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The Importance of Having the Global Innovation Index and its Effect on Economic Growth in Palestine

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Abstract

Objectives: The study aimed to conduct a literature review on the definition and significance of the Global Innovation Index (GII). Also, to investigate the impact of the GII on economic growth by highlighting the importance of global innovation indicators for countries. The study emphasizes the role of the GII in assessing a country's development and economic growth.

Methods: The study adopted the descriptive analytical approach, including a literature review of published studies and economic theories related to the GII and its impact on economic growth. Then analyze the findings and data presented in patents and analysis of the reality of technology and innovation in Palestine in promoting innovation and economic development.

Results: The GII has a significant impact on economic growth and development. Education and investment in research and development are crucial in promoting innovation and driving economic growth. Establishing a GII for Palestine is necessary to assess its economic growth and innovation capabilities.

Conclusions: The study underscores the importance of the GII in driving economic growth through innovation. It emphasizes the need for Palestine to establish its own GII to evaluate its development and position compared to other countries, which would provide valuable insights for policymakers and stakeholders.

Keywords: Global Innovation Index (GII), economic growth, innovation.

أهمية وجود مؤشر الابتكار العالمي وتأثيره على النمو الاقتصادي في فلسطين

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الملخص

الأهداف: هدفت الدراسة إلى إجراء مراجعة للأدبيات حول تعريف وأهمية مؤشر الابتكار العالمي. أيضاً، دراسة تأثير مؤشر الابتكار العالمي على النمو الاقتصادي من خلال تسليط الضوء على أهمية مؤشرات الابتكار العالمية للبلدان. تؤكد الدراسة على دور مؤشر الابتكار العالمي في تقييم التنمية والنمو الاقتصادي للبلد.

المنهجية: اعتمدت الدراسة المنهج الوصفي التحليلي بما في ذلك إجراء مراجعة أدبية للدراسات المنشورة والنظريات الاقتصادية المتعلقة بمؤشر الابتكار العالمي وتأثيره على النمو الاقتصادي. ثم تحليل النتائج والبيانات في براءات الاختراع وتحليل واقع التكنولوجيا والابتكار في فلسطين في تعزيز الابتكار والتنمية الاقتصادية.

النتائج: مؤشر الابتكار العالمي له تأثير كبير على النمو الاقتصادي والتنمية. والتعليم والاستثمار في البحث والتطوير أمران حاسمان في تشجيع الابتكار ودفع عجلة النمو الاقتصادي. إن إنشاء مؤشر عالمي شامل لفلسطين أمر ضروري لتقييم نموها الاقتصادي وقدراتها على الابتكار.

الخلاصة: تؤكد الدراسة على أهمية مؤشر الابتكار العالمي في دفع النمو الاقتصادي من خلال الابتكار. ويشدد على ضرورة قيام فلسطين بإنشاء مؤشر الابتكار العالمي الخاص بها لتقييم تطورها وموقفها مقارنة بالبلدان الأخرى ، مما يوفر رؤى قيمة لصانعي السياسات وأصحاب المصلحة.

الكلمات الدالة: مؤشر الابتكار العالمي، النمو الاقتصادي، الابتكار.

Introduction

Palestine exists under a unique and challenging reality, enduring a long-term Israeli occupation that imposes arbitrary control systems and restrictions on the flow of goods and raw materials. The movement of people and control of resources in over 60% of occupied lands severely limit development (Ezbidi, 2020). For over 70 years, Palestine has faced extraordinary political, economic, and security challenges, culminating in significant economic and humanitarian fragility. The enduring Israeli occupation, coupled with resource scarcity and inadequate transportation and technological infrastructure, makes Palestine particularly vulnerable to continuous financial crises (Hawajri, 2016).

By the end of 2016, statistics indicated that about 42% of Palestinian refugees resided in 27 camps within Palestine, relying on aid from the United Nations Relief and Works Agency (GUPW, 2018). Currently, the isolation of East Jerusalem from the rest of the occupied West Bank and the Israeli siege and blockade on the Gaza Strip pose substantial barriers to survival, particularly following conflicts like the Gaza War. These measures result in severe economic and social consequences, such as high unemployment rates and limited opportunities for innovation, especially among the youth (Palestine Cabinet, 2018).

Economic development in Palestine faces considerable impediments due to restrictions imposed by the Israeli occupation regime. These restrictions include a lack of control over borders, limitations on production inputs, imports and exports, land confiscation, Israeli exploitation of natural resources (such as controlling approximately 80% of Palestinian water resources), the Israeli wall, and the physical destruction of Palestinian economic infrastructure (Oxfam, 2015). Consequently, these constraints lead to increased costs for imports, exports, production, and transportation, significantly impeding Palestinian economic growth and competitiveness.

The study of Awwad (2024) mentions that dimensions of public sector governance, including voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and corruption control, also impact economic growth. Enhancing entrepreneurship elements through public governance evaluation in Palestine can aid economic growth, with a focus on supporting women's entrepreneurial projects. The study emphasizes the importance of cooperation between government and entrepreneurial institutions to foster economic development.

The process of economic empowerment and improving the level of well-being of the individual and society depends primarily on the ability of the economy to increase and grow the productivity of physical and human capital. Without sustainable economic growth, the economy may enter a recession and weaken its competitiveness with other economies (Qumsiyeh, & Isaac 2012). With the great spread of globalization and the accompanying revolution in communication and information technology, there is an urgent need to move from the traditional economy to an economy based on knowledge and innovation, without which modern economies cannot grow and develop, especially in light of wide economic openness and high competitiveness between countries. In Palestine, efforts to invest in innovation and technological development promise positive results, especially since Palestine relies heavily on human capital, which is considered the main pillar of the knowledge economy if it possesses the capabilities and skills necessary to produce knowledge and transform it into goods and services. Economic growth is primarily driven by innovation. Productivity has increased by innovation, making things more effective (Qumsiyeh & Isaac 2012).

The World Intellectual Property Organization (WIPO) releases an annual report on the Global Innovation Index (GII). Launched in 2007, the GII serves as a reference tool for policymakers, businesspeople, and the public sector, providing insights into the state of innovation in various nations (Dutta et al., 2017). It aims to identify metrics and methods that capture the diversity of innovation in society, moving beyond traditional metrics like the number of PhDs, research articles, research centers, patents, and R&D expenditures. The GII fosters a global dialogue about the role of innovation in addressing these challenges (Woldai, 2020). Recognizing innovation as a key driver of economic growth, the GII offers an innovation ranking and detailed analysis of approximately 132 economies. Over the years, it has become a leading source of information on innovation and a catalyst for action among countries incorporating it into their innovation agendas. The GII evaluates the effectiveness of innovation ecosystems, highlighting strengths, weaknesses, and specific metrics gaps.

To meet the study's objectives, the researcher employed a comprehensive methodology based on the GII framework, underscoring the importance of innovation in fostering economic growth and competitiveness in

both developed and developing nations. A crucial component of the GII methodology is maintaining high data quality standards. Each GII indicator undergoes an annual, rigorous quality control and audit process, including mean analysis, outlier identification, rank change analysis, and management of missing or outdated data. These stringent measures ensure the reliability and accuracy of GII data. The GII methodology is divided into two equally important sub-indices: The Innovation Input Sub-Index and the Innovation Output Sub-Index. The Input Sub-Index assesses factors within an economy that support and facilitate innovative activities, while the Output Sub-Index evaluates the outcomes of these activities. Both sub-indices are equally weighted in calculating the overall GII score, highlighting the balance between innovation inputs and outputs (Muchtar et al., 2022).

The GII methodology is periodically updated to reflect the evolving nature of innovation and to integrate new data sources or methodologies. For instance, the 2023 edition of the GII introduced changes to three indicators, added a new indicator, and removed two indicators from the framework. These adjustments ensure that the GII stays relevant and accurately reflects current innovation environments. The GII is based on a comprehensive dataset comprising 81 indicators from international public and private sources. This extensive range of indicators enables the GII to provide a more holistic view of innovation ecosystems, extending beyond traditional innovation metrics. The indicators encompass various dimensions of innovation, including the political environment, education, infrastructure, and knowledge creation (Global Innovation Index 2023, WIPO). By utilizing this methodology, the researcher effectively assessed the innovation performance of economies, identified their strengths and weaknesses, and gained insights into the factors that drive or hinder innovation.

According to Dutta, Lanvin, and Wunsch-Vincent (2017), increasing productivity immediately raises economic production relative to the population, which raises living standards. Innovation can be seen as a major contributor to the relative economic prosperity of societies. Originating from a system that can turn a concept into something genuinely valuable for enhancing innovation. Innovation and the drive for research and development are two of the most important factors in building a strong economy that advances and satisfies sustainable development goals.

A study of Petrariu et al., (2013) endeavor sought to examine the correlation between innovation and economic advancement within Eastern and Central European nations, regions often beset by economic turmoil. The study deployed a comprehensive array of metrics to gauge innovation, including expenditures on research and development, patent filings, and the representation of researchers, alongside corporate attributes such as mergers and acquisitions. Significantly, the findings underscored that innovation serves as a potent catalyst in augmenting a nation's competitiveness, fostering economic expansion, thereby emphasizing the imperative of investing in innovation.

Seventeen sustainable development goals (SDGs) were set by the UN in a resolution (A/RES/70/1) with the aim of meeting present needs without sacrificing those of future generations. Innovation is not just a primary goal for the successful implementation of the SDGs, but it also serves as a vital enabler for the accomplishment of all 16 of the other goals. It is difficult to anticipate the 2030 agenda in the absence of sustainable innovation. Innovation is interpreted as new or enhanced technology products and processes, as well as new or improved organizational and social practices. Furthermore, by boosting productivity and generating wealth and economic well-being, innovation and technological diffusion play a crucial part in a nation's economic progress and improve a country's ability to compete (UNCTAD, 2017).

GII relates to the 9^{TH} of SDGs which focuses on industry, and innovation, and 8^{TH} goal holds significant importance for economic growth. The most important of which is the promotion of scientific research and the improvement of technological capabilities in the industrial sectors in all countries, especially developing countries, encouraging innovation and increasing percentage in the number of workers in the field of research and development, and an increase in public and private sector spending on research and development. By promoting research and development, fostering entrepreneurship, and supporting technological advancements, Palestine can spur innovation within its economy. Innovation can lead to the creation of new products, services, and processes, thereby boosting productivity and enhancing competitiveness on a global scale. By prioritizing fostering innovation, Palestine can overcome economic challenges, and promote sustainable development, this goal encourages Palestine to take the first step and add to the report of GII (Morrar, 2022).

To support the Sustainable Development Goals (SDGs) in Palestine, United Nations institutions and the Palestinian government can utilize the Global Innovation Index (GII) as a comprehensive framework for measuring innovation performance across various sectors, including education, technology, and infrastructure. The GII comprises around 80 indicators, covering aspects such as the political environment, education, infrastructure, and knowledge creation (Site homepage) Enhancing the quality of education is crucial for fostering a skilled workforce, which is essential for innovation and economic growth. Improving literacy rates and increasing school enrollment can significantly contribute to knowledge creation and technological development. An educated populace drives innovation, leading to the development of new products, services, and technologies that can boost the economy.

Technology indicators, ICT usage through increasing the use of information and communication technology (ICT) enhances connectivity and access to information, thereby fostering innovation. R&D expenditure and patent applications through these indicators reflect the level of innovation activity, which is a critical driver of economic growth. Infrastructure quality, internet connectivity, and electricity availability upgrading infrastructure improve the business environment, making it easier for companies to operate and innovate. Reliable internet connectivity and electricity are essential for digital innovation and the operation of modern businesses. High-quality infrastructure facilitates trade, attracts investment, and enables the adoption of new technologies, all of which are vital for economic growth. By leveraging the GII indicators, United Nations institutions and the Palestinian government can identify areas for improvement and develop targeted strategies to enhance innovation in education, technology, and infrastructure. This approach can significantly contribute to achieving the SDGs in Palestine and driving economic growth (EC, 2017).

The Global Innovation Index (GII) is foundational in advancing sustainable development objectives by encouraging innovation across governance, social, and environmental spheres. Prior research indicates that innovation propels sustainable development by elevating Environmental, Social, and Governance (ESG) performance. Companies that allocate resources to research and development (R&D) and secure patents generally display superior ESG performance, thereby bolstering their competitive edge and sustainability credentials. Innovation is instrumental in fortifying governance by advocating for transparency, accountability, and operational efficiency within public administrations. The GII framework underscores the significance of sound institutional frameworks and regulatory climates in nurturing innovation. Well-structured governance mechanisms are pivotal for the execution of sustainable policies, prudent resource allocation, and fostering equitable expansion. Furthermore, innovation exerts a profound influence on the social domain by tackling educational disparities, healthcare accessibility, and social integration. In Palestine, there is an acute requirement to bolster investments in education and research to stimulate innovation and augment human capital. The GII incorporates metrics that gauge the caliber of education and the extent of human capital investment, both of which are indispensable for sustainable societal advancement (OECD, 2024). Environmental sustainability is increasingly intertwined with innovation via the cultivation of green technologies and sustainable methodologies. The GII integrates eco-innovation and the embrace of environmentally benign technologies as fundamental aspects of its framework. In Palestine, confronting environmental hurdles like water scarcity and soil erosion necessitates inventive approaches and technologies. Research has underscored that innovation in environmental governance can result in more sustainable resource stewardship and diminished environmental footprint (Wang & Razzaq, 2023).

Economic growth, which is the relative change in gross domestic product, which reflects the volume of final goods and services produced by a particular economy in a country and over a specific period, is theoretically thought to be one of the most important issues related to economic development. Despite the objections raised against the economic growth criterion as a gauge of development, it is a quantitative measure that ignores the qualitative dimensions of development, particularly those about social and political aspects. The pursuit of high growth rates is one of the most crucial issues that economic growth is concerned with (Guerron-Quintana et al, 2023).

Economic growth is the long-term increase in a nation's capacity to offer people different types of economic products focusing on changes to institutions and ideologies as well as technical advancement. According to Schumpeter, economic growth results from an increase in the following fundamental variables: the pace of knowledge and invention, the growth of the factors of production, and the efficiency of privatization via

economic activity (Aghaei et al., 2023). The accumulation of knowledge and innovation will fuel economic growth under the conditions of full functioning and effective privatization.
The annual GDP growth rate for Palestine has shown some variation over recent years. Figure (2) shows the GDP growth annual percentage.

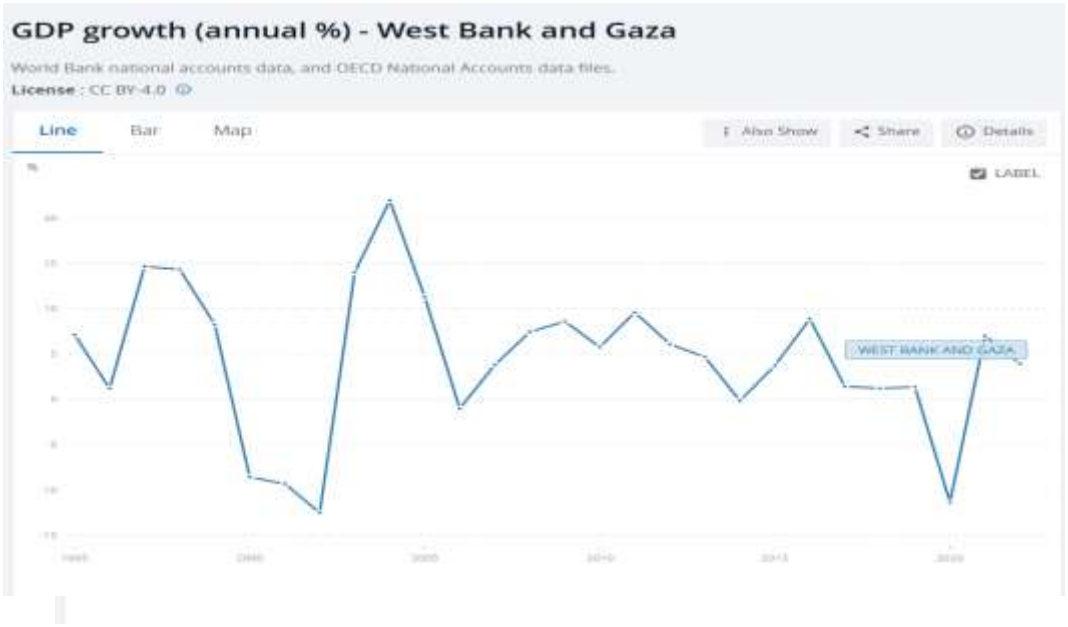

Figure (2): The GDP Growth (annual %) in Palestine from 1995 – 2022

Source: The World Bank GDP growth (annual %) - West Bank and Gaza | Data (worldbank.org).

The figure showing GDP growth (annual %) for Palestine from 1995 to 2022 highlights the economic volatility in the region. The early 2000s saw one of the steepest declines, with GDP growth rates dropping nearly 15%. This period coincides with the height of the Second Intifada, leading to extensive economic damage due to conflict, movement restrictions, and reduced investor confidence. In addition, between 2015 and 2020 the growth rates during this period were subdued. This can be linked to ongoing political and economic pressures, including reduced international aid, and internal political divisions. In 2020, there was a sharp economic downturn due to the COVID-19 pandemic, severely affecting global and local economies causing widespread economic disruptions, lockdowns, and reduced economic activity.
In summary, the GDP growth rate in Palestine has been highly volatile due to political conflicts, external economic pressures, and global events such as the pandemic. However, this indicator can be increased when focusing on innovation, attention to scientific research, striving for technological development, protecting innovators, and encouraging them. Economic Growth Theories; comprehensive review of numerous theories aiming to elucidate economic growth was undertaken. Additionally, this endeavor sought to address any ambiguities or uncertainties inherent in the subject matter by drawing upon insights gleaned from these diverse theoretical frameworks. Furthermore, the researcher supplemented this analysis by incorporating perspectives from other scholars and formulating arguments that corroborate viewpoints espoused by classical, neoclassical, and Schumpeterian economic theories. By integrating perspectives aligned with the economic theory upon which the study is predicated, a comprehensive understanding of the subject matter is achieved.

- **Classical Growth Theory**

One of the pivotal factors influencing economic growth, often overlooked by classical economic theory, is technological advancement (Pelsa & Balina, 2022). This theory operates on several fundamental assumptions that underpin economic thought. Firstly, it advocates for market freedom, positing that in the absence of government intervention, market forces determine the equilibrium quantity and price. Secondly, it espouses the neutrality of money, suggesting that money solely functions as a medium of exchange. Thirdly, it upholds Say's law, which posits that supply creates its demand. Moreover, according to Classical Growth Theory, in a

scenario where the economy operates at full capacity, the anticipation is that economic growth will decelerate as the population expands (Nihal et al., 2023). This proposition is an extension of the theory's premise that a temporary increase in real GDP per capita inevitably triggers a population surge, depleting a nation's resources and diminishing real GDP. Consequently, the pace of economic growth begins to diminish. However, the conventional growth model downplays the critical role of technological innovation in fostering the efficient functioning of a nation's economy. Technological advancements have the potential to mitigate diminishing returns (Rada et al., 2023). Furthermore, since the traditional growth model assumes that wages consistently hover around the subsistence level, the calculation of total earnings may be inaccurately assessed. Changes in the industrial structure and significant economic developments may result in total wages fluctuating above or below the subsistence level. Moreover, the conventional growth theory fails to account for the influence of trade unions in determining wage levels (Jun et al., 2022).

- **Neoclassical Growth Theory**

According to the neoclassical growth theory, achieving a steady rate of economic growth hinges on the synergy of three economic forces: labor, capital, and technology and innovation (Alani et al., 2023). Neoclassical growth theory expounds upon the influence of capital accumulation and technological advancements on the economy, with a focus on Solow's neoclassical growth model. This theory asserts that sustainable economic growth arises from the interplay of labor, capital, and technical innovation (Solow, 1956; Romer, 1990). It underscores the pivotal role of these factors in fostering enduring economic growth and stability. Moreover, technological progress is considered indispensable in propelling economic development within the neoclassical growth framework, highlighting its profound impact on shaping economic trajectories toward sustained growth and long-term viability.

A scrutiny of key principles within neoclassical theory - Solow's model, Romer's endogenous approach, and Freeman's evolutionary growth theory - converges on the recognition that technological advancements constitute a primary driver of economic growth. This consensus has prompted numerous governments to allocate significant resources to scientific research and development to foster innovation creation and dissemination (Alaeddine, 2022). Advocates of the endogenous theory stress the importance of externalities, such as technological spillovers and research and development endeavors, in generating and diffusing innovation, deviating from the neoclassical emphasis. Additionally, recent research by Ikeshita et al. (2023) reinforces the assertions of neoclassical growth theory, identifying labor, capital, and technological innovation as foundational elements for a thriving economy. Their findings underscore the critical importance of these components in promoting economic well-being and adaptability, thereby further validating the principles advocated by the neoclassical growth paradigm.

- **Joseph Schumpeter's Theory of Economic Growth**

Joseph Schumpeter (1883–1951) is familiar with his economic cycles and growth theories. Growth is dependent on two fundamental factors: the regulator and bank credit, which gives the regulator the opportunity for renewal and innovation (Tkachuk, 2023). He introduced the concept of "creative destruction" in his seminal work "Capitalism, Socialism and Democracy" (1942). This theory suggests that economic growth is spurred by the process of entrepreneurial innovation, which disrupts existing markets, destroys old industries, and creates new ones. Schumpeter argued that innovation, particularly in the form of technological advancements and new methods of production, is the primary driver of economic growth. He emphasized the importance of entrepreneurs in introducing new products, processes, and business models, which lead to increased productivity, efficiency gains, and ultimately economic expansion. Schumpeter's theory implies that economic growth is not a smooth, linear process but rather a series of discontinuous changes driven by technological breakthroughs and entrepreneurial initiatives. This perspective contrasts with neoclassical theories of economic growth, which often focus on factors like capital accumulation and labor productivity (Lipieta & Lipieta, 2022).

Furthermore, a recent study conducted by Sebti (2021) provides additional evidence in favor of the Schumpeter growth theory by defining the fundamental elements necessary for a prosperous economy. The research highlights the crucial significance of the global innovation index in promoting economic growth. Schumpeter view offers a useful insight into the innovation that drives sustainable economic growth. The study recommended the need for the Arab countries under study to increase spending on research and

development activities, and activities that would enhance the global innovation index and achieve high and positive growth rates.

In summary, Schumpeter's Theory of Economic Growth and the Global Innovation Index are interconnected concepts that emphasize the critical role of innovation in driving economic progress. The GII provides a framework for assessing a country's innovation capacity and performance, reflecting key aspects of Schumpeterian growth theory such as entrepreneurship, R&D investment, intellectual property protection, and global competitiveness (Callegari & Nybakk, 2022).

The Significance of the Study

The study focuses on the importance of the Global Innovation Index (GII) and its impact on economic growth in Palestine. The study aims to conduct a comprehensive literature review on the definition and significance of the GII. This involves exploring existing studies and economic theories related to the GII and its influence on economic growth. The study seeks to analyze how the GII affects economic growth in Palestine. This involves highlighting the importance of global innovation indicators for countries and assessing the role of the GII in evaluating a country's development and economic growth. Also, the study aims to underscore the significance of innovation in driving economic growth. It focuses on the need for education and investment in research and development to promote innovation and stimulate economic progress. One of the specific goals is to advocate for the establishment of a GII for Palestine. This would enable the country to assess its economic growth and innovation capabilities, providing valuable insights for policymakers and stakeholders. By addressing these specific goals, the study aims to shed light on the critical relationship between the GII, innovation, and economic growth in Palestine. It seeks to provide a comprehensive analysis of how enhancing innovation through initiatives like the GII can contribute to economic development and prosperity in the region.

Problem Statement

The study problem centers on understanding the significance of the Global Innovation Index (GII) and its impact on economic growth in Palestine. Specifically, the study aims to investigate how the GII influences economic development in the region and the role of innovation in driving sustainable growth. There is a lack of comprehensive understanding of how the GII affects economic growth in Palestine and the specific mechanisms through which innovation contributes to economic progress. Furthermore, the study problem emphasizes the crucial role of innovation in fostering economic development and underscores the need for countries, including Palestine, to prioritize education, research, and innovation to enhance their competitiveness and productivity. Another aspect of the study problem is the necessity of establishing a GII for Palestine to assess its innovation capabilities and economic growth compared to other countries, thereby providing valuable insights for policymakers and stakeholders. The research aims to elucidate the relationship between the GII, innovation, and economic growth in Palestine by addressing these aspects of the study problem. The study will offer recommendations for enhancing innovation and driving economic progress in the region.

Methodology

This study begins with a comprehensive literature review of existing literature related to the topic. This literature review provides a theoretical foundation and contextual understanding of the subject matter. Then, the research has integrated statistical analysis centered on patent data by providing empirical evidence through quantitative analysis of patent data. By combining theoretical insights from the literature review with empirical evidence from statistical analysis, the researcher aims to gain a deeper understanding of the impact of the Global Innovation Index on economic growth in Palestine. This methodological approach ensures a well-rounded analysis of the subject matter and helps draw meaningful conclusions based on theoretical and empirical perspectives.

Palestine is not listed as an independent entity in the Global Innovation Index. The GII, indeed, is an annual ranking that assesses the innovation capabilities and performance of countries worldwide. It includes 132 countries in the report for the year 2023 that have data to evaluate their innovation. As mentioned before, Palestine faces unique challenges due to its political status, which may limit its participation in global rankings and indices. Nevertheless, efforts are being made to promote innovation and entrepreneurship within Palestine, and there are initiatives to support startups, research, and technological development, the researcher

discussed the importance of joining this index, and how it will affect an increase in the economic growth of the country. Relating to Cornell University et al., (2019) the indicator includes two sub-indicators, namely (1) the innovation inputs sub-indicator and (2) the creativity outputs sub-indicator. The first sub-indicator is based on five main pillars, namely: human capital and research, infrastructure, institutions, market development, and business development. The second sub-indicator is based on two main pillars: knowledge and technology outputs and creative outputs. Each pillar, in turn, is divided into a list of sub-pillars, where each sub-pillar consists of individual indicators. The researcher emphasizes that the inclusion of Palestine in the future in the Global Innovation Index will be very important in measuring innovations' success and progress.

The Economist Intelligence Unit index employs the innovation inputs and outputs methodology. The innovation environment is assessed using nine variables, including foreign trade and exchange controls, whereas direct innovation inputs are assessed using six metrics, including workforce education (Hammer & Yusuf, 2020). The only metric for gauging outputs is the total number of patents issued by the European, Japanese, and US Patent Offices (EPO, JPO, and USPTO, respectively) (EIU, 2009).

There are 12 pillars in the World Economic Forum's (WEF) Global Competitiveness Index (GCI), which measures competitiveness and shares some enabling components for innovation in the GII (MURAT, 2020). The World Economic Forum (2010) claims that the GCI contains a separate pillar for innovation that covers metrics normally related to R&D, the protection of intellectual property, and patents, all of which are crucial for innovation. Amorós et al., (2019) found that the indicator's value varies from 0 to 100 and that the degree of innovation increases as the indicator gets closer to 100. The Global Innovation Index (GII), which has seven levels and multiple sub-areas at each level, is the economic profile of the 81 indicators included in the index (Reis & Aragó, 2023).

When compared to their level of economic growth, several developing economies are beating expectations in terms of innovation. The 26 economies that are the GII innovation achievers are surpassing GII 2022 forecasts for their level of development (Figure 1) (Ma et al, 2023). For instance, India continues to hold the record for the most years as an innovation achiever, as shown by the large bubble (Dutta et al., 2022).

The Global Innovation Index serves as a crucial benchmark for evaluating the innovation performance of economies on an annual basis. Notably, the inclusion of a positive sign here underscores the pressing need for adequate funding for innovation, particularly in consideration of the extensive global human and economic losses resulting from the global COVID-19 pandemic. This index is instrumental in drawing business and policy leaders from around the globe, underscoring the significance of preserving innovation efforts despite facing challenges. As progress is made toward managing the spread of the Coronavirus COVID-19, it becomes increasingly important to ensure that our support for innovation transcends the confines of the health sector and encompasses environmental considerations as well. Ultimately, the Global Innovation Index underscores the necessity for enduring investment in innovation to counteract detrimental effects on our economies and societies.

Figure 1 illustrates the GII scores plotted against GDP per capita in natural logarithms and in PPP US dollars. The central feature of the figure is the trend line, which delineates the anticipated levels of innovation performance for a given economy concerning its GDP per capita. The figure encompasses all economies featured in the GII, positioned against this trend line. Economies situated near the trend line exhibit innovation performance commensurate with expectations based on their developmental stage.

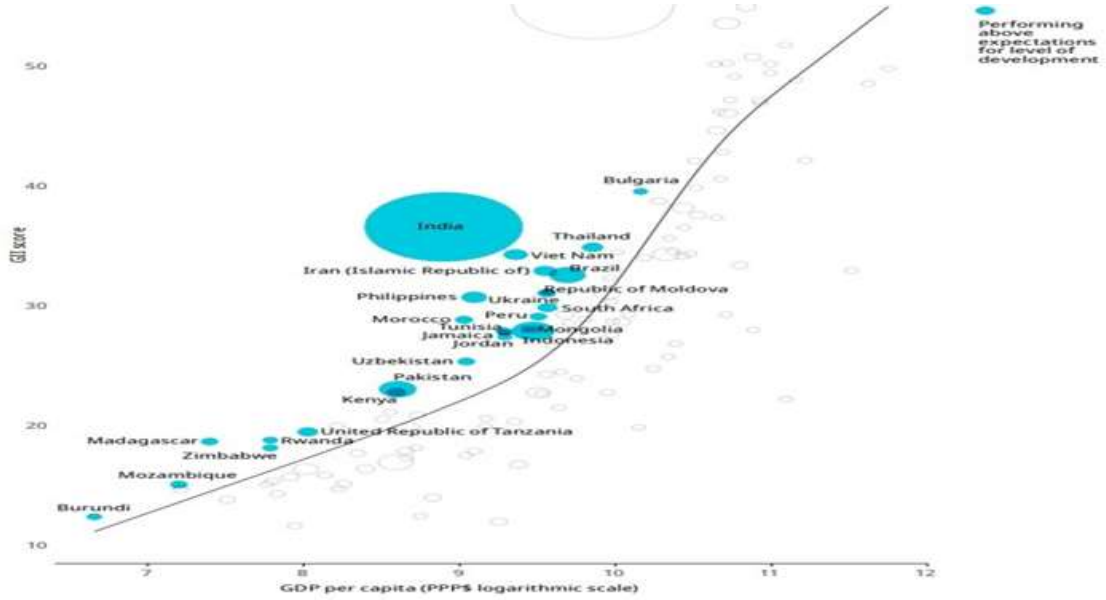

Figure (1): The Positive Relationship between Innovation and Development

Source: Global Innovation Index Database, WIPO, 2022.

Analysis of the Situation and the Reality of Technology and Innovation in Palestine

As of late 2023, the economic situation in the Palestinian territories, particularly following recent aggression in Gaza and the West Bank, remains highly challenging. GDP growth in these territories is expected to decelerate to approximately 3% in 2023, with real GDP growth stagnating due to population growth trends. The unemployment rate continues to be high, with significant disparities between the West Bank and Gaza. As of late 2023, the unemployment rate in the West Bank is about 13.1%, while in Gaza it is around 45.3% (World Bank). Additionally, inflation is projected to ease to approximately 3.4% in 2023, indicating a slight improvement from previous years (IMF). The conflict in Gaza has resulted in a severe humanitarian crisis, with significant loss of life and extensive infrastructure damage. By early 2024, over 34,000 Palestinians have been killed in Gaza since October 2023, with the majority being women and children. In the West Bank, including East Jerusalem, more than 370 Palestinians have been killed during the same period (IMF). The ongoing conflict has further strained economic conditions, exacerbating existing challenges. Restrictions on movement and access imposed by Israel continue to limit economic activity, particularly in Gaza, creating conditions akin to a nearly closed economy (World Bank). International organizations, such as the World Bank, are mobilizing resources to support urgent relief efforts in Gaza, focusing on providing emergency medical supplies, food, and water through UN agencies like UNICEF, WHO, and WFP (World Bank). Despite improvements in revenue collection, the Palestinian Authority faces tight policy space and unsustainable public debt. Efforts to boost economic growth and stabilize public finances will require easing constraints from Israel and ambitious structural. Donor aid is expected to remain at historically low levels, below 2% of GDP, further tightening economic conditions (World Bank). In summary, the Palestinian territories continue to face significant economic and humanitarian challenges, exacerbated by recent conflicts. Recovery and growth prospects are heavily dependent on political stability, easing of restrictions, and continued international support.

Both the public and private sectors, higher education institutions, and civil society organizations have launched numerous innovation and entrepreneurship initiatives in Palestine. These initiatives include awards, incubators, accelerators, and centers of excellence. Key public sector contributors are the Ministry of National Economy and the Higher Council for Innovation and Excellence. Prominent initiatives and organizations include the Palestine Academy for Science and Technology (PALAST), Al Nayzak, the Palestine Investment

Fund (PIF), the Palestinian Investment Promotion Agency (PIPA), the Palestine Information and Communication Technology Incubator (PICTI), the Palestinian Information Technology Association of Companies (PITA), Sharek Youth Forum, Expotech, and INJAZ Palestine. These centers maintain robust linkages and interactions with the industry, focusing their research on areas of significant interest to this sector (Judeh, 2016).

Palestine possesses experience from university graduates at an average rate of 2,270 annual graduates in the field of technology (Technology and Public Administration Cluster, 2021-2023). This is in addition to 20 business incubation programs Leadership and empowerment institutions and start-up companies (Technology and Public Administration Cluster, 2021-2023). On the other hand, there is a need to make more efforts to qualify university graduates and create an environment that stimulates creativity and leadership for companies, and individuals, and supports and stimulates funds for investment. There are about (700) Palestinian companies specializing in the field of information and communication technology (Technology and Public Administration Cluster, 2021-2023). The current size of Palestine's information and communication technology market is estimated at (651) million dollars, which constitutes about (4%) of the Palestinian GDP. Human capabilities and energies are the most important features of this sector (Technology and Public Administration Cluster, 2021-2023).

Furthermore, as mentioned in Dwikat et al., (2022), the pivotal role of Small and Medium Enterprises (SMEs) in driving economic growth is widely recognized. In developing nations characterized by unstable and turbulent business landscapes, such as Palestine, the potential of manufacturing SMEs can be significantly bolstered through innovative approaches. Drawing upon data from a sample comprising 377 manufacturing SMEs in Palestine, this study reveals a positive correlation between strategic business innovation (SBI) and the sustainable performance of these enterprises. These findings underscore the significance of SBI as a vital management instrument for firms navigating highly competitive and volatile environments.

Table (1): Number of Innovation Projects

Year	Total of Innovation Project
2013-2017	776
2018	53
2019	172
2020	79
2021	33
2022	32
Total	1,145

Source: Higher Council for Innovation and Excellence, 2023

Despite the challenges posed by the migration of skilled labor and resources from Palestine due to its status as an occupied territory, characterized by numerous checkpoints and roadblocks, as well as restricted movement of people, goods, and services across regions, and limited access to local markets and essential resources, there has been a notable surge in innovation activities. Over the past decade, a total of 1,145 innovation projects spanning various domains such as technology, new and renewable energy, among others, have been initiated (Council for Innovation and Excellence, 2023)

The Ministry of National Economy, in the "Sectoral Strategy for the Development of the National Economy 2021-2023", addressed the importance of supporting and developing the industrial sector. The vision of the National Strategy for Industry is based on “a competitive industry with benefits based on creativity and innovation that exploits available resources and integrates with local and global economies.”

The digital economy offers developing countries significant opportunities for rapid advancement and expanded market access. Digital startups are characterized by their provision of technology solutions and delivery of innovative services. While the technology startup in Palestine is still in its infancy, it shows promising signs. According to World Bank data from 2017, there were approximately 250 tech startups in Palestine (Kuester & Arya, 2021). The emergence of disruptive technologies within the service sector highlights a potential avenue for competitive advantage for Palestine. Moreover, digital startups serve as catalysts for job creation, with estimates suggesting up to 8,500 jobs linked to startup activities in Palestine.

These startups not only drive innovation but also rejuvenate the Micro, Small, and Medium Enterprises (MSME) sector, while also laying the groundwork for the growth of established digital firms (World Bank Group. 2021).

Analysis of the Patent in Palestine

The data is available from 1994 to 2023. The sources of the literature reviews of data consist of a wide range of national and international reports, articles, and other secondary and published materials. The main sources are the Palestinian Central Bureau of Statistics (PCBS), The Ministry of National Economy (MNE), The World Bank, and the Council for Innovation and Excellence.

The total number of patents in Palestine until the end of 2023 is 394 (Ministry of National Economy, 2024) with the highest year of patent filing being in 2023. The highest count of number of patents is 137 are specialized in Engineering, then 99 patents are specialized in Medical Sciences.

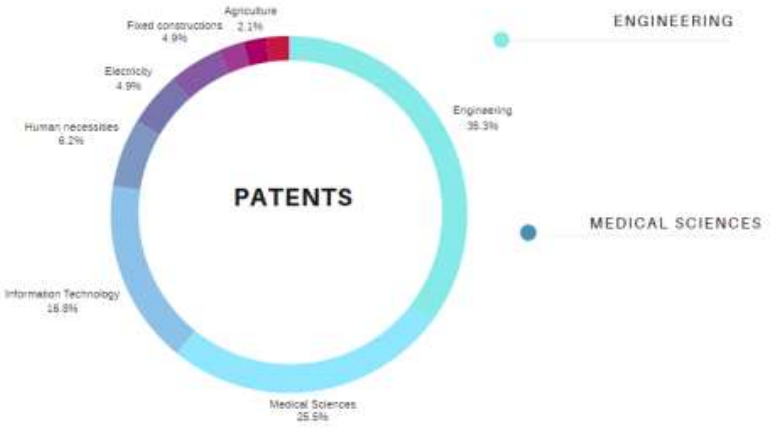

Figure (3): The specialization of patents in Palestine from 1994 – 2023

Relating to Figure 3, the most of patents that are registered in Palestine are specialized in engineering related to the innovative students from the universities are from engineering colleges. Moreover, special attention and emphasis can be directed towards graduation projects for students enrolled in engineering programs at Palestinian universities and educational institutions. Among these students, numerous inventors demonstrate remarkable creativity in their projects, to the extent that their graduation endeavors may qualify for patents. A higher number of engineering-related inventions and, as a result, a higher number of patent registrations in this field may result from this concentration on engineering education. There might be a sizable market need for engineering solutions in the local and regional areas, which would encourage businesses to spend money on R&D to produce innovative technologies that would eventually result in patent registrations.

As of the conclusion of 2023, a minority of international patents originating from Jordan, the United States, and France were recorded within the General Directorate of Intellectual Property at the Ministry of National Economy. However, Palestinian inventors held the majority, accounting for 80% of the patents (Ministry on National Economy, 2024).

Relating to Khudhair's (2014) article that presented several important recommendations, most notably the need for middle- and semi-middle-income countries (developing countries) to begin to have the Global Innovation Index and begin providing and compiling indicators for raising the country's gross domestic product, which affects economic growth. In addition, it emphasizes the need for developing countries to move towards a knowledge-based economy, rooted in creativity and innovation, within the framework of global competition. This transformation is considered necessary to enhance human development capable of absorbing and developing all technological innovations. Since these low-income countries lack resources,

they must pay attention to creativity and innovation through government strategies and initiatives to ensure optimal exploitation of limited resources to bridge the existing gap with advanced economies.

Palestine encounters a multitude of difficulties in executing sustainable policies, largely attributed to restricted resources, geopolitical limitations, and the imperative for considerable infrastructural advancement. Nonetheless, innovation holds the potential to effectuate a revolutionary transformation by introducing novel methodologies, technologies, and tactics that amplify efficiency, diminish expenses, and champion sustainability. Below are particular avenues through which innovation can aid Palestine in mitigating these challenges: Utilizing Advanced Technologies: Harnessing state-of-the-art technologies can refine resource distribution, augment service provision, and rationalize operations across sectors such as energy, water, and transportation. Digital platforms' implementation can contemporize public services, rendering them more accessible and efficient. E-governance systems can streamline procedures for citizens, businesses, and governmental entities. Also, innovations in agriculture, including precision farming techniques and hydroponic systems, can boost productivity and sustainability. These technologies permit a more judicious use of water and fertilizers, thereby contributing to food security and environmental preservation. Dedicating resources to renewable energy technologies, such as solar and wind power, can broaden the energy spectrum and lessen reliance on imported fuels. This diversification not only enhances energy independence but also mitigates environmental impact. Furthermore, stimulating entrepreneurship and endorsing startups committed to sustainable solutions can engender employment opportunities and spur economic expansion. Innovation hubs and accelerators can offer mentorship, financial support, and market access to these ventures. Innovation can expedite cross-border cooperation and international partnerships. The exchange of knowledge, technologies, and best practices can empower Palestine to confront shared challenges and tap into external expertise. Crafting pioneering policies that incentivize sustainable practices and investments can lure foreign aid and collaborations. This strategy encompasses the establishment of beneficial tax incentives, grants, and subsidies for sustainable undertakings.

In summary, innovation emerges as a critical enabler for Palestine to surmount the hurdles associated with sustainable policy implementation. By embracing advanced technologies, fostering entrepreneurship, and facilitating cross-border collaboration, alongside the development of innovative policies, Palestine can pave the way for a more sustainable and resilient future.

Conclusion

When Palestine becomes a member of the Global Innovation Index, it signifies the formal acknowledgment by the international community of the innovative potential and capabilities of the Palestinian people. This recognition serves to bolster the national identity of Palestinians and galvanize collective efforts toward progress and advancement across diverse domains, including science, technology, and innovation. Consequently, this fosters a stronger sense of national identity and elevates Palestine's stature on the global stage, bolstering the legitimacy of its aspirations. Furthermore, Palestine's inclusion in the Innovation Index has the potential to attract increased foreign investment to the country. Foreign investment plays a pivotal role in fostering economic and technological development, thereby enhancing Palestine's economic self-reliance. Moreover, by aligning with the Innovation Index, Palestine gains access to a myriad of international resources and support mechanisms aimed at fostering innovation and sustainable development. This access facilitates the cultivation of domestic technological and scientific capacities, thereby augmenting the nation's ability to achieve sustained economic growth.

Palestine's inclusion in the Global Innovation Index holds significant economic significance across multiple fronts, with a primary focus on investment attraction. Effective innovation and development serve as fundamental pillars of investment allure. Through Palestine's integration into the Innovation Index, its innovative potential and capabilities come to the forefront, rendering it an appealing destination for foreign investors seeking promising prospects.

Moreover, alongside bolstering competitiveness through innovation, Palestine stands to enhance its footing in global markets. Consequently, heightened competitiveness can spur increased productivity, while the development of novel products and services can fuel expansion in Palestinian exports. This, in turn, has the potential to ameliorate trade imbalances and stimulate economic growth.

Palestine should develop a national GII strategy for Palestine, an action plan with a clear timeline for implementation and collecting the data, in addition to a communication strategy between the collaborating

group to ensure effective dissemination and promotion of the GII in Palestine. Creating the Global Innovation Index will boost spending and inventiveness, increase the competitiveness of national industries and the economy, and boost productivity. This will boost economic growth in Palestine.

Recommendations

Having GII in Palestine will improve economic growth, and then it will affect the living standards of citizens, reducing unemployment rates, and empowering youth and women financially. Strengthening local and international partnerships in the fields of technology, innovation, and startups. Also, engage in networking activities such as conferences, seminars, and workshops to connect with potential partners with foster collaboration through joint research projects, and technology transfer agreements. Governments play a crucial role in facilitating international partnerships for sharing ideas, expertise, and resources to address common challenges. Furthermore, provides supportive policies, incentives, and funding mechanisms to encourage collaboration between domestic and foreign entities. Also, encourages joint ventures and investments between companies from different countries to leverage complementary strengths and resources. This will lead to the development of innovative products and technologies with global market potential. Therefore, it is necessary to establish the position of Palestine within the global technological map. Unifying efforts among all parties to enhance investment in the innovative and technical sector through plans to launch initiatives and attract, enable, and support international companies and emerging and innovative companies. Attracting regional and international investment houses. Need to support and encourage digital industries technology, promote digital content, and provide an incubating environment for creativity, innovation, and startups Encouraging scientific research and development to improve the quality of life in the Palestinian society, building and growing a knowledge-based economy. Hence, the importance of establishing this indicator is linked to the Global Innovation Index. So, based on the findings from previous literature, the research recommends:

- Urging the development of a national team that should get to work as soon as possible with a Palestinian collaboration. The team studies every indication, its accessibility, value, and the prerequisites needed to include Palestine in the Global Innovation Index. The team considered: The Palestinian Central Bureau of Statistics, Ministry of National Economy, Ministry of Higher Education and Scientific Research, Ministry of Telecom & Information Technology, Ministry of Finance, Higher Council for Innovation & Excellence, Ministry of Labor, and some private sector institutions like universities, incubators, or accelerators that are related to the innovation.
- Increase spending on research and development on the global innovation index, as there is no information and data available on the global innovation index in Palestine.
- Providing a legal, stimulating, and supportive environment for innovation and creativity, especially with the global innovation index.
- Studying various countries' experiences to learn from them regarding this subject, such as Switzerland's experience, which for the 12th year in a row tops the GII 2022 rankings, followed by Malaysia, Turkey, the United Arab Emirates, Kuwait, Tunisia, and Jordan. These nations exceed others in innovation relative to their degree of development, as shown by their rapid economic expansion and prominent rankings in the Global Innovation Index (WIPO, 2022).
- Due to the Global Innovation Index's significance for Palestine's economy, there should be funding, maybe from incubators or accelerators.
- Strengthening the innovation system's structure across various sectors involves supporting institutions dedicated to innovation, enhancing their institutional capacities, and promoting coordinated and integrated efforts to maximize collective impact. This approach aims to eliminate duplication and fragmentation of efforts. Additionally, it is essential to encourage the private sector in Palestine to increase its investment in innovation and creativity. Establishing multi-party partnerships that include public and private sectors, civil society, universities, and other relevant institutions will create an organizational framework that stimulates and enhances innovation, thereby facilitating economic growth outcomes.
- The formalization of cooperation agreements with expert countries, alongside the organization of bilateral and multilateral workshops and conferences on innovation, is crucial. Such efforts will foster collaboration among relevant stakeholders in developing legislative projects related to innovation and improving performance on the global innovation index. These initiatives will enhance the exchange of

knowledge, best practices, and policy development in innovation.

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