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ABSTRACT

This study aims to develop an effective strategic innovation model for Egypt from the standpoint of high-tech exports, as a good indicator for the innovation output. The chosen design is a descriptive design to identify the key factors influencing high-tech exports as a crucial marker of an economy's capacity for innovation. The study utilized the Global Innovation Index as a main source of data, and it investigated the most influential factors on high-tech exports across different income groups. Considering the effect of the income level on the nation ability to manufacture and export high-tech products. This gave a global general insight about the differences between factors influence on the countries according to their belonging to income groups. From this view point the study took the findings discovered in the analysis made on the income group where Egypt belongs, and validate it on the case study of Egypt. Another perspective has been added to the study, to grasp another edge of the high-tech industries, which is the high-tech manufacturing. The study investigated the most influential factors on high-tech manufacturing across different income groups, and it validate the findings in the Egyptian case study. Logically the higher rates of high-tech exports should reflect higher rates of manufacturing, and this has been shown in results of the

income group where Egypt belongs. Unexpectedly the combined analyses in the case study of Egypt revealed a different relation between high-tech imports, high-tech exports, and high-tech manufacturing.

Key Words: Innovation management, Innovation ecosystem, Innovation strategy, Egypt's strategic plan, High-tech exports, High-tech manufacturing, Knowledge-based economy, Knowledge society.

I- INTRODUCTION

The World Intellectual Property Organization (WIPO), a specialized agency of the United Nations (UN), aims to foster innovation and creativity. The two primary goals of WIPO are to advance the protection of intellectual property on a global scale and maintain administrative coordination between the intellectual property Unions set up by the treaties that WIPO oversees. Each year, WIPO publishes a report called the Global Innovation Index (GII) that compares and measures the innovation performance of UN members by looking at a number of indicators for each country; some of these indicators are viewed as input indicators that support the innovation performance, while others are output indicators that reflect this performance. Egypt was ranked 94th out of 132 nations in the 14th issue of the GII, which was published at the time.

Egypt has a long history in introducing brilliant minds and high talents to the world and this has been demonstrated in several instances, bearing in mind a long list of Egyptian scientists who contributed to global scientific progress. However, how these correlates to Egypt innovation success is unclear. Diverse talent has always existed in Egypt, but this has never been sufficient to raise Egypt's standing when evaluating innovative performance (Bond et al., 2011). Similarly, and in accordance with WIPO (2021), Egypt did well in various important metrics of innovative performance; for instance, it placed ninth in "labor productivity growth". However, it ranked in the worst 10 nations in terms of other metrics. For instance, it came in at number 124 for "The regulatory environment".

In a similar manner, Bakhtiar et al. (2021) discovered that Egypt is one of the countries with an innovation system that is both efficient and unsuccessful at the same time in their analysis of various innovation systems throughout the world. Therefore, although having promising innovation skills, Egypt appears to be falling short of its potential in utilizing this crucial factor in achieving economic growth and prosperity.

Khalil (2000) stressed the significance of innovation in maintaining competitive advantage and generating income for nations. Innovation increases productivity, produces more goods and services, helps consumers and businesses greatly, raises wages and consumer spending power, and results in successful companies that can create more employment (European Central Bank, 2017). According to Sarangi et al. (2022), strong macroeconomic policies should be planned by policymakers in a nation with low levels of innovation if they want to achieve long-term economic growth. And while Egypt already possesses certain significant advantages that may be built upon to improve its innovation performance, several additional issues still need to be resolved.

In the study there is some items need to be defined for good understanding. Innovation: The concept of innovation has been extensively examined, and several examples have demonstrated how well-managed innovation has a significant influence on the growth of nations. According to Smith (2010), innovation is the successful exploitation of ideas. According to Khalil (2000), the innovation process entails coming up with ideas, gathering the necessary information, putting it to use, and then offering it to society in the form of new goods, services, and technology that address various societal requirements.

Innovation ecosystem: The innovation ecosystem was further defined by Granstrand and Holgersson (2020) as "the evolving set of actors, activities, and artefacts, as well as the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a urostatnn of actors". A well-developed knowledge-based economy, which is an economic structure built on knowledge-intensive activities that foster rapid progress in technological and scientific innovation, is best exemplified by a robust innovation ecosystem (Powell & Snellman, 2004).

High Technology: According to World Bank (2022) "High-Technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery". According to Eurostat European Commission (2008), the manufacturing of basic pharmaceutical products and pharmaceutical preparations, the production of computer, electronic, and optical products, and the production of air and spacecraft and related machinery are all high technology manufacturing industries. According to OECD (2022), high-tech products are technical goods whose production required a significant amount of research and development.

The Leapfrogging: The concept "leapfrogging" refers to the ability of developing nations to bypass the traditional stages of the development path that developed industrial nations have taken and instead jump straight to the most cutting-edge technologies. It also refers to the ability of developing nations to find unusual paths of technological advancement through new emerging technologies with new opportunities that will enable them to catch up with sustainable development and economic growth. 2020 (Yayboke).

Components of an Innovation Ecosystem

The International Development Innovation Alliance IDIA (2022) lists the following as typical participants in an innovation ecosystem:

- Research institutions, which play roles in knowledge creation and dissemination

-Incubators and accelerators that offer companies the necessary supporting environment

-Angel investors that assist rapidly expanding small businesses

-Venture capitalists

-Private equity firms, which frequently acquire 100 percent control of more established, creative enterprises

-The government, which has a variety of important roles in fostering innovation

-Friends and family play a key role in innovation

-Civil Society Organizations (CSOs) or Non-Governmental Organizations (NGOs)

-Development organizations that encourage innovators at the very beginning of their careers Startups

-Market connectors and middlemen who assist in connecting businesses inside an innovation ecosystem

-business-led initiatives like research and development partnerships, knowledge-sharing platforms, technology and skills transfers, and infrastructure investment

Reasons behind weak innovation performance

The poor performance of innovation in Egypt has a number of causes. According to Biziri (2017), this is because of poor management, unpredictable finance, and lack of assistance. Similar to this, Bond et al. (2011) defined Egypt's problems as the dearth of research money, a subpar educational system, and graduates with inadequate skills. In addition, the inflexible academic culture and the weak public interest in research are not taken into account by the R&D business model. Jackson (2011) put out the idea that the innovation ecosystem is made up of two different but essentially independent economies: the research economy, which is fueled by basic research, and the commercial economy, which is fueled by the market.

The resources used in the research economy must be supplied by innovation that leads to higher profits in the commercial sector for an ecosystem to remain healthy. Attia (2015) has focused in particular on the obstacles to university-industry collaboration, which can be summed up in the lack of mutual understanding and different orientations as universities tend to look toward long-term pure science research, which is not the same perspective as the industry.

In addition to the hurdles linked to regulations and royalties, transaction barriers have also been highlighted, such as the low visibility of industry liaison offices in universities and even if they do exist, they have unreasonable expectations. Similar to this, Kirby and El Hadidi (2019) discovered that there is little industry-

university collaboration and that interventions made to improve it are ineffective. This indicates the need for a comprehensive national coordination policy that encourages universities and industry to cooperate, particularly in research, and to get involved in the transfer and commercialization of technologies.

Egyptian Endeavors

In the document of "Egypt Vision 2030," a national agenda unveiled in February 2016, Egypt has established an innovation strategy that represents the state's long-term strategic plan to accomplish sustainable development principles and objectives in all domains. The agenda pledges to make Egypt's economy knowledge-based, with "Knowledge, Innovation, and Scientific Research" as one of its key focuses. That is to say, knowledge, innovation, and scientific research are viewed as crucial development pillars in Egypt. Making Egypt one of the top 40 nations for innovation, having high-caliber institutions for scientific research, and maintaining innovative personnel and competencies and to be among the top 20 nations for both patents and intellectual property rights, are some of the key KPIs of the Egyptian strategic plan (Ministry of Planning and Economic Development, 2016).

II- Literature Review

Importance of high-Teck exports

When it comes to domestic and international economies, the collective social awareness is familiar with the term's imports and exports because they both have a significant impact on standards of living. Imports are a key indicator and a crucial part of any given economy, and a high

level of imports indicates a high domestic demand, which may reflect a growing economy, especially if these imports are for productive assets like high-tech machines.it is widely recognized that the proportion of high-technology exports to total manufactured exports is a key indicator of an economy's capacity for innovation.

Usman (2017) came to the conclusion that high-tech exports still have a positive significant impact and should be taken into consideration if an agricultural economy is looking for long-term economic growth and a sustainable competitive advantage. High-tech exports are one of the key drivers of any nation's sustainable economic growth, according to Gökmen and Turen (2013).

Determinants of the High-Tech Exports

Through a study of the literature, Alam and Chand (2021) investigated the role of foreign direct investment, the human development index, the GDP, and R&D spending as major factors influencing high-tech exports in advanced and emerging economies. Additionally, Zheng-pei et al. (2010) investigated the effects of Research and Development fund and personnel quality as an input on the export of high-tech products, and they found that the R&D fund had a favorable impact on the high-tech export performance.

The middle-income trap

The middle-income trap is a circumstance in which a middle-income country experiences slow economic growth as a result of its inability to compete on the global stage due to low productivity and limited skill sets while there is a demand for relatively high wages. This situation

is brought on by the government's lack of focus on fostering domestic innovation capabilities while adhering to market-led strategies, which hinder investments, gradually reduce wages, and encourage the growth of the informal economy. Middle-income countries are likely to be drawn more and more into this trap unless they adopt a broad innovation strategy with effective policies that can help them escape it and begin to move toward higher income levels.

Egypt is one of five Middle East and North Africa (MENA) countries that fall into the Middle-Income Trap (MIT), and it has been trapped there for more than 40 years, according to Arezki et al. (2019). While researchers believe that MENA countries have a lower chance of escaping the MIT than other countries around the world, they highlighted that the main cause of this is the region's poor technology adoption.

Aim of the Study

Egypt's low global position in innovation, ranking 94th out of 132 countries in the GII report, indicates a lack of progress in this area. This has led to dependence on other innovative countries for new technologies and products. Additionally, 60% of Egypt's population is either poor or vulnerable, indicating an increasing level of inequality. This research problem highlights the need for Egypt to address its innovation performance and address its challenges.

Studies on the Egyptian innovation ecosystem lack focus on improving key innovation input indicators to directly affect high technology exports. There are no bespoke strategic innovation models for Egypt, and most studies on high-tech exports examine human capital, FDI, and growth

expenditure on research and development. No studies explore the impact of academic-industry collaboration, income level classifications, or high-tech manufacturing impediments. Consequently, there is a need for more comprehensive research on this topic.

Research questions

-What are the key factors influencing high-tech exports as a crucial marker of an economy's capacity for innovation?

-What are the innovation input indicators that can enhance high-tech exports in Egypt?

-What is the strategic model that can best fit the Egyptian case?

III- Research Methodology

This study adopted a descriptive research design with a comparative approach centered on the income level for the nations under study to analyze various innovation input elements that directly affect high-tech exports as an innovation output indicator. While the comparative analysis strategy is used to highlight the contrasts between the examined countries in terms of income level, the descriptive approach is used in the research to describe, display, analyze, and summarize the data that was gathered and the insights that were produced.

The selection for the countries subjected to the study varied between developed and developing countries, and from high income to low-income countries. While taking into consideration the income category in which Egypt falls which is the low-middle income group, that's in

order to have a comprehensive diverse understanding across different innovation systems represented by the economies under study.

- 202 observations of 102 countries across the globe extracted from the GII report of year 2022, and another global 100 countries extracted from the GII report of year 2021. Those countries are aggregated and classified into four income groups as high-income group, upper-middle income group, lower-middle income group, and low-income group.
- The findings of the previous study will be reflected on Egypt as it will be the focus of the study.
- The data were collected from different secondary sources:
  - Global Innovation Index GII Reports (2017-2022) is an annualreport created by the World Intellectual Property Organization WIPO.
  - World Bank Database
  - United Nations Comtrade Database
  - Data collected from literature and previous studies.

Strategy for Data Analysis

Literature review gives a comprehensive understanding of what are the indicators being investigated in previous studies that has the most significant effect on high-tech exports. While most of previous studies tended to measures the effect of Human Capital, Foreign Direct Investment (FDI), Gross Expenditure on Research and Development (GERD), and Openness for International Trade on the high-tech exports, these effects can be represented in the following innovation input indicators:

Human Capital	The level of total government spending on education as a percentage of the nation's GDP, also the total number of graduates in the country in the fields related to Science, Technology, Engineering, and Mathematics (STEM)
High-Tech Exports	dependent variable "High Technology Exports" as a percentage of the total manufactured exports of a given country.
Foreign Direct Investment	FDI is the measurement of the total amount of investments that have a controlling ownership in a country and are made by parties or investors located in another country.
Gross Expenditure on Research) & Development (GERD	Measuring the total spending on research and development activities, and this include the share made by business enterprises, higher education institutions, as well as government and private non-profit organizations. The indicator is measured as a percentage of the total GDP
Openness to international trade in form of High-Tech Imports	It indicates the country openness for international trade, by measuring the state orientation toward external markets in importing high technology products.
University-Industry collaboration in research and development activity	The study will have a clear understanding of the relationship in innovation activities by assessing the extent of collaboration between the university and industry in research and development activities, with a hypothesis that it has a significance on high-tech exports.

A statistical software "Microsoft Excel" is used to facilitate completing the statistical analysis in all study projects. With the cohesive holistic perspective of the different factors positively affecting high-tech exports, and the closest impact that can be generated with the focus on definite aspects in term of laws, allocation of resources, and soft instruments, the research concluded a recommended policy, and a suggested strategic model that can suit the situation in Egypt.

Table 1: suggested strategic models

Global Empirical Model "High-Tech Exports Case"	Egyptian Empirical Model "High-Tech Exports Case"	Global Empirical Model "High-Tech Manufacturing Case"	Egyptian Empirical Model "High-Tech Manufacturing Case"
The variables data are drawn from the 2022 and 2021 Global Innovation Index publications, and GII employs a variety of data sources. Some of them have concrete statistics, while others are taken from the Executive Opinion Survey of the World Economic Forum (WEF), which aims to capture ideas for which concrete data might not be accessible.	In order to predict the dependent variable (high technology exports as a percentage of all manufactured exports of a given country) on a global scale divided into four categorical income groups, an analysis of the seven independent variables previously selected in the global analysis was conducted.	In this section, the study attempted to investigate a high technology industry advantage unrelated to exporting; this advantage is connected to the factors influencing high technology manufacturing. The high-tech manufacturing percentage of all manufactured goods is utilized as an innovation output dependent variable, and the same seven innovation input independent variables that were used in the global analysis for the high-tech exports are employed once more.	The study could understand the peculiarity of Egypt while taking into account the income group it belongs to, which is the lower-middle income group. This study analyzed the results of the investigation of the seven independent variables previously chosen in the global analysis to be used to predict the dependent variable of (high technology manufacturing as a percentage of the total manufactured products of a given country) on the global scale classified into 4 categorical income groups.

IV - Results and Discussion

Descriptive Global Results "High-Tech Exports Case"

202 observations were gathered about data of 102 countries from GII 2022, and of 100 countries from GII 2021. The analyzed countries representing four different income groups, and they were aggregated together according to their respective income groups, with no regards to groups shifting during the two consecutive years. The observations were analyzed using multiple regression based on seven independent variables.

The chosen seven variables are percentage of expenditure on education of the country GDP, percentage of graduates in science and engineering of total graduates, number of researchers per million population, percentage of gross expenditure on R&D of the country GDP, university-industry R&D collaboration based on executive opinion survey, percentage of high-tech imports of the total trade, and percentage of foreign direct investment net inflows of the country GDP.

Table 2: Descriptive Global Results "High-Tech Exports Case" according to the income level

High income group	Upper Middle-Income group	Lower middle-income group	Low Income Group
In the high-income group category gross expenditure on R&D as a percentage of GDP proved to be an important determinant for the level of high technology exports of a high-income country with a P value less than 0.05 and a positive coefficient of 2.92. Most of the high-income group are developed countries which have a solid education system and this effect on innovation capabilities hence high technology exports. Therefore, changes in spending on education does not have an immediate measurable direct effect on high tech exports. The study shows that the variable university-industry R&D collaboration failed to demonstrate statistical significance with no predicted sign.	In the upper middle income group category, high-tech imports as a percentage of total trade proved to be an important determinant of the level of high technology exports of an upper middle-income country	In the lower middle income group category, expenditure on education as a percentage of GDP proved to be significant with a P value less than 0.05, but it didn't yield a predicted sign considering the negative coefficient estimates. The remaining four variables of graduates in science and engineering as a percentage of all graduates; researcher full time equivalent per million population; university-industry R&D collaboration measured by executive survey; and gross expenditure on R&D as a percentage of GDP were not demonstrated to be significant at a P value less than 0.12.	The small sample size and lack of data related to more than one variable in this small sample make it not applicable to be calculated in a regression. This is due to the lack of reliable recoding from the responsible governmental entities in those countries. In the lower income group, neither the regression was significant with a significance F of 0.42, nor did the variables return any significance less than 0.24 in P value.

Descriptive Global Results "High-Tech Manufacturing Case"

In Egypt, and as expected as being a country that belongs to the lower middle income group category, all of the three independent variables which have proved significance in the lower middle-income group, have also proved to be significant in Egypt as a country belongs to the group.

While the high technology imports proved to be an important determinant of the high technology exports considering the positive coefficient, the expenditure on education didn't yield a positive predicted sign. FDI didn't yield a positive predicted sign considering the coefficient which indicates that the direction of the FDI is not supporting high technology industries.

Descriptive Global Results "High-Tech Manufacturing Case"

The analysis used data for 101 countries from GII 2022, and data for 99 countries from GII 2021, classified into 4 income groups, same as the analysis made for the high technology exports. The only difference was that the dependent variable was changed to the percentage of high-tech manufacturing output percentage of the total manufactured outputs rather than the high technology exports percentage of the total trade. The data were gathered from 200 observations.

Table3. Descriptive Global Results "High-Tech Manufacturing Case" according to the income level

High income group	Upper Middle-Income group	Lower middle-income group	Low Income Group
In the high-income group category, expenditure on education as a percentage of GDP proved to be significant with a P value less than 0.05, but it didn't yield a positive predicted sign considering the negative coefficient estimates. expected effect should appear on the long run, considering the long-term nature of education. Unlike the results revealed by the analysis made on the high-tech exports percentage of total trade; Gross expenditure on research and development as a percentage of GDP didn't prove to be significant with a P value less than 0.08, but it still yields a positive coefficient. Between the two analyses of high-tech exports and high-tech manufacturing, there was a notable discrepancy in the results of significance in the innovation input independent variable expenditure on research and development as a percentage of GDP. The long term and unguaranteed results nature of research and development could explain this discrepancy.	The significance of the expenditure on education as a percentage of GDP in the upper medium income group category shows similarities to the higher income group with a P value less than 0.05 and a negative coefficient. Although this variable was not significant in the study of high-tech exports, it begins to become important in the manufacturing stage and takes longer time to exhibit the predicted positive sign in the yielded coefficient. With a P value less than 0.05, and a positive predicted sign with a coefficient of 17.42, the gross expenditure on research and development as a percent of GDP proved to be an important determinant of the level of high technology manufacturing in a given upper middle income group nation. The university-industry collaboration in research and development has proven significance with a P value less than 0.05, but it didn't yield a positive predicted sign considering the negative coefficient. High-Tech imports as a percentage of total trade, which proved to be an important determinant of the level of high technology exports. The study revealed inconsistency of the significance in the innovation input independent variable foreign direct investment as a percent of GDP between the two analyses related to high-tech exports, and high-tech manufacturing.	In the lower-middle income group category only high technology imports as a percentage of total trade proved to be an important determinant of high technology manufacturing, So the high-tech imports positively affect high-tech manufacturing and exports in the middle-income countries even it is at the upper level or at lower level. Unlike the high-tech exports, both expenditure on education as a percentage of GDP, and the foreign direct investment as a percentage of GDP didn't show significance.	In the lower income group, the regression was neither significant with significance F of 0.51, nor the variables returned any significance less than 0.52 in P value. This is due to the small sample size and the lack of data related to more than one variable in this small sample, which makes it not applicable to be calculated in a regression. This is related to the absence of dependable recoding from the responsible governmental entities in those countries.

Descriptive Egyptian results "high-Teck manufacturing case"

In Egypt and as expected as being a country that belongs to the lower middle income group category, high technology imports as a percent of total trade proved to be significant with P value less than 0.05. Unlike the group, the coefficient yielded a negative sign, although it matched the group in the high technology exports.

This result reflects that the group tend to import high technology products in a way that enhances their own manufacturing, and exports capabilities. This is done by directing the imports toward machinery, and advanced production lines that nurture their factories with new production technologies, and processes, which is a healthy indicator.

Descriptive Results on the Findings in the Egyptian Case Study in High-Tech Exports

In Egypt the corresponding high technology imports value of a preceding year affect the reference high technology exports value of the current year. This means that the imports of products other than high-tech is not considered affecting positively on enhancing high-tech exports performance. On the contrary, it might be of negative effect, as it might drive the domestic market trends toward higher consumption for final imported products rather than depending on the local production.

The empirical study undertaken in this research highlighted different seven innovation input independent variables that can have an effect on the performance of high technology exports as an innovation output dependent variable. This effect was realized in different countries, categorized according to their level of income. It has been revealed that the variables significance varies between different income levels.

Table 4: results for high-tech exports for different countries categorized to their level of income

High-income level	Upper-middle income level	Lower-middle income level	Low-income level
the study found the significance in the investment in research and development as well as in increasing the skills of human capital through the high quality of education.	those catch-up countries that attempt to shrink the technological and economical gap with the leader developed countries, significance appeared in the foreign direct investment that supported the establishment of the industrial capacity of those countries. Significance also appears in the high technology imports for the advanced machinery.	This countries group, which is the category where Egypt resides unfortunately for decades, significance of the human capital appears like in the high-income group.	the poverty level of these countries didn't even support the study, as the missing recorded data regarding their performance make studying the effect of the chosen innovation input independent variables on the performance of innovation output variable of high technology exports impossible to be achieved.

the research went further steps by investigating the same seven innovation input independent variables effects on the high-tech manufacturing of total manufactured products as an innovation output dependent variable at the global scale. This has been made within the same countries classified into the same four income groups. This investigation could reveal another dimension related to the preceding step before the exporting activity.

Table 5: results for high-tech manufacturing for different countries categorized to their level of income

High-income level	Upper-middle income level	Lower-middle income level	Low-income level
like the analysis made to the exports, the same effect appeared with the variable expenditure on education, but what has been found different here was the absence of significance related to the gross expenditure on research and development.	innovation is mainly incremental focused on enhancing production process, and that's why positive significance appears in their case by the gross expenditure on research and development, as well as the imports of high technology.	the income group Egypt belongs to, the significance was in the same three variables, the only difference arose was in the negative coefficient of the foreign direct investment. This indicated that Egypt is in the back seats comparing to the income group it belongs to regarding its ability to attract foreign direct investments	countries still prove their limited level of exerted efforts in recording and measuring their own performance, as the small sample size and the missing records prevented generating a significant regression analysis

The second part of the study involved studying the three-innovation input independent variables which were found significant in the lower middle-income group. Those variables are the expenditure on education, the high technology imports, and the foreign direct investment. The study tried to investigate their influence on the performance of high technology exports as an innovation output dependent variable in Egypt though 41 consecutive years from 1981 to 2021. This could spot the light on the Egyptian case peculiarity.

In Egypt we find that This analysis revealed that the high-tech imports influence the high-tech manufacturing but negatively. Although this influence was positive in the high-tech exports, this indicates the Egyptian market tendency toward consuming the imported final products and favor the imported products quality over the lower price from the domestic products. This negatively affect manufacturing as the producers are not welling to increase their production that can't compete with the imported products, but it positively influences exporting this production that couldn't be marketed domestically to other markets in lower income countries that favor price over quality. The results confirmed the positive influence of the high-tech imports on the near future high-tech exports of the same technology, as well as the positive influence of the total high-tech imports on the exports of the classified high technologies. The results also showed the negative influence of the total imports on the exports of the classified high technologies.

Current Situation in Egypt

The current situation in Egypt implies the state intention toward future economic prosperity. Egypt seeks by 2030 to have

a competitive, balanced, and diversified, economy supported by innovation and knowledge, based on justice, inclusion and participation, with a balanced and diversified ecosystem, utilizing the potentials impeded in the location and people to achieve sustainable development and improve the quality of the Egyptians lives. (Ministry of Planning, Monitoring and Administrative Reform, 2016).

Moreover, the Egyptian constitution included many articles that demonstrate the nation welling to enhance its capabilities in innovation in order to achieve economic growth. The state sponsors researchers and inventors, and allocates a percentage of government expenditure that is no less than 1% of Gross National Product to scientific research. The state commits to protecting them, increasing their competitiveness, providing an environment that attracts investment, and works on increasing production, encouraging exports, and regulating imports. The state gives special attention to small and medium enterprises in all fields. It works on regulating and training the informal sector".

By reviewing the decrees and laws issued by the successive Egyptian parliaments and governments and their affiliated bodies belonging to the various ministries, the study found that Egypt has issued multiple laws and decrees in order to push forward its innovation capabilities. The study also found a set of Egyptian

laws and decrees that were supposed to target the transfer of modern technology through importing from the developed world, in order to push the development then compete with the national production in global markets through exporting.

The current situation in Egypt appears that Egypt has many funding bodies for scientific research, technology and innovation, like "the academy of scientific research and technology", "science, technology & innovation funding authority", and "innovators support fund". Those funding bodies' specializations may overlap, which makes the need to unifying efforts a vital issue. Also, the current policies and regulations are not considering the state-led imports instead of the market-led one currently existing, and still there are a lot of policies and regulations that needs to be updated and enhanced, while there is almost a shortcoming in the definition of high technology in that it is limited to information and communication technology. So, more efforts are needed in order to be more effective in enhancing the high-tech manufacturing and exports, hence innovation capabilities and economic welfare.

Figure 1: Suggested strategic model and policies

1.Directing high-tech imports

a. Setting laws that stimulate importing for new high technological electrical machinery and advanced production lines that operates factories that produces final high technology products.

b. Setting laws that restrain importing final high technology products that has a domestic national equivalent.

2.Support for high-tech producers

a. Allocating resources to facilitate initiating the factory

b. Setting laws that stimulate high technology manufacturing

3.Steer market orientation toward national products

4.Enhancing the quality of high-tech production to be able to compete domestically with the imported high-technology products

a. Setting laws that encourage the deployment of the total quality management concepts and process innovation in the high-tech production practices

b. Allocating resources that motivate the development of products and production

c. Stimulating the collaboration between university and industry

5.Boosting high technology exports

a. Setting laws that encourage exporting high-tech products

b. Allocating resources that support the exporters of high-tech products

c. Stimulating the production for exporting with competitive quality and prices

IV- Conclusion

The study identifies high-tech imports as the innovation input indicator with the most significant impact on improving high-tech exports in Egypt. However, a robust high-tech manufacturing sector is essential to establish

a healthy relationship between imports and exports. The unhealthy correlation observed among high-tech imports, manufacturing, and exports necessitates government intervention. By strategically allocating resources, enacting appropriate legislation, and implementing targeted programs and initiatives, the government can bolster Egypt's overall innovation capacity, particularly in high-tech industries.

To initiate innovation, Egypt should prioritize process innovation. This foundational step, if sustained for an appropriate duration, can subsequently catalyze more advanced forms of innovation, such as service or product innovations. To escape the middle-income trap and ascend to higher income levels, Egypt must adopt a leapfrogging approach. This entails significant enhancements in innovation capabilities, a robust innovation strategy, and well-defined science, technology, and innovation policies. Technological leapfrogging can be facilitated by a strong collaborative mechanism involving universities, industry, and government, often referred to as the triple-helix approach.

Moreover, this study aims to illuminate a crucial innovation indicator that should be considered when planning for the future of a developing nation like Egypt. Based on the findings, the study proposes specific policies and a strategic direction. It is hoped that this research will inspire further investigation into this vital domain, providing valuable insights for policymakers.

The study encountered several limitations, primarily related to missing data and inconsistent product coding standards. To address the issue of missing data, the authors employed interpolation and extrapolation techniques on recorded data points from various sources. Additionally,

they estimated missing records for specific years in the case of Egypt. To overcome inconsistencies in product coding standards, the authors converted available codes to a preceding standard, enabling the inclusion of older data in the study.

Motivated by Egypt's relatively low standing in global innovation indices, this research examines a specific facet of innovation. Recognizing the limitations of a comprehensive analysis encompassing all innovation dimensions within a single study, this research adopts a focused approach. The methodology employed here can serve as a foundational model for future research exploring the intricate relationships between diverse innovation input and output indicators. By dissecting these interconnections, researchers can construct a holistic understanding of the innovation landscape within any specific economy.

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Appendix – Extract from the data analysis

Egypt Exports Case

Year	Expenditure on education %GDP	High Tech Imports (Million USD)	FDI (Million USD)	HT Exports (Million USD)
1981	5.61	314.71	752.57	0.89
1982	5.61	341.42	293.57	0.73
1983	5.22	404.18	490.00	1.25
1984	4.87	496.19	729.14	0.76
1985	4.87	250.85	1,177.57	0.93
1986	4.87	433.56	1,217.43	2.07
1987	4.87	449.28	947.71	2.72
1988	4.53	539.09	1,190.00	3.03
1989	4.60	393.32	1,250.18	12.30
1990	4.33	493.37	734.00	10.37
1991	4.33	557.32	253.00	34.92
1992	4.05	691.74	459.00	27.46
1993	4.20	697.50	493.00	16.42
1994	4.58	483.04	1,256.00	5.58
1995	4.60	542.03	598.00	7.45
1996	4.67	622.15	636.00	7.20
1997	4.81	764.14	890.55	4.32
1998	4.81	961.81	1,076.00	3.15
1999	4.81	921.92	1,065.30	3.46
2000	4.81	768.78	1,235.00	5.61
2001	4.81	831.74	509.90	12.27
2002	4.81	734.17	646.90	12.84
2003	4.95	652.24	237.40	10.29
2004	4.67	641.36	1,253.30	13.45
2005	4.79	1,114.72	5,375.60	10.10
2006	4.00	1,027.76	10,042.80	15.78
2007	3.68	1,446.22	11,578.10	5.65
2008	3.76	3,021.45	9,494.60	102.54

2009	3.65	2,506.57	6,711.60	92.74
2010	3.54	2,898.25	6,385.60	107.03
2011	3.34	3,651.16	-482.70	133.33
2012	3.37	3,778.41	2,797.70	76.86
2013	4.12	3,642.10	4,192.20	72.70
2014	4.25	4,128.99	4,612.20	177.49
2015	3.93	4,453.94	6,925.20	95.47
2016	4.05	4,400.07	8,106.80	55.86
2017	3.33	3,950.57	7,408.70	73.76
2018	3.33	5,700.04	8,141.30	124.93
2019	2.61	6,117.10	9,010.10	326.72
2020	2.48	3,985.27	5,851.80	342.66
2021	2.48	5,665.56	5,122.00	526.99

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.853265073				
R Square	0.728061284				
Adjusted R Square	0.706012199				
Standard Error	58.93392834				
Observations	41				
ANOVA					
	df	SS	MS	F	Significance F
Regression	3	344056.2094	114685.4	33.02002	1.47E-10
Residual	37	128508.6927	3473.208		
Total	40	472564.9021			

Egypt Exports adding Time Factor

Years	Technology import value (Million USD) (-1)	Total HT Imports (Million USD)	Total imports	GERD %GDP (-1)	Expenditure on Education % GDP (-1)	FDI (million USD) (-1)	Total exports (million USD)	GDP (million USD)	Technology Export Value (million USD)
1995	0.23	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.00
1996	0.22	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.00
1997	0.38	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.00
1998	0.25	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.00
1999	1.34	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.00
2000	0.24	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.02
2001	5.78	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	0.00
2002	1.28	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	0.00
2003	0.31	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.17
2004	0.69	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	0.00
2005	8.60	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	0.00
2006	1.12	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	0.00
2007	0.83	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	0.00
2008	0.28	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	0.06
2009	9.17	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	0.06
2010	4.99	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	0.01
2011	15.43	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	0.37
2012	28.01	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	0.00
2013	12.90	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	0.00
2014	28.25	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	0.00
2015	8.81	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	0.00
2016	32.31	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	0.04
2017	21.03	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	0.20
2018	7.85	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	0.03
2019	26.57	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	0.00
2020	19.28	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	29.70
2021	163.35	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	43.36
1995	71.77	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.08
1996	82.47	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.02
1997	82.90	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.11
1998	115.95	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.52
1999	150.32	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.73

2000	136.43	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.98
2001	138.74	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	1.12
2002	157.48	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	0.93
2003	165.41	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.74
2004	134.85	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	0.75
2005	124.66	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	1.04
2006	203.82	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	6.64
2007	212.74	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	0.65
2008	180.65	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	9.33
2009	504.51	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	13.61
2010	366.36	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	13.52
2011	431.92	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	34.17
2012	475.74	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	4.10
2013	563.84	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	2.75
2014	449.97	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	11.20
2015	384.54	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	6.87
2016	342.53	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	0.93
2017	287.20	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	0.54
2018	221.25	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	0.26
2019	425.98	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	0.52
2020	499.16	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	7.48
2021	401.62	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	13.70
1995	147.11	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.02
1996	134.80	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.12
1997	186.56	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.09
1998	203.53	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.69
1999	383.54	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.19
2000	413.14	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.29
2001	331.67	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	1.25
2002	331.06	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	1.25
2003	254.21	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.96
2004	221.91	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	6.43
2005	196.15	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	2.87
2006	561.20	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	4.94
2007	505.69	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	1.45
2008	813.36	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	76.00

2009	1,283.21	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	51.37
2010	901.47	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	54.26
2011	1,322.66	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	62.42
2012	1,472.51	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	36.25
2013	1,498.31	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	21.34
2014	1,503.01	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	18.16
2015	1,925.81	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	25.51
2016	2,188.67	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	25.98
2017	2,006.70	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	44.25
2018	1,965.07	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	21.25
2019	3,138.73	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	36.10
2020	3,373.22	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	33.53
2021	1,715.95	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	51.88
1995	63.43	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	1.33
1996	88.98	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.85
1997	95.33	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.71
1998	152.14	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.14
1999	159.67	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	1.89
2000	138.12	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	2.86
2001	119.88	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	3.19
2002	166.93	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	9.00
2003	193.95	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	5.92
2004	130.60	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	2.02
2005	106.29	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	3.44
2006	135.11	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	2.33
2007	86.18	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	0.51
2008	125.30	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	1.90
2009	324.74	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	3.40
2010	328.49	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	13.58
2011	317.52	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	4.19
2012	423.63	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	6.08
2013	471.67	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	5.10
2014	468.90	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	3.20
2015	523.29	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	3.05
2016	565.24	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	2.01
2017	558.27	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	1.98

2018	485.29	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	2.46
2019	584.87	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	3.77
2020	795.33	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	9.78
2021	763.55	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	10.35
1995	80.07	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.10
1996	89.58	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.10
1997	98.54	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.64
1998	113.31	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.32
1999	107.67	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.13
2000	109.01	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.52
2001	79.02	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	0.19
2002	82.25	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	0.26
2003	85.81	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.66
2004	65.94	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	0.61
2005	86.51	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	0.50
2006	88.30	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	0.66
2007	84.11	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	1.13
2008	152.54	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	1.86
2009	396.64	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	4.61
2010	360.47	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	3.43
2011	353.47	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	5.08
2012	330.48	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	2.94
2013	386.83	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	2.06
2014	423.08	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	1.95
2015	495.11	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	2.80
2016	506.75	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	3.25
2017	567.95	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	2.26
2018	450.38	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	3.40
2019	525.07	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	2.52
2020	569.78	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	15.57
2021	420.64	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	12.23
1995	20.55	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.05
1996	21.82	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.02
1997	18.94	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.01
1998	22.93	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.01
1999	31.28	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.00

2000	27.92	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.01
2001	21.62	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	0.06
2002	23.82	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	0.01
2003	31.03	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.07
2004	23.31	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	0.22
2005	32.86	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	0.38
2006	35.05	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	0.02
2007	28.18	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	0.20
2008	28.04	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	1.24
2009	75.68	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	1.15
2010	70.11	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	0.33
2011	71.57	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	0.12
2012	70.57	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	0.54
2013	77.20	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	0.19
2014	76.81	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	0.21
2015	78.48	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	0.14
2016	142.21	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	0.02
2017	151.07	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	0.35
2018	120.78	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	0.66
2019	132.00	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	0.15
2020	130.18	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	2.93
2021	76.96	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	8.82
1995	8.97	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.09
1996	8.25	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.02
1997	9.65	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.00
1998	14.25	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.08
1999	22.28	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.05
2000	14.12	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.01
2001	8.21	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	0.15
2002	6.32	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	0.04
2003	2.89	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.54
2004	3.75	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	0.07
2005	11.94	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	0.28
2006	7.59	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	0.00
2007	12.14	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	0.04
2008	17.25	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	0.47

2009	163.30	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	0.98
2010	227.94	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	0.48
2011	126.15	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	0.09
2012	474.81	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	0.01
2013	280.16	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	0.03
2014	165.25	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	0.12
2015	201.80	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	0.16
2016	164.40	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	0.15
2017	311.11	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	0.11
2018	188.05	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	0.15
2019	195.61	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	0.06
2020	100.12	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	28.11
2021	114.78	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	109.27
1995	88.84	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	5.77
1996	109.62	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	6.07
1997	127.10	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	2.76
1998	141.34	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	1.37
1999	104.00	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.47
2000	80.75	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.91
2001	62.84	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	6.32
2002	62.16	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	1.35
2003	0.04	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	1.22
2004	70.92	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	3.34
2005	71.03	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	1.59
2006	80.16	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	1.18
2007	97.28	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	1.67
2008	127.51	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	9.24
2009	254.89	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	17.13
2010	240.59	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	18.59
2011	253.00	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	26.84
2012	364.88	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	25.89
2013	479.50	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	40.94
2014	499.99	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	142.41
2015	470.51	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	55.51
2016	474.41	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	23.47
2017	493.05	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	23.87

2018	506.15	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	96.70
2019	641.39	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	280.01
2020	618.68	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	215.57
2021	310.27	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	277.36
1995	2.07	542.03	11,739	0.21	4.58	1,256.00	3,444.14	60,159.25	0.00
1996	6.27	622.15	13,020	0.21	4.60	598.00	3,534.49	67,629.72	0.00
1997	2.75	764.14	13,168	0.21	4.67	636.00	3,907.97	78,436.58	0.00
1998	0.44	961.81	16,479	0.20	4.81	890.55	3,195.26	84,828.81	0.02
1999	1.70	921.92	15,962	0.20	4.81	1,076.00	3,500.90	90,710.70	0.00
2000	2.19	768.78	14,018	0.19	4.81	1,065.30	4,710.27	99,838.54	0.00
2001	1.02	831.74	12,779	0.19	4.81	1,235.00	4,159.62	96,684.64	0.00
2002	0.43	734.17	12,552	0.23	4.81	509.90	4,682.69	85,146.07	0.00
2003	0.52	652.24	11,230	0.23	4.81	646.90	6,349.02	80,288.46	0.00
2004	0.26	641.36	12,864	0.23	4.95	237.40	7,693.66	78,782.47	0.00
2005	3.33	1,114.72	19,847	0.27	4.67	1,253.30	10,661.76	89,600.67	0.00
2006	2.37	1,027.76	20,648	0.24	4.79	5,375.60	13,755.06	107,426.09	0.00
2007	0.60	1,446.22	27,079	0.26	4.00	10,042.80	16,194.78	130,437.83	0.00
2008	1.29	3,021.45	53,596	0.26	3.68	11,578.10	26,335.16	162,818.18	2.44
2009	9.32	2,506.57	45,430	0.27	3.76	9,494.60	24,213.37	189,147.01	0.43
2010	6.14	2,898.25	53,003	0.43	3.65	6,711.60	26,331.84	218,983.67	2.84
2011	6.53	3,651.16	62,282	0.43	3.54	6,385.60	31,582.44	235,989.67	0.05
2012	10.52	3,778.41	69,866	0.53	3.34	-482.70	29,417.01	279,116.67	1.06
2013	8.00	3,642.10	66,666	0.51	3.37	2,797.70	28,779.41	288,434.11	0.29
2014	26.85	4,128.99	71,338	0.64	4.12	4,192.20	26,812.20	305,595.41	0.25
2015	40.64	4,453.94	73,998	0.64	4.25	4,612.20	21,858.77	329,366.58	1.43
2016	37.42	4,400.07	70,670	0.72	3.93	6,925.20	22,973.37	332,441.72	0.01
2017	3.70	3,950.57	66,768	0.71	4.05	8,106.80	26,434.04	235,733.70	0.21
2018	5.74	5,700.04	82,445	0.68	3.33	7,408.70	29,483.04	249,713.00	0.03
2019	29.83	6,117.10	77,310	0.72	3.33	8,141.30	30,828.83	303,080.87	3.60
2020	11.34	3,985.27	60,280	0.84	2.61	9,010.10	26,815.14	365,252.65	0.00
2021	18.14	5,665.56	73,781	0.96	2.48	5,851.80	40,701.70	404,142.77	0.00

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.442371					

R Square	0.195692					
Adjusted R Square	0.168194					
Standard Error	29.93396					
Observations	243					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	8	51014.62	6376.827	7.116661	2.01E-08	
Residual	234	209673.8	896.042			
Total	242	260688.4				

Egypt Manufacturing Case

Year	High Tech Imports (Million USD)	High Tech Manufacturing %
1990	493.37	23.38
1991	557.32	22.29
1992	691.74	16.84
1993	697.50	18.75
1994	483.04	27.46
1995	542.03	25.13
1996	622.15	28.39
1997	764.14	31.00
1998	961.81	36.82
1999	921.92	36.23
2000	768.78	36.19
2001	831.74	32.18
2002	734.17	32.49
2003	652.24	32.18
2004	641.36	27.36
2005	1114.72	28.97
2006	1027.76	25.75
2007	1446.22	25.71
2008	3021.45	25.71
2009	2506.57	24.26

2010	2898.25	23.84
2011	3651.16	21.32
2012	3778.41	20.76
2013	3642.10	18.09
2014	4128.99	14.03
2015	4453.94	18.49
2016	4400.07	20.04
2017	3950.57	20.94
2018	5700.04	20.94
2019	6117.10	20.94
2020	3985.27	21.90
2021	5665.56	21.80

S U M M A R Y OUTPUT					
Regression Statistics					
Multiple R	0.590664069				
R Square	0.348884042				
Adjusted R Square	0.327180177				
Standard Error	4.84161148				
Observations	32				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	376.8112785	376.8112785	16.07474237	0.000372175
Residual	30	703.2360518	23.44120173		
Total	31	1080.04733			

دراسة العوامل الرئيسية المؤثرة على صادرات التكنولوجيا الفائقة فى مصر

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تهدف هذه الدراسة إلى وضع نموذج استراتيجي فعال للابتكار فى مصر من وجهة نظر صادرات التكنولوجيا المتقدمة، باعتباره مؤشراً جيداً لنواتج الابتكار. والتصميم المختار هو تصميم وصفي لتحديد العوامل الرئيسية التي تؤثر على الصادرات ذات التكنولوجيا العالية بوصفها علامة حاسمة على قدرة الاقتصاد على الابتكار. واستخدمت الدراسة المؤشر العالمي للابتكار كمصدر رئيسي للبيانات، وبحثت أهم العوامل المؤثرة فى صادرات التكنولوجيا العالية عبر مختلف فئات الدخل. نظرا لتأثير مستوى الدخل على قدرة الأمة على تصنيع وتصدير المنتجات ذات التكنولوجيا العالية. وقد أعطى ذلك فكرة عامة عالمية عن الاختلافات بين العوامل التي تؤثر على البلدان وفقا لانتمائها إلى فئات الدخل. ومن هذا المنطلق، أخذت الدراسة النتائج المكتشفة فى التحليل الذي أجري على فئة الدخل التي تنتمي إليها مصر، وتأكدت من صحتها فى دراسة حالة مصر. وأضيف منظور آخر إلى الدراسة، للوصول إلى ميزة أخرى للصناعات ذات التكنولوجيا العالية، وهي الصناعات التحويلية ذات التكنولوجيا العالية. وبحثت الدراسة أهم العوامل المؤثرة فى الصناعات التحويلية ذات التكنولوجيا العالية فى مختلف فئات الدخل، وأكدت النتائج الواردة فى دراسة الحالة المصرية. ومن المنطقي أن تعكس المعدلات الأعلى للصادرات ذات التكنولوجيا العالية معدلات أعلى للصناعة التحويلية، وقد ظهر

ذلك فى نتائج مجموعة الدخل التي تنتمي إليها مصر. ومن غير المتوقع أن تكشف التحليلات المجمعة فى دراسة حالة مصر عن وجود علاقة مختلفة بين الواردات من التكنولوجيا المتقدمة والصادرات من التكنولوجيا العالية والصناعات التحويلية من التكنولوجيا العالية.

استراتيجية الابتكار، الصادرات عالية التقنية، الاقتصاد القائم على المعرفة