It follows strategic partnerships between multiple stakeholders who pool their resources toward creating dynamic ecosystems centred around technological advancements. In conclusion, with unparalleled investment initiatives from governments seeking innovative solutions worldwide looking towards UAE's success stories for guidance towards achieving similar feats, there is no doubt that this country remains at the forefront when it comes to actively shaping our future world today.

3.2.3 Exploring Saudi Arabia's Innovation Ecosystem.

The Middle East has seen a surge in successful startups, and many attribute this to the success of Saudi Arabia's Vision 2030. This ambitious plan aims to reduce the country's dependence on oil and diversify its economy by investing heavily in sectors such as technology and tourism. Al-Saud (2016) states,, The success of Saudi Arabia's Vision 2030 is evident in the increase of successful startups in the Middle East, which is attributed to the greater availability of investment funding." Indeed, innovative ideas can become a reality with more funding available for entrepreneurs. The rise of these startups not only boosts economic growth but also creates job opportunities that help tackle youth unemployment in the region. However, it is essential to note that increased funding alone is insufficient for startup success. Proper mentoring and support networks are crucial elements that contribute significantly towards flourishing businesses. Therefore, governments should focus on providing resources beyond financial assistance if they want entrepreneurship endeavours to thrive fully.

Saudi Arabia is a country that has shown outstanding commitment to technology and innovation, particularly in the areas of AI, Blockchain, and IoT. This dedication can be observed through its various programs and ventures that support startup development. According to Alserhan et al., Saudi Arabia's efforts towards advancing technological innovation are reflected in its promotion of new technologies such as Artificial Intelligence (AI), Blockchain, and the Internet of Things (IoT). These innovative technologies have significant potential for creating value across different sectors by improving efficiency and enhancing user experiences. Furthermore, these startups development programs in Saudi Arabia help launch an environment conducive to growth by providing resources like mentorship opportunities, funding sources, and workspace provisions. Saudi Arabia's dedication to promoting innovative technologies is demonstrated through its various ventures that provide startups with the necessary tools needed for success in today's ever-evolving digital world, according to research conducted by Alserhan et al.'s article,, The role of Islamic Financial Tools in Supporting Economic Activates in Jordan: Special Case: The Islamic International Arab Bank" (Alserhan et al., 2016).

The Badir Program for Technology Incubators has played a crucial role in fostering the growth of startups across different sectors in Saudi Arabia. One of the key factors contributing to its success is the financial support provided by the program, which helps entrepreneurs overcome some of the initial hurdles in starting a business. In addition to funding, mentorship and training programs are offered through Badir, providing aspiring entrepreneurs access to experienced industry professionals who can offer valuable guidance and advice. Moreover, these initiatives have led to increased technological innovation within various industries, such as healthcare and finance

(Moussa et al., 2020). The combination of financial resources and mentorship programs has enabled founders to develop creative solutions that address pressing societal needs while improving economic growth.

Furthermore, this model encourages startup collaboration, increasing knowledge-sharing and networking opportunities (Al-Mubaraki et al., 2019). This collaborative approach allows fledgling businesses with limited resources to pool their skills and expertise together towards achieving common goals. In conclusion, initiatives like Badir are pivotal in nurturing entrepreneurship ecosystems by offering comprehensive support programs consisting of mentorship and training programs alongside substantial financial aid. These efforts drive sustainable economic development and promote technological innovation across diverse sectors, encouraging broader positive impacts on society.

3.2.4 Exploring Turkey's Innovation Ecosystem.

Istanbul's strategic location between Asia and Europe has been critical to its success as a hub for innovative business ventures. This positioning has provided an environment where businesses can thrive, supported by numerous resources such as coworking spaces, accelerators, and venture capital firms that offer invaluable guidance to entrepreneurs looking to start or grow their enterprises.

Kolektif House is one of Istanbul's most popular coworking spaces, founded in 2015 by Ahmet Onur. In addition to providing high-quality office facilities, this space fosters collaboration among members from diverse industries. Accelerators like İTÜ Çekirdek offer mentorship programs and seed funding opportunities for startups working on cutting-edge technologies such as artificial intelligence and blockchain. Venture capital firms like Revo Capital invest in early-stage companies across Turkey’s technology landscape – including fintechs like iyzico - exploring disruptive models that change how people do things.

Turkey has established itself as a significant player in fostering innovation, with Istanbul at the forefront of entrepreneurship culture. The government provides funding opportunities and training programs for aspiring business owners while also maintaining a solid education system producing graduates specialized in STEM fields fueling young innovators’ growth. However, early-stage funding remains a significant challenge for startups trying to get off the ground; hence most founders must look beyond domestic investors for financing options.

Despite these hurdles, Turkey remains staunchly committed to becoming one of the leading tech hubs globally through hosting key international startup events such as Startup İstanbul. Such events enable Turkish startups to access exposure insights and potentially lucrative connections with global business magnates while building partnerships across borders further showcasing Istanbul's

reputation as one of Europe's leading centers of innovation.

In conclusion, although challenges remain within the industry concerning access to seed funding requiring attention from both private and public stakeholders, Turkey's success in nurturing a culture of entrepreneurship and innovation is unwavering. The country's growing middle class presents ample market opportunities for new businesses targeting tech-savvy consumers seeking innovative solutions tailored explicitly towards their needs offering hope for future growth prospects within the industry.

3.2.5 Exploring Persian Gulf Countries' Innovation Ecosystem.

Innovation ecosystems are essential for economic diversification and reducing dependence on oil revenues in the Persian Gulf region. In recognition, Qatar, Bahrain, and Kuwait have invested significantly in their respective innovation ecosystems. Actual progress in enhancing innovation is through investment in education, research centres, and startup accelerators. As demonstrated by initiatives like Qatar Science and Technology Park (QSTP), Hamad Bin Khalifa University's Center for Advanced Materials (CAM), Flat6Labs, and Bahrain FinTech Bay. Qatar has made commendable strides towards building a robust innovation ecosystem that has impeded its economic development efforts. QSTP provides a platform for innovators to transform their ideas into successful businesses through incubation services that support startups' growth. The acceleration program at QSTP also helps entrepreneurs scale up their businesses more quickly with mentorship programs from experienced professionals.

Moreover, CAM contributes substantially to scientific advancements across different sectors, such as energy storage materials or healthcare technologies, by fostering interdisciplinary collaboration between experts in engineering fields related to materials science, chemical engineering, and physics. Education is vital for promoting innovation since it equips students with knowledge necessary to thrive in today's complex business world. Several universities operate high-level educational programs fostering skills development where students can gain the ability to succeed globally. The Qatar Foundation supports cutting-edge research projects aimed at improving quality-of-life issues worldwide - including sustainable agriculture practices or renewable energy solutions which could help build resilience against global environmental challenges. Bahrain has equally invested heavily toward nurturing entrepreneurs with startup accelerators like Flat6Labs that provide mentorship opportunities to fledgling companies seeking funding rounds. This investment paid off when the non-oil sector achieved a growth rate of 3.7% in 2016, with finance exhibiting strong performance at 5.2%. One pivotal factor contributing to this progress is the establishment of one of the largest fintech hubs called, Bahrain FinTech Bay. This hub provides

co-working spaces, mentorship programs, and networking opportunities for innovative startups within fintech. Kuwait focuses on fostering technological innovations around artificial intelligence (AI). Supply chain localization is another crucial aspect driving regional economic growth here. Recent reports highlight increased agility, customer-centricity, and logistics improvements alongside local content policies that have contributed towards boosting productivity levels and further enhancing competitiveness across value chains.

Bahrain and Kuwait have adopted proactive measures towards achieving economic growth and attracting foreign investments, making them exemplary models for developing countries. For instance, Bahrain has established an ecosystem that supports entrepreneurs and small businesses seeking to promote development in innovative sectors through the Economic Development Board. Bahrain has positioned itself as a potential leader in fintech and innovation by encouraging economic growth through foreign investments. Education is critical in achieving developmental goals by cultivating the human capital infrastructure necessary for sustainability. In this regard, several universities have been set up across both nations alongside research centres dedicated to nurturing innovators from these institutions who can significantly contribute towards achieving their objectives. These initiatives provide practical experience working with cutting-edge technologies while offering access to resources essential for independent research projects.

Kuwait is also making notable efforts towards developing its innovation landscape using mechanisms such as "The National Fund for SME Development", designed explicitly for small-medium enterprises (SMEs), creating opportunities where none existed. Kuwait's Direct Investment Promotion Authority also aims to attract foreign investment into the country's economy and encourage new startups. According to OECD (2002), national policies play a crucial role in attracting FDI into developing countries; hence proactive government intervention is essential in facilitating economic development through increased overseas investments. It follows that prioritizing education is vital since it lays the foundation for sustainable growth by fostering human capital development.

3.2.6 Exploring Egypt’s Innovation Ecosystem.

In contemporary times, Egypt has been experiencing notable advancements in its economy. The partnership between universities, research institutions, and corporations has significantly contributed to promoting innovation in various sectors such as information technology (IT), fintech, and renewable energy. Empirical evidence from scholars such as Batra and Tan (2003) and Lee (2001) supports this trend. Furthermore, Khedr's evaluation (2021) highlights the growth of autonomous cultural agents in the nation, a clear indication of progress. These collaborations have

driven technological advancements and provided new opportunities for individuals to express themselves creatively. The partnership between different sectors enables people to learn from each other's expertise and combine their knowledge to create something innovative. Fintech startups work with banks to offer better banking services. Universities partner with companies for renewable energy technology. The partnerships between these entities provide mutual benefits, ultimately leading to progress for Egypt’s economy. While these initiatives face some challenges along the way, like bureaucracy or legal frameworks, they can deliver sustainable outcomes that uplift Egyptians’ living standards while creating jobs; this will eventually result in more excellent national and global competitiveness. Overall, it appears that collaborations between universities/research centres/industry groups help drive innovation forward – whether we're talking about culture startups or groundbreaking technology solutions alike - leading us towards a bright future of progress ahead.

The digital age has brought about a new wave of innovation and entrepreneurship in Egypt, particularly in the startup scene. Egyptian startups, such as Vezeeta, SWVL, Flat6Labs, Fawry, Nahdet Misr, and Nawah Scientific, are at the forefront of this movement by transforming various sectors through digital innovation. For instance, Vezeeta is revolutionizing healthcare by providing an online booking platform for doctors' appointments that reduces waiting times and increases accessibility for patients. Similarly, SWVL is reshaping transportation by offering affordable ride-sharing services that alleviate traffic congestion in Cairo's notoriously gridlocked streets. Meanwhile, Flat6Labs is fueling fintech development with its accelerator program that assists early-stage startups with funding opportunities and mentorship programs. According to recent reports, these startups are not only driving economic growth but also addressing crucial societal challenges such as access to healthcare and education.

Moreover, Nahdet Misr has contributed extensively to publishing, while Nawah Scientific has made tremendous strides in scientific research. Their innovative solutions have far-reaching implications beyond Egypt's borders; they could serve as models for other developing countries looking to foster entrepreneurial ecosystems that enhance their citizens' quality of life. In conclusion, the emergence of these enterprises marks a significant shift towards a more tech-driven society led by visionary entrepreneurs who leverage technology to solve problems creatively.

According to the International Telecommunication Union (2021), RiseUp is a platform that has been instrumental in promoting entrepreneurship and innovation in Egypt. The platform has created an ecosystem where startups, investors, mentors, and industry leaders can interact and share knowledge on technological capabilities and skills development. This fostering of connections between players in the startup scene has enabled entrepreneurs to access funding opportunities

otherwise unavailable to them. With this increased access to capital, Egyptian-based founders have scaled their businesses across borders while creating job opportunities for locals. Furthermore, RiseUp's efforts towards promoting skills development through its events have boosted the confidence levels of young people considering technology-related careers as viable options. These initiatives are particularly crucial since they facilitate knowledge transfer from experienced professionals who may not necessarily be accessible without such platforms. RiseUp's contribution towards fostering a thriving ecosystem for technological capabilities cannot be overstated. Its role in connecting various stakeholders within the startup ecosystem is critical for sustaining entrepreneurship growth in Egypt (International Telecommunication Union, 2021). Its activities inspire young entrepreneurs by providing insights on navigating challenges associated with starting up companies while encouraging collaboration among industry players interested in driving economic growth through innovation.

3.2.7 Exploring Morocco's Innovation Ecosystem.

Morocco launched the National Innovation System (NIS) in the latter part of the 1990s to achieve economic growth through scientific research and innovation. This comprehensive framework involves multiple entities, including government officials, ministries, and research establishments. The NIS program has given rise to opportunities for consultations with experts and introduced initiatives to encourage entrepreneurship and innovation. These endeavours aim to enhance Morocco's competitiveness in the global market while strengthening the links between universities and research programs. These concerted efforts are expected to drive technological progress and groundbreaking scientific discoveries that will help propel Morocco's economy forward. (Hamidi and Benabdeljalil, 2013)

3.2.8 Exploring Palestine's innovation ecosystem.

Palestine's innovation system requires better organization, coordination, and connection among sectors (Morrar, 2019). Education and professionalism investment have led to knowledge creation and the promotion of innovation. There are various research institutions in Palestine, including PALST- a public, non-profit organization established in 1997; HCIE - Higher Council for Innovation and Excellence- established by PNA to regulate innovation but mainly focuses on advocacy; the Scientific Research Council - formed by the Ministry of Higher Education in 2013 headed by the education minister comprising deans of scientific research from four Palestinian universities and five members from private sectors and NGOs.

3.3 Regional Cooperation

Collaboration among neighbouring nations is imperative to attain common goals in the MENA region. This can take many forms, from trade agreements facilitating cross-border commerce to diplomatic initiatives encouraging dialogues and mutual understanding between countries (Katulis, 2023; Bayhaqi et al., 2013). As MENA nations face various challenges related to water scarcity, environmental sustainability, and economic diversification, partnerships leveraging cutting-edge technologies have become crucial in promoting inclusivity while contributing to the region's growth and stability. One such collaboration is between Morocco's Rahatech and Israeli ag-tech company SupPlant on sustainable agriculture. With the global issue of water scarcity becoming increasingly pressing—particularly in arid regions like Morocco—optimising resource utilization while maximizing crop yield has become vital. To this end, SupPlant tailors its technology solutions for various crops by employing sensors that monitor soil moisture levels and plant stress. These insights enable farmers to adjust watering schedules accordingly and effectively. The technology could result in up to 70%less water consumption if applied across all 2.1 million palm trees in the UAE alone. While AI may not replace human farmers anytime soon—if ever—it will undoubtedly assist them by providing real-time data insights into irrigation needs and other factors affecting crop health. Another example of international cooperation involving advanced technologies pertains to hydrogen production with H2Pro partnering with Gaia Energy Projects from Morocco on greener hydrogen production at more affordable rates than previously possible—a step towards reduced reliance on fossil fuels along with increased independence from foreign oil sources as well as promoting international cooperation amongst countries looking forward together towards tomorrow's challenges. Accordingly, Hussain Al Mahmoudi emphasizes the significance of transferring technology at MITT Summit 2022, highlighting its crucial role in boosting economic growth besides stability within MENA, which has long relied on oil exportation. However, with the emergence of advanced technologies, there is potential for diversification and the creation of a more environmentally sustainable economy. The transport sector is one area where disruption occurs through innovations aimed at creating a safer and greener future. Al Mahmoudi's emphasis on academic institutions underscores an essential point about intellectual property and research. Rapid advancements have been witnessed in every field worldwide due to the knowledge and technology transfer model requiring collaboration between academia, research organizations, SMEs (Small- and Medium-sized Enterprises), government agencies, investors as well as venture capitalists (Bayhaqi et al., 2013; Technical Review Middle East p16). The Sharjah Research Technology and Innovation Park, along with the Sharjah Academy for Innovation and Entrepreneurship, are examples of initiatives promoting inclusivity while contributing to the

MENA region's economic growth and stability by fostering knowledge transfer and collaboration amongst various stakeholders. By bringing together academia, research organizations, SMEs (Small and Medium-sized Enterprises), government agencies, and investors alongside venture capitalists, it becomes possible for the MENA region to overcome challenges related to water scarcity while promoting environmental sustainability plus economic diversification—paving the way towards a prosperous, equitable future (Regional Multi-annual Indicative Programme 2021–2027).

All in all, challenges are encountered in the MENA regions' innovation systems, including insufficient backing from the government, inadequate institutional frameworks, and disjointed systems. To address these issues, policies for innovation should be established with a shared regional outlook while considering worldwide knowledge and technology.

4. Data Analysis and Discussions.

The current segment of the thesis addresses several critical areas, including the principal research goal and objective, research inquiries, problem statement, range, blueprint, and methodologies implemented for the elaboration. The data acquisition process and its analytical system are also explained. Subsequently, emphasis is placed on elucidating why certain cases were selected and outlining the techniques utilised for sampling. Furthermore, this chapter offers insight into the constraints of utilising the chosen approach.

Objectives of the Study

The objective of this thesis is to scrutinize the impact of innovation on economic development in countries within MENA by studying their innovation milieu and providing suggestions based on outcome evaluation. Considering this, this research’s aims are categorised threefold.

1. To analyse the impact of innovation on MENA's GDP.
2. To analyse the effect of innovation on the productivity of the MENA region.
3. To assess the effect of innovation on Human Development in the MENA region.

Problem Statement

The MENA region is faced with a considerable challenge of achieving economic growth and sustainable development. To surmount this challenge, it is imperative to comprehend the role of innovation in influencing crucial socioeconomic indicators. Despite acknowledging innovation's potential, more empirical research is needed on its impact on Human Development, Gross Domestic Product (GDP), and Productivity in MENA. Therefore, this study endeavours to bridge this research gap through an exhaustive assessment of innovation's effect on Human Development, exploring how it influences GDP, and scrutinising its impact on Productivity in MENA. By

producing solid evidence-based findings and insights, policymakers, stakeholders, and concerned organisations operating in MENA can harness innovative strategies that will ensure sustainable development and enhance economic performance.

Research Questions

1. How does innovation affect Human Development in the MENA region?
2. How does innovation impact the Gross Domestic Product (GDP) of the MENA region?
3. What is the relationship between innovation and productivity in the MENA region?

Research Strategy

This thesis contains procedures, techniques, and approaches that direct collecting, scrutinising, and construing evidence to formulate novel knowledge or understandings. These methodical and orderly techniques utilised by the researcher to tackle research involve,

• Control for confounding variables when analysing the relationship between innovation and human development.
• Provide policy recommendations based on conclusions drawn from the analysis.
• Conduct a literature review to understand the theory and evidence on the link between innovation and GDP.
• Define variables for innovation and GDP, then gather relevant data from MENA countries.
• Use regression analysis to examine the relationship between innovation and GDP while controlling for confounding factors.
• Analyse results, draw conclusions and provide policy recommendations based on findings.
• Conduct a thorough literature review on the link between innovation and productivity in the MENA region.
• Define relevant variables related to innovation and productivity.
• Collect data on MENA countries' innovation indicators and productivity measures.
• Use quantitative methods to analyse their relationship whilst controlling for probable confounding variables.
• Conclude findings by concluding and make policy recommendations based on study results

Research Design

Research Question: What is the relationship between innovation and economic growth in MENA countries, and what are the key determinants of innovation in these countries?

Research Strategy: Quantitative analysis

Data Collection:

Data was collected on innovation indicators (patent count, FDI inflows, internet penetration, trade openness, employment, and government effectiveness) and economic development indicators (Gross Domestic Product, productivity, human development) for a sample of MENA countries over some time. For the analysis of this thesis, a period of 12 years was used.
Data sources could include national statistical agencies, the World Bank, United Nations Development Programme (UNDP), and other relevant organisations.

Data Analysis:
Analysing research data involves transforming, organising, interpreting and drawing conclusions from collected data by applying statistical and analytical techniques to identify patterns, relationships and trends. Data were analysed by.

• Data collection for examining the effect of innovation and Human Development, GDP, and Productivity indicators.
• OLS model specification with Human Development, GDP, and Productivity as dependent variables and innovation indicators as independent variables.
• Preparation of data by cleaning, handling missing values, and transforming variables if necessary
• Interpretation of coefficients to understand how each indicator affects Human Development, GDP, and Productivity.
• Goodness-of-fit evaluation using measures like R-squared or adjusted R-squared.
• Analysing results to conclude the impact of innovation on Human Development, GDP and Productivity.

Expected Results:
• The analysis may show that MENA countries with high levels of innovation will perform better than those with low levels in terms of human development, economy, and productivity.

Limitations and Implications
Limitations:
•Data reliability varies across countries and affects the accuracy of findings.
• Cross-sectional studies and OLS regression analysis may have difficulty establishing causality due to potential reverse causality or omitted variable bias.
• Unaccounted factors could impact both innovation and the studied variables.
• MENA is a diverse region with socioeconomic, cultural, and institutional contexts.
• Findings may not be generalisable to the region due to country-specific dynamics and variations.

• Measuring innovation, human development, GDP, and productivity is complex and subject to challenges.

• Chosen indicators may not fully capture the multidimensional aspects of these constructs that could affect results.

Implications:

-Encouraging innovation can promote human development, economic growth, and productivity.

• Policymakers should design targeted policies for innovation-driven development.

• Innovation should be prioritised as a driver of sustainable growth in the MENA region.

• Developing innovative ecosystems and investing in research and development is crucial for economic development strategies in MENA.

• Intellectual property rights protection should be strengthened.

• The study's findings can guide investment decisions.

• Funding should be allocated to activities that generate socioeconomic benefits associated with innovation.

• Future research can investigate specific mechanisms, policies, and interventions that improve the relationship between innovation and human development, GDP, and productivity.

• Researchers can analyse country-specific factors influencing these relationships within the MENA region.

Scope of Study

The primary objective of the investigation will be to concentrate on a group of MENA nations. The choice of countries to examine will be influenced by factors such as the adequacy and accuracy of information about innovation and economic markers.

Temporal Scope:

The investigation will encompass over a decade, commencing in 2011 and concluding in 2022 (12 years). The deliberated duration was chosen to guarantee the availability of an adequate quantity of information on economic indicators and innovation for scrutiny.

Sectoral Scope:

The investigation will not centre on a particular industry or sector. However, subgroup examinations may be carried out to investigate variances in the correlation between innovation and economic advancement among various regions or sectors.

Possible Paraphrase: The extent of the investigation may be more precisely delimited or modified following the data and resources that are obtainable, as well as the research inquiries or hypotheses being examined.

Method For Selecting Countries.

Selecting countries for this study on innovation's impact in MENA countries is crucial to ensure that the findings are representative and applicable. A combination of the world development indicators from the World Bank and UNDP were databases to select the countries for this thesis on the role of innovation and its impact on MENA countries. The selection process involved analysing factors such as GDP per capita, productivity, human development, and innovation index scores. Additionally, several educational articles to gain insights into the criteria used by experts in selecting countries for similar research studies on MENA countries. These nations exhibited technological readiness levels and had invested significantly in research and development. This approach will provide relevant data to support this thesis's central argument while ensuring that it is grounded in empirical evidence from credible sources.

Why The Selected Countries and Sampling

This thesis analyses how innovation impacts economic development in MENA countries. To achieve this, all 21 countries labelled by the World Bank as belonging to MENA are analysed to understand how socioeconomic factors and innovation indicators relate. Using a diverse sample, the research can make meaningful comparisons and ensure regional representation. The outcomes of this study will provide policymakers and stakeholders with practical implications for understanding what drives and results from innovation in MENA countries.

Data Collection

A thorough data collection process was initiated to conduct a study on how innovation affects MENA countries' economies. The sources used for gathering data included educational articles that pinpointed potential resources for both economic indicators and innovation. These included national statistical agencies, international organisations like the World Bank, academic databases and industry reports. The first step in this extensive process required developing an in-depth plan outlining how data would be collected and organised. To do so, a spreadsheet containing details about variables was gathered along with units of analysis, calculations, or transformations necessary were central aspects. Subsequently, collecting relevant information according to the plan occurred while simultaneously checking for any errors or gaps in knowledge. Once all pertinent information had been acquired collectively, it underwent cleaning processes while being transformed where necessary to guarantee accuracy and consistency during analysis sessions using the SPSS software tool. Descriptive statistics played an important role when summarising findings obtained from regression analyses, allowing hypotheses testing concerning links between growth within economies and advanced innovative procedures. Finally, conclusions based on analysed

results were presented effectively through tables, charts and graphs, taking into account feasibility regarding researching questions tested and challenges existing when acquiring and analysing data depending on context-specific factors at play.

4.1 Linear Regression

In many instances, regression models are applied to analyse data. Simple linear regression is functional when variables are linear. Two parameters are estimated in this model: β_o (Y-intercept) and β_1 (slope). Academic research extensively employs this particular kind of analysis, and its effectiveness was demonstrated in numerous studies, such as those conducted by Nieto and Quevedo in 2005, Chen and Huang in 2009, and Schneider and Spieth in 2013. The typical formula for a regression model takes the form $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n + \varepsilon$. In this equation, y represents the dependent variable under investigation. The independent variables that may influence y are labelled x_1 through x_n.

To account for factors that cannot be explained by these independent variables alone, an error term ε is included. The unknown parameters or coefficients of regression - β1 through βn - must be determined through data analysis. By carrying out regression analysis according to this model structure and using relevant statistical tools, researchers can make informed conclusions about their data sets and gain new insights into complex phenomena. Employing the standardized format of mathematical expression. It is possible to break down the equation into the following components.

$GDP_{it} = \alpha_0 + B_1 Pat\_App_{it} + B_2 FD\_Inv_{it} + B_3 Int\_Use_{it} + B_4 Trd\_Opness_{it} + B_5 Emp_{it} + B_6 Pol\_Stab_{it} + \varepsilon_{it}$

Where GDP = Gross Domestic Product

α = Constant Term (Intercept)

Pat_App =Patent Application

FD_Inv = Foreign Direct Investment

Int_Use = Internet Usage

Trd_opness = Trade openness

Emp = Employment

Pol_stab = Political stability

ε = error term

$Productivity_{it} = \alpha 0 + B_1 Pat\_App_{it} + B_2 FD\_Inv_{it} + B_3 Int\_Use_{it} + B_4 Trd\_Opness_{it} + B_5 Emp_{it} + B_6 Pol\_Stab_{it} + \varepsilon_{it}$

Where α = Constant Term (Intercept)

Pat_App =Patent Application

FD_Inv = Foreign Direct Investment

Int_Use = Internet Usage

Trd_opness = Trade openness

Emp = Employment

Pol_stab = Political stability

ε = error term

$HDI_{it} = \alpha_0 + B_1 Pat\_App_{it} + B_2 FD\_Inv_{it} + B_3 Int\_Use_{it} + B_4 Trd\_Opness_{it} + B_5 Emp_{it} + B_6 Pol\_Stab_{it} + \varepsilon_{it}$

Where HDI = Human Development Index

α = Constant Term (Intercept)

Pat_App =Patent Application

FD_Inv = Foreign Direct Investment

Int_Use = Internet Usage

Trd_opness = Trade openness

Emp = Employment

Pol_stab = Political stability

ε = error term

The Ordinary Least Squares (OLS) method is frequently used in statistical analysis to estimate relationships between variables. It calculates coefficients that show the effect of independent variables on the dependent variable and determines if a significant relationship exists using a p-value. A p-value below 0.05 suggests a significant correlation. The standard error measures the precision or uncertainty linked with the coefficient estimate. It gauges the mean extent to which the coefficient may differ from the definite population value in diverse samples. On the other hand, how far apart the coefficient estimate is from its hypothesized null value (usually zero) can be determined by using a t-statistic. This statistical measure assists in determining how many standard errors away from this null value the coefficient estimate lies in, and it is calculated by dividing the coefficient estimate by its standard error.

OLS analysis measures how well independent variables predict variation in the dependent variable through R-squared values. Higher R-squared values indicate better predictors of changes in the dependent variable, giving analysts valuable insights into relationships among their data sets.

4.2 Description of Variables

Table 4 Variables involved in the Thesis.

Variable	Indicators	Measure	Description	Source
Dependent	Gross Domestic	GDP (current	GDP means the overall worth of commodities	World

variable	Product (*GDP_CURRENT)*	US$)	created in a certain place or nation over a set period.	Bank
Economic Development (In MENA countries)	Productivity *(LABOUR_PAT)*	Labour force participation rate, total (% of total population ages 15+)	This variable portrays the use of labour to create economic value by measuring the relationship between employed labour and produced goods/services.	World Bank
	Human Development *(HUMAN_D)*	Human Development Index (HDI)	The enhancement of personal and communal welfare and potential, through a progression known as human development.	UNDP
Independent Variables	Patent Count *(PATENT_APP)*	Patent applications, residents	It reflects technology advancements and intellectual property protection in a field or jurisdiction	World Bank
Innovation	Foreign Direct Inflows *(FOREIGN_DIRECT)*	Foreign Direct Investment, Net Inflows (% of GDP)	FDI measures foreign investment in MENA countries, indicating the attractiveness of the region and reflecting confidence in its economic potential and growth prospects.	World Bank
	Internet Penetration *(INTERNET_PEN)*	Individuals using the Internet (% of the population)	This metric gauge the proportion of people or households that have internet access and portrays the extent of connectivity and utilization within a specified context.	World Bank
	Trade Openness *(EXPORT_GOODS andIMPORT_GOODS)*	Export and import of goods and services (%GDP)	Trade openness encourages innovation by creating new markets, exchanging knowledge, promoting learning, and providing resources to domestic companies.	World Bank
	Employment *(EMPLOYMENT_PO)*	Employment to population ratio, 15+, total (%)	Employment helps individuals with the chance to acquire knowledge, cooperate with others, and utilize their skills.	World Bank
	Government Effectiveness *(POLITICAL_ABI)*	Political Stability and Absence of Violence/Terrorism	Government effectiveness assesses the quality and efficiency of a government in achieving objectives and implementing policies.	World Bank

Source: Author's own adaptation from World Development Indicators, World Bank and UNDP HDI index

4.3 Notable Results of the Analysis

Table 5 Results of Data on The Impact of Innovation on Mena's GDP.

Variable	Coefficient	Std Error	t-Statistic	Prob
C	-3.37E+10	3.38E+10	-0.997127	0.3206
PATENT APP	-7042364	2608037	-2.700255	0.0079
FOREIGN DIRECT	-1.89E+09	8.16E+08	-2.311167	0.0224
INTERNET USA	23701328	4.38E+08	0.054127	0.9569
OPPNESS	52.76018	2.192400	24.06504	0.0000
EMPLOYMENT	1.90E+09	6.91E+08	2.754078	0.0067

POLITICAL_ABI	2.26E+10	9.60E+09	2.348475	0.0204
R-Squared	0.863636	Mean dependent var		2.07E+11
Adjusted R-squared	0.8572393	S.D dependent var		2.00E+11
F-statistic	136.1661	Hannan-Quinn criter.		0.267591
Prob(F-statistic)	0.000000			

Source: Authors own calculations (Data collected from World Bank and UNDP)

The results in Table 5 measure the effect of innovation measured by patent count on GDP as a measure of economic development is inversely related and significant at 1%. The results show that 86% of the variation in GDP is explained by the regression model. The F-statistic is also significant, indicating that the models significantly explain changes in GDP. Even though one would have expected a positive relationship, the inverse relationship can be explained in two ways. First, innovation can be disruptive in which case the gains of innovation may not be immediately realized. Secondly the importation of inappropriate technology of innovation can be counterproductive and therefore could compromise economic performance by reducing the size of the GDP.

Table 6 Results of Data on The Effect of Innovation on The Productivity of The Mena Region (Labour Force Participation Rate)

Variable	Coefficient	Std Error	t-Statistic	Prob
C	3.123917	0.017861	174.9065	0.0000
LOG (PATENT APP)	0.007342	0.002238	3.281476	0.0013
FOREIGN DIRECT	0.000809	0.000362	2.235677	0.0271
INTERNTUSA	0.000353	0.000195	1.814906	0.0719
OPPNESS	-1.19E-12	1.26E-12	-0.939560	0.3492
EMPLOYMENT_OP	0.015472	0.000316	48.92683	0.0000
POLITICAL_ABI	0.000612	0.004258	0.143728	0.8859
R-Squared	0.985187	Adjusted R-squared	0.984498	
F-statistic	1429.909	Prob(F-statistic)	0.000000	

Source: Authors own calculations (Data collected from World Bank and UNDP)

The study also measures economic development by labour productivity proxied by labour force participation rate, as shown in Table 6. The result of the study shows that there is a positive and significant relationship between the logarithm of patent count and logarithm of labour productivity. The relationship is significant at 1% and 98% of the variation is explained by the model. A one per cent change in patent count change results in a 0.007 per cent change in labour productivity in the same direction.

Table 7 Results of Data on The Impact of Innovation on Human Development in The Mena Region

Variable	Coefficient	Std Error	t-Statistic	Prob
C	0.468088	0.028810	16.24754	0.0000
LOG (PATENT APP)	0.012209	0.003609	3.382563	0.0010
FOREIGN DIRECT	0.002574	0.000584	4.408135	0.0000
INTERNTUSA	0.001720	0.000314	5.482565	0.0000
OPPNESS	3.99E-12	2.04E-12	1.962223	0.0519
EMPLOYMENT_OP	0.002521	0.000510	4.942610	0.0000
POLITICAL_ABI	0.018248	0.006868	2.656898	0.0089
R-Squared	0.766051	Adjusted R-squared	0.755170	
F-statistic	70.40044	Prob(F-statistic)	0.000000	

Source: Authors own calculations (Data collected from World Bank and UNDP)

The study presents results on the effect of innovation on the human development index, depicted on Table 7. The results as presented in Table 7 show that the model is significant, and the 77% R square is an indication that 77% of the variation in human development index is explained by the regression model. The logarithm of patent count is positive and significantly related to the human development index as a measure of economic development. The result is interpreted to mean that a one patent count change results in a change in the human development index by 0.01 percentage points in the same direction.

4.4 Discussion of the Results

In table 5, there is a negative relationship between innovation (measured by patent count) and GDP in the findings that was conducted. As the number of patents increases, GDP decreases. This opposes the expectation of a positive relationship where innovation brings economic growth.

Innovation can be disruptive, introducing new technologies that disrupt existing industries or

markets. This delay in reaping benefits creates an inverse relationship between patent count and GDP.

New technologies and business models can cause a short-term negative impacts on GDP due to necessary adjustments in the labour market, infrastructure, or regulatory frameworks. However, once these adaptations are made, the economy can benefit from long-term growth and the advantages of disruptive innovation.

The second reason for the negative economic impact is importing unsuitable technology, which can be counterproductive. Inappropriate technology refers to the implementation of technologies that are not suitable for local conditions or needs. This can happen if technologies are imported without considering market conditions, infrastructure limitations, or skill gaps.

Importing inappropriate technologies can harm productivity and competitiveness, leading to inefficiencies and reduced economic output. The negative correlation between patent count and GDP might be due to the adverse effects of unsuitable or poorly adapted innovations imports.

The regression model explains 86% of GDP variation, and the F-statistic is significant. This indicates a good fit and captures many factors influencing GDP. The F-statistic signifies that the model is statistically significant in explaining changes in GDP.

These findings imply that the regression model explains the changes in GDP, despite the negative correlation between innovation and GDP in MENA nations. To delve deeper into this analysis, referring to relevant literature on the relationship between innovation and economic development would be beneficial. Schumpeter's theory of economic development emphasizes the role of disruption as a driver of long-term progress. While initially hindering GDP growth, innovative disruptions ultimately pave the way for sustainable development.

In table 6, the interpretation examines the relationship between innovation and labour productivity as a proxy for economic development in MENA countries.

The study shows a positive and significant relationship between patent count and labour productivity, indicating that as patents increase, so does productivity. This confirms the belief that innovation leads to economic development.

A 1% change in patents results in a 0.007% change in labour productivity in the same direction. Though small, this effect is statistically significant. Even incremental increases in the patent count can modestly improve labour productivity and eventually contribute to economic development over time. The regression model explains 98% of the variation in labour productivity, indicating it captures many factors and provides a robust fit to the data. It accounts for many relevant factors affecting labour productivity in MENA countries.

The interpretation shows that the patent count and labour productivity have a significant and robust

statistical association at the 1% level, indicating that it is not due to chance or random fluctuations. This interpretation examines the link between patent count and labour productivity in MENA countries as a proxy for economic development. The results indicate a significant and positive relationship. However, contextual factors and potential limitations must also be considered.

Infrastructure, human capital, institutional support, and access to financing can affect innovation's impact on economic development.

In table 7, it examines how innovation affects economic growth in the MENA region, using patent count and HDI as indicators. By analyzing these factors, we can understand the relationship between innovation and development in MENA countries.

The regression model shows a significant relationship between innovation and Human Development Index (HDI). It accurately accounts for a large portion of the observed variance in HDI, with a 77% R-squared value. The model captures influential factors contributing to changes in HDI score, highlighting the importance of innovation in shaping development outcomes. Policymakers must consider this factor when advancing their countries' economic and social growth agendas.

A higher number of patents is linked to economic growth, as evidenced by the positive correlation between the log of patent count and HDI. This supports the idea that innovation is crucial for enhancing human welfare; societies with more innovation have a better chance of achieving high living standards, improved healthcare, advanced technology, and better education. Therefore, emphasizing research and development can promote economic progress and societal prosperity.

Changes in patent numbers significantly affect the Human Development Index (HDI), leading to improvements in education, healthcare, and living standards. The HDI measures a country's development based on income, life expectancy, and education. Thus, increased patents can enhance a nation's progress towards achieving higher human development levels.

4.4.4 Answering the Problem Statement.

The current research in this paper demonstrates the impact of innovation on socioeconomic metrics within the MENA territory. The findings reveal a negative correlation between the number of patents and GDP. In contrast, a good relation is evident between the number of patents, labour productivity, and the human development index. This underscores the significance of utilizing innovation to foster economic growth and lasting progress in MENA, enabling efficacious policymaking.

4.4.5 Comparing Results with Existing Literature.

The negative relationship between patent count/innovation and GDP in MENA nations challenges

the conventional notion that innovation leads to economic growth. This exciting finding is supported by the research of Otomo (2017), who found that patents have an increasing effect on research and development expenditure decreasing rate. However, as indicated by Moser's study (2004), patent laws expand the set of industries where innovation is attractive to inventors. These studies contradict each other, but it is essential to consider their context. According to Akcigit et al.'s research (2017) on the golden age of U.S. innovation, there is a positive relationship between patented inventions and long-term economic growth. The authors identified characteristics of inventors and their life cycle while exploring social structure's impact on innovation drivers for regional performance, such as population density, financial development, and geographic connectedness. These findings differ quite from mine; however, they offer valuable insights into understanding why my results differ from those obtained in previous studies. My research indicates that innovation can be disruptive since new technologies often disrupt existing industries or markets, leading to short-term negative impacts on GDP due to necessary adjustments in labour market infrastructures or regulatory frameworks. This delay in reaping benefits creates an inverse relationship between patent count and GDP, as Akcigit et al.'s study findings suggest positive relations between innovations' drivers for regional performance, like population density indicating how much more complex this issue may be than initially thought.

Furthermore, importing unsuitable technology can cause counterproductive effects resulting in inappropriate technology implementation without considering local conditions or needs, such as market conditions, infrastructure limitations skill gaps leading to inefficiencies, reduced economic output, and harm productivity competitiveness which ultimately causes problems about not only national but also global community efforts towards sustainable development goals set forth under UN Agenda 2030 framework initiatives aimed at tackling poverty reduction access education health care services gender equality environmental protection among others key thematic areas covered through these programs worldwide. The negative correlation between patent count and GDP might be due to the adverse effects of unsuitable or poorly adapted innovation imports. This finding indicates a need for further research and analysis to explore the relationship between innovation and economic development in MENA nations while considering various contextual factors such as social structure, population density, financial development, and geographic connectedness, among others highlighted by Akcigit et al.'s study. Overall, these findings imply that regression models can explain changes in GDP effectively despite the negative correlation between innovation measured by patent count and GDP in MENA nations. However, more research is needed to understand how innovations can lead to sustainable growth while minimizing short-term negative impacts on national economies through proper adaptation practices when

introducing new technologies into existing systems to enhance productivity competitiveness globally towards achieving SDGs set forth by UN Agenda 2030 initiatives worldwide.

Also, according to the research outcomes, a good correlation exists between economic growth in the Middle East and North Africa (MENA) region and innovation, as assessed through the number of patents. This result confirms the hypothesis that innovation leads to economic growth. According to the OECD (2015),, the future of productivity" is a subject that requires close attention. The current study supports this claim by demonstrating a positive correlation between innovation and economic development in MENA countries, specifically labour productivity. Patent count serves as an indicator for measuring innovation, which has been found to improve labour productivity even with small increases modestly.

Similarly, Smart specialisation strategies are designed to promote innovation-driven growth in regions (Organization for Economic Co-operation and Development, 2013). This aligns with our study's findings on promoting innovation within MENA countries. It was observed that patent counts significantly contribute to improved labour productivity in these countries.

Lastly, Innovation is crucial in propelling economic advancement and progress, as evidenced by multiple studies establishing a favourable association between innovation and various development measures. The MENA region, in particular, has significant potential for growth through innovation, given its vast resources and young population. This essay uses patent count and HDI as indicators to explore the relationship between innovation and economic growth in the MENA region. The regression model employed shows a significant impact of innovation on HDI, accounting for 77% of the observed variance. The findings of this study demonstrate the significance of emphasizing research and development as a critical priority for policymakers. Such a focus could enhance education, healthcare, and overall living conditions, integral to fostering societal prosperity. Analyzing different sources such as,, the Global Innovation Index 2018" (Cornell University et al., 2018), "2021/2022 Human Development Report" (United Nations Development Programme, 2022) highlights how vital innovation can be when shaping development outcomes while also pointing out some critical factors like income. This finding suggests that access to education can level up opportunities beyond current socio-economic status, leading to more inclusive innovations contributing significantly to the overall human development index (HDI). Numerous benefits are associated with increased patent counts ranging from better healthcare services through technological advancements to enhanced educational facilities resulting from higher funding inflows into research domains. These benefits provide immense value at national levels and globally by increasing productivity gains across countries, benefiting all stakeholders involved. Therefore, it becomes crucial for governments worldwide to promote policies focused on

encouraging Research & Development initiatives to foster innovative solutions tailored towards solving real-world problems, eventually achieving high living standards across nations.

Additionally, Diwan's (2014;2016) research focuses on governance, institutional development, and economic policies in MENA countries. He argues that political institutions play a significant role in shaping economic outcomes. Although the author helps us to get more insight into the political economy, order and chaos dynamics, and inequality issues in the Arab world and MENA, he failed to factor in how innovation could help boost and resolve several of these economies. In his article,, The Middle East Economies in Times of Transition, 2016," Ishac Diwan provides a comprehensive and insightful analysis of the region's economic challenges during political upheaval periods. Diwan argues that structural reforms and systemic changes are needed to promote sustained growth and development, as demonstrated by observers such as Romagnoli, Alessandro and Mengoni, Luisa, 2014.

5. Conclusion and Recommendation

5.1 Conclusion

In the Middle East and North Africa (MENA) region, progress in socio-economic development has been driven by innovation. It has enabled the MENA countries to create new industries, create jobs, and boost productivity. The thesis analysis underscores the significant influence of innovation on economic development in MENA countries. The results reveal a negative correlation between the number of patents and GDP, underscoring the need for a deeper comprehension of innovation outcomes. Bringing in unsuitable innovation can result in unfavourable aftereffects, highlighting the significance of effective technology transfer mechanisms.

The robust association between the logarithm of the number of patents and labour efficiency indicates that even slight fluctuations in patent count may result in substantial changes in labour productivity. Furthermore, the considerably favourable and statistically noteworthy correlation between inventiveness and the human development index underscores the significance of encouraging innovation to improve general human prosperity and advancement.

To effectively utilize innovation, policymakers must create a supportive environment, enhance methods for transferring technology, encourage entrepreneurship and training initiatives, and consistently assess the impact of innovation. Moreover, allocating resources to improve human capital development is pivotal in achieving lasting economic progress within the MENA region.

The MENA countries have the opportunity to fully realize the benefits of innovation, bolster their economic growth and enhance the general welfare of their citizens by adopting these suggestions.

5.2 The Analysis Conducted in The Thesis Revealed the Following Findings:

• Patent count has an inverse and significant relationship with GDP.

• Importing inappropriate innovation can lead to counterproductive consequences.

• The logarithm of patent count has a strong correlation with labour productivity.

• Even a marginal variation in the patent count can lead to a 0.007% adjustment in labour productivity.

• There is a profoundly positive and statistically significant correlation between innovation and human development index.

• Promoting innovation is essential to enhancing overall human well-being and progress.

• Policymakers need to have a more nuanced understanding of how factors interact when designing strategies for innovation-led growth.

• Suggestions proposed include establishing a conducive ecosystem that encourages creative thinking, fortifying technology transfer methods, promoting entrepreneurship, capacity-building programs, knowledge-sharing platforms.

• It is essential to regularly monitor and evaluate the effects of innovation on economic development indicators.

• Prioritising investment in human capital development is necessary for sustainable economic growth.

5.3 Recommendation

A significant relationship has been discovered, unveiling the interplay between patent count and GDP. Recognizing the profound implications of innovation is crucial for informed decision-making. Implementing well-established channels for technology transfer is imperative to ensure optimal outcomes. It is essential to exercise caution when importing innovations that may yield unfavourable consequences.

The correlation between patent count and labour productivity must be considered. Even slight fluctuations in the patent count can engender substantial shifts in labour productivity. Furthermore, a reasonable nexus between innovation and the human development index has been identified. Cultivating an environment that fosters innovation is of utmost importance, driving overall welfare and advancement.

To fully exploit the potential of innovation, it is vital to forge a supportive ecosystem. Augmenting techniques for technology transfer, stimulating entrepreneurship, and nurturing skill-building initiatives constitute necessary measures. By doing so, we unlock the transformative power of innovation and empower our society.

Perpetually evaluating the impact of innovation is a prudent practice. This ensures that we remain vigilant, effectively mitigating risks and leveraging opportunities. Investing in human capital is indispensable for sustainable economic progress in the MENA area. By allocating resources towards developing individuals' knowledge and skills, we lay the foundation for enduring prosperity.

By adhering to these recommendations, we fortify economic growth and foster the well-being of our populace. Our endeavours to cultivate innovation, establish supportive frameworks, and cultivate entrepreneurship will drive tangible benefits for all. Together, let us forge a future where our society thrives, propelled by dynamic strategies that maximize our potential.

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Appendices

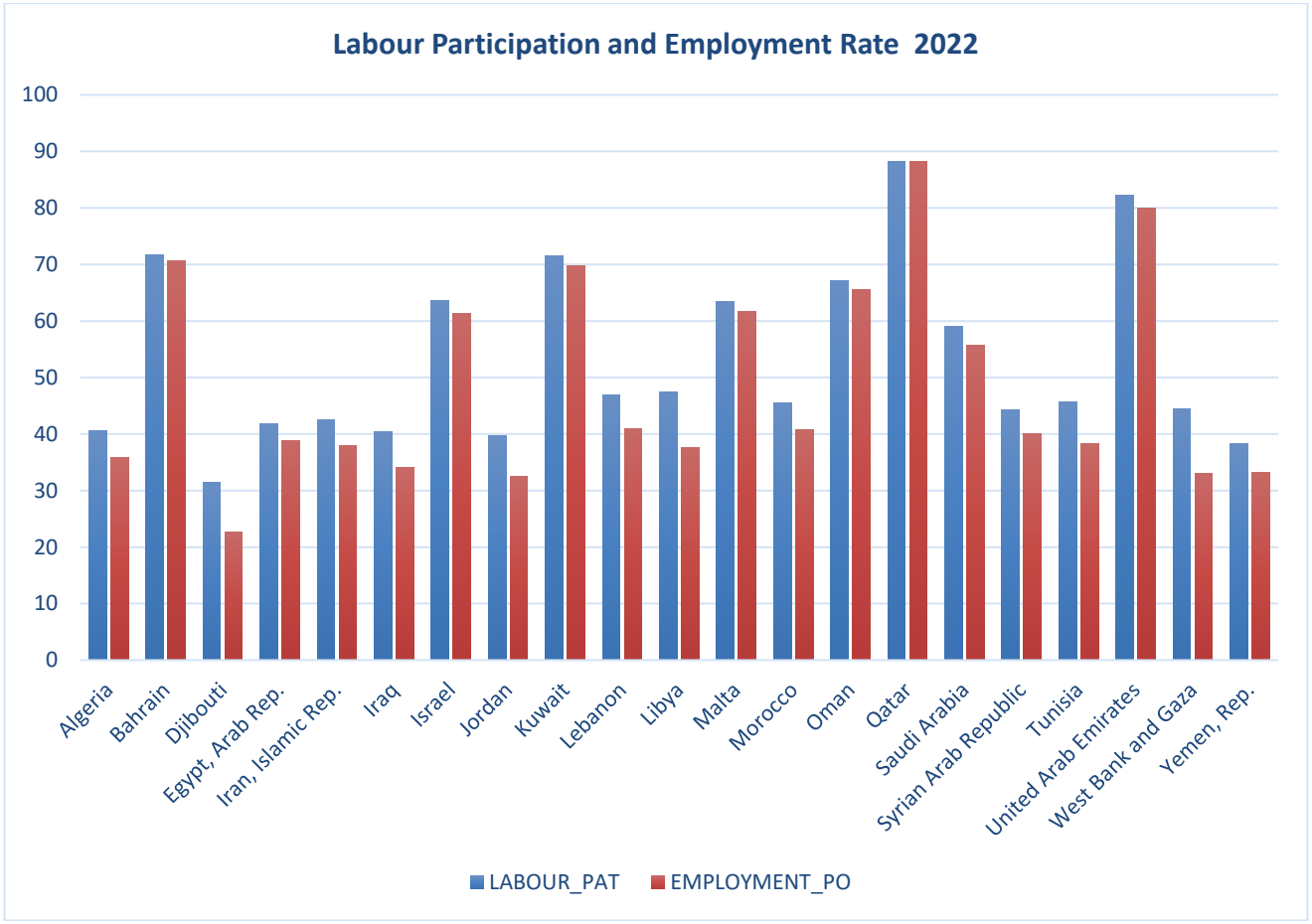
List Of Appendices

1. Appendix A Economic Diversification in MENA Oil Exporters

	Economic Diversification Index		Agriculture, value added (% of GDP)		Industry, value added (% of GDP)		Services, value added (% of GDP)	
	2014	2019	2014	2019	2014	2019	2014	2019
Algeria	0.745	0.817	10.29	12.38	42.31	37.44	43.89	46.23
Bahrain	0.671	0.694	0.3	0.28	46.52	42.27	52.47	55.06
Iran	0.686	0.672	9.78	12.18	39.62	31.68	49.90	55.83
Iraq	0.866	0.863	4.93	3.33	55.31	52.51	40.11	45.40
Kuwait	0.785	0.789	0.45	0.38	70.55	58.38	42.17	54.72
Oman	0.707	0.682	1.28	2.35	63.95	53.72	41.07	48.14
Qatar	0.773	0.796	0.12	0.23	69.76	56.89	32.85	46.73
Saudi Arabia	0.753	0.785	2.23	2.23	57.18	47.43	40.53	50.44
UAE	0.518	0.534	0.64	0.73	52.76	46.16	46.60	53.11
Yemen	0.761	0.774	7.82	/	44.04	/	27.27	/

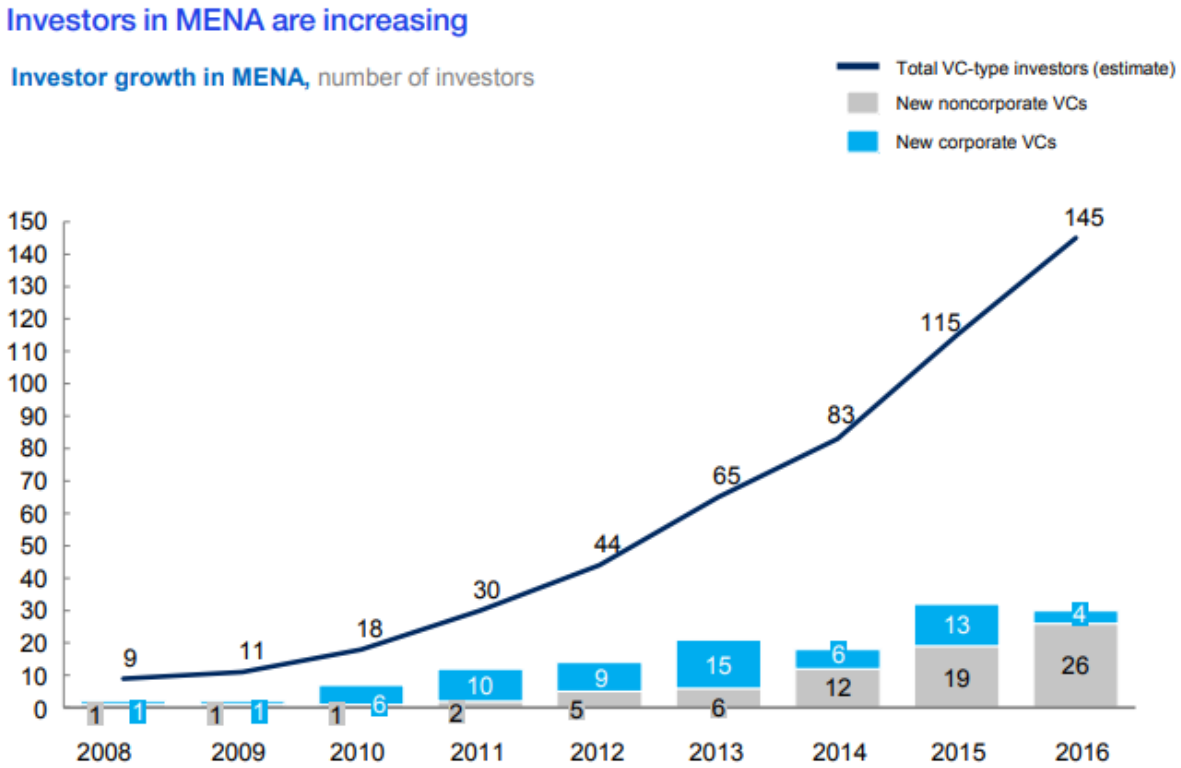
Source: Environmental Science and Pollution Research (2023 p. 8)

2. Appendix B MENA's Employment and Labour Participation Ratio to The Population In 2022.



Source: Author's own calculations from World Bank Development indicators.

3. Appendix C, The Number of Investors in The MENA Region (2008-2016).



Source: Entrepreneurship in the Middle East and North Africa: How investors can support and enable growth. p. 23