THE MINISTRY OF EDUCATION OF THE REPUBLIC AZERBAIJAN

THE CORRELATION BETWEEN INNOVATION ECONOMY (TECHNOLOGICAL INNOVATION) AND ECONOMIC GROWTH

RAFAEL YUSUBOV

AZERBAIJAN STATE UNIVERSITY OF ECONOMICS

JUNE 2018

Table of Contents

2 Introduction: 4

2.1 Popularity of relation between Innovation and sustainable growth: 4

2.2 Importance of Technological Innovation: 4

2.3 Importance of Research and Development: 5

2.4 Theories about Innovation: 6

Chapter I 7

3.0 Theoretical Literature 7

4.0 Empirical literature 9

4.0 Solow model 12

4.1 Consumption and Saving Function: 14

4.2 Capital accumulation per worker: 15

4.3 Solow's stationary balance: 16

4.4 The Golden Rule of Capital: 17

4.5 Population increasing and Growth: 19

4.6 Solow Artifact - Technological Development and Growth: 20

4.7 Solow Model and Convergence 20

4.8 Summary of Solow model: 21

CHAPTER II 22

5.0 Empirical Relation between R&D and Economic Growth 22

6.0 The Relationship between Technological Development and Growth 26

6.1 Characteristics of Transition Countries 26

6.2 Reasons of different performance: 27

6.3 Role of technology and human capital on transition countries: 28

Table: R & D and Innovation Indicators in Transition Economies 28

6.4 Innovation capacity index: 29

7.0 Innovation and Research & Development 29

7.1 Innovation and economic growth: 30

7.2 R&D and development 30

CHAPTER III 32

8.0 Regional Innovation System 32

8.1 Regional innovation system: 33

8.2 Theoretical approaches to regional dimension of innovation systems: 34

8.3 Main reasons that regional innovation systems are important: 34

9.0 Innovation climates in developing countries 35

9.1 Significant shortcomings in the general condition: 35
9.2 Innovation systems 36
9.3 Innovation processes: 37
9.4 Innovation needs and opportunities in developing countries: 38
9.5 Local improvements: 39
9.5.1 Gas burning techniques in Africa: 40
9.6 Development of competitive industries: 40
9.7 Innovations of global significance: 41
9.8 From foreign technologies to indigenous knowledge: 42
9.9 Indigenous Knowledge: 43
9.10 Low-income countries: 44
9.11 Medium-income countries: 45
9.12 High-income countries: 46
9.13 Multi-level situations: 46
9.14 Stimulating and supporting enterprise innovation: 47
9.15 Flexible and autonomous agencies: 48
9.16 Mobilizing local communities: 48
9.17 Research and technology infrastructure: 48
9.18 The legal and regulatory environment: 50
10 Conclusion and suggestion 52
10.1 What can be done to transform into a R & D and innovation-based economy? 54
References: 58

2 Introduction:

2.1 Popularity of relation between Innovation and sustainable growth:

Nowadays, there is intense competition in international markets. In this case, the main targets of the countries are sustainable growth and the superiority of foreign trade. Innovation and R&D activities are the main factors that countries need to achieve these targets. By making it possible to produce innovative products and services, R&D expenditures provide long term growth and competitive advantages for countries. The emphasis on R & D and innovation-based development process in the world and Azerbaijan in recent years and thanks to the public incentives given major distances have been traversed.

2.2 Importance of Technological Innovation:

Essentially, technological innovation / change economics academic studies dealing with the effects on processes are not new. Marx and From Schumpeter, many researchers and academics are change, production efficiency, profitability, capital accumulation, national many positive effects have been addressed, and numerous studies they put. While some of them deal with technology as an internal dynamic others, such as externality and imitation, this phenomenon is exogenous in the long run they have interpreted it as a variable. But it is a fact that, whether it is intrinsic Considered as an external variable, the general trend, technological innovation and R & D activities have led to positive results in the context of economic development. The aim of this study is to explore the relationship between R & D, innovation and economic development is to present a condensed summary of Azerbaijan case.

Research and Development (R & D) concept has been widely used recently. R & D investments are activities aimed to produce a new

product to increase the sales and profitability of firms when micro-oriented. When assessed from a macro point of view, it includes the activities that countries do in order to excel in foreign trade. Nowadays, when competition is on a nation-by-country basis or on a business-based basis, it is imperative to innovate to gain superiority to competitors. Innovation is the entirety of technical, industrial and commercial steps in creating a new product or process, from scientific research to discovery, development and commercialization. Innovation is the discovery of innovation and the successful adaptation of the market. Innovation involves processes, products, services and technology (Brown and Jan, 2004: 2).

2.3 Importance of Research and Development:

R & D is an important part of innovation. Innovation can be defined as the application of new or significantly improved and upgraded goods, service processes or new marketing and organizational methods in various business lines, workplaces and external relations. Innovation has three main purposes. These; the ability of the business to survive, the presence of the business leader in the market and the increase in profits.

In today's world, the importance given to R & D to be unique and make a difference day by day. Accordingly, the R & D share of the enterprises is increasing in the budget. In order to provide the best response to the client's needs, the business establishes and maintains substantial departments in the R & D departments. Countries and firms gain cost advantages by making R & D investments. The advantage obtained in cost affects profit positively.

2.4 Theories about Innovation:

Economic growth, per capita Real Genius Safi Domestic is defined as continuous increase. Before the industrial revolution the per capita income for centuries in the global sense almost never changed. After the industrial revolution there is a significant increase in per capita income in the global sense It was observed. This is because many researchers scientifically to find a satisfactory answer to the question of what to work. Smith's free trade, division of labor and specialized work, Ricardo's declining yield law based distribution and growth studies, Malthus' population and growth studies are the first individual made in the field of economic growth working parties. Expressed as the first wave in growth theories and Harrod-Domar, who emerged after Keynes's "General Theory" growth model built on savings-investment-capital accumulation-growth It was. In this model, where technological progress is ignored, economical Growth saves resources and is therefore expressed as investments It was. In 1956, the growth and development In the Neoclassical growth model, which is expressed as the second wave in theory technology, an unexplained phenomenon of growing labor and capital inflows have been expressed as surplus. In this model, economic growth income growth) is an external variable in the steady state it depends on progress. The 1980s and the theory of growth In the inner growth models expressed as the third wave The sources of growth are explained in the model. The Romer revealed, R & D activities and innovations based thereon constitute the source of economic growth The summarized work has been the guide of our work.

Chapter I

3.0 Theoretical Literature

Since it is closely related to the level of social prosperity, a lot of academic work has been done on the sources of the economic growth in the last century. New technologies have an important place in many growth theories starting from classical economists to day-to-day. The famous theory of Schumpeter (1943), a theory of growth that does not involve innovations (new technologies), resembles Hamlet, which is not a Danish prince (Gülmez and Ekoglu, 2012: 336).

Schumpeter (1943), one of the first economists to emphasize the importance of innovations in economic growth, explains that new technologies will destroy old technologies from the other side while enhancing social welfare with the concept of "creative destruction"

The Harrod-Domar growth model, which investigates whether Keynes's static analysis is valid in a dynamic-growing economy, is a source of savings-investment-capital accumulation that grows with the assumption that technology has not changed. In two different works in 1937-1939, Harrod emphasized that in his study in 1946, Domar, as Keynes said, is not only increasing demand for investments but also increasing production capacity. Under the assumption that the ratio of capital to product in the model based on multiplying and accelerating mechanisms has not changed, economic growth is determined by the accumulation of capital. The financing of investments that lead to capital accumulation in a closed model is national saving.

In Solow's 1956 Neoclassical Growth Theory, technology has been expressed as a residual-balance, although it has the most important share

in economic growth. In his work covering the fifty-year period for the US economy, Solow has not been able to explain in a model how technology is produced, although the part of economic growth that is not accounted for by labor and capital inflows is due to technological progress. In the Basic Solow Model, where technology has not changed, there is no intensive growth while there is widespread growth due to the population growth that is external to the stationary state balance. In the General Solow Model, where technology is external and constantly increasing, there is intense growth as well as widespread growth in the steady state equilibrium. It is the technological progress that is regarded as externally, which enables the growth to be intense.

The inability to explain the technological development, which is the main factor for long-term economic growth, to the neoclassical model reveals theories of internal growth as a reaction to the neoclassical growth model and its assumptions. In summary, the theories of internal growth of Romer (1986, 1990, 1994) and Lucas (1988) differ from the Neoclassical growth theory in three points: first, economic growth is a product of in-model elements, not a consequence of forces externally affecting the system; Secondly, technological development is not external, but occurs within the economic system. The third is that undercompared competition in the inner growth models is equivalent to the full competition market in the Harrod Domar and Solow models.

Romer's model, one of the foremost and most important of internal growth models, is built on R & D activities and innovations. According to Romer, the engine of long-term economic growth is technological innovations and technological innovations in an economy arise as a result of R & D activities. According to Romer, there is a strong correlation between R & D, innovation and economic growth.

Romer, in your academic studies; The R & D sector has revealed the intrinsic nature of technology with its three sector models, namely the intermediate goods sector and the final goods sector. According to the model, the inputs of the R & D sector are qualified labor and knowledge. The output of this industry is patents taken. When R&D activities are invented as a result, this invention is patched and patents are sold to a monopolistic firm operating in the search industry. The monopolistic firm operating in the search industry is offering sales in the final goods sector by producing the patronized product (innovation- novelty). Romer explains the emergence of innovations in this way in the model. However, the information in the model is an entry that can not be completely excluded. In the event of an innovation, the inability to fully exclude even patent protection will cause information to flood and accelerate the emergence of new inventions with the expansion of the pool of knowledge (the effect of stopping on the shoulders of the giants).

The theoretical background of this study is; R & D activities are based on the Solow model, which can be summarized as the emergence of new inventions, the emergence of new inventions as a result of the acquisition of new inventions, innovation, and innovations as the source of economic growth, and on the middle and upper middle income countries.

4.0 Empirical literature

The empirical literature of economic growth theory is quite extensive. A number of academic studies were conducted in which the only single country in the literature survey was studied or many countries were examined. Some academic studies have focused on R & D expenditures, patent numbers and growth relations, while some have searched for a short and long-lasting relationship between R & D spending and

economic growth. All of the academic studies mentioned above have been tried to be examined in the literature search we made.

Lichtenberg (1993) analyzed the relationship between R & D spending, productivity and economic growth financed by private and public sectors in the study of 74 countries from 1964 to 1989. In his study, he found a positive and meaningful relationship between R & D expenditures financed by the private sector and growth and productivity. In his study, R & D expenditures financed by the public sector have reached the point where there is no effect on economic growth.

Goel and Ram (1994) 18 and 34 underdeveloped countries in the 1960-1980 period, a long-term relationship between R & D expenditures and economic growth was found to be significant but the direction of causality could not be determined.

Park (1995) investigated the relationship between R & D expenditure and the increase in factor productivity in the OECD countries study covering the period 1970-1987. In the study it was stated that the R & D investments of the local private sector were an important determinant of the increase in total factor productivity, ie both local and foreign factor productivity.

Coe and Helpman (1995) examined the relationship between total factor productivity, domestic R & D activities and R & D activities abroad in the study of 24 countries from 1971 to 1990. The authors have concluded that all variables in the study are cointegrated relations with each other and that both domestic R & D activities and foreign R & D activities are a strong and meaningful relationship with the total factor productivity.

Freire-Serén (1999) examined the effect of R & D expenditures on economic growth in the OECD country's 1965-1990 study. A strong

positive correlation was found between R & D expenditure and growth in the study and a 1% increase in R & D spending resulted in an increase of 0.08% in real domestic income.

Guellec and van Pottelsberghe (2004) in the work of 16 OEC countries in the 1980-1998 period, the R & D activities carried out by the private sector, the public sector and the foreign firms have had an impact on productivity growth. As a result of the study, they pointed out that the increase in productivity over the long term of all three R & D activities is a significant determinant.

Falk (2007) investigated the effects of R & D expenditures and R & D investments on high technology on per capita income in the OECD countries' 1970-2004 study. As a result, the increase in R & D expenditures and R & D investments in high technology has resulted in a strong and positive impact on GDP per capita and per capita GDP.

Samimi and Alerasoul (2009) analyzed the relationship between R & D expenditures and economic growth in 30 emerging countries' studies covering 2000-2006 period by panel data method. As a result of the work they found negative and meaningless relationships throughout the panel. They are underlining the need to upgrade R & D activities for R & D spending despite specify whether any positive impact on economic growth, achieve a higher economic growth rate of developing countries such as Azerbaijan.

Alene (2010) investigated the growth / productivity increase in agricultural production of agricultural R & D expenditures in the study of 52 African countries covering the years 1970-2004. The study concluded that agricultural R & D expenditures had a positive and significant effect on growth / productivity growth in agricultural

production. The author found the national income elasticity of agricultural R & D spending as 0.20. That is, a 1% increase in agricultural R & D spending boosts agricultural production by 0.2%.

4.0 Solow model

The model developed by Solow in 1956 is also known as neoclassical growth model. The basic assumptions of the model are as follows.

In the economy a single homogeneous commodity is produced. The economy is closed to the outside and there is no government. The Cobb Douglas type production function is valid and has a fixed return on a scale basis. The law of reduced yield for labor and capital is valid. Economy is full employment and full competition conditions apply Economies of the economy equals savings. Labor and capital inflows can be substituted Economy externalities are not the issue. In the model the convergence hypothesis is valid. Under the same conditions, underdeveloped countries grow faster than developed countries.

The level of technology in the basic model is fixed Production function: In the model firms produce output using three inputs: capital, labor and technology. Assuming that the technology is constant, the output is determined by the inputs of capital and labor. Accordingly, the production function is expressed as follows.

$$Y= f(K,L) =K^{a}. L^{1-a}$$

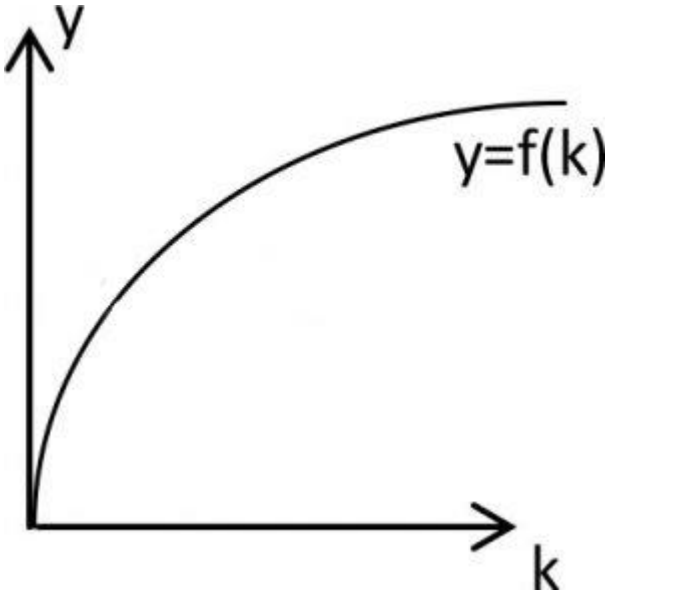
In the model, it is assumed that every person in the economy is a worker at the same time, there is no difference between the amount of labor input (L) and the population (N), and therefore the labor input growth rate is equal to the population growth rate (n). Solow defines the function

per worker by dividing both sides of the production function by the amount of labor in the Solow model.

$Y=f(K,L) \Rightarrow Y/L=F(K/L \,.\, L/L) \Rightarrow y=f(k)$

The production function expressed as y = f (k) is the output function per worker. In the function y expresses the level of output per worker, k expresses the amount of capital per worker. Accordingly, output per worker is a function of capital per worker. And the number of employees is independent of the number of jobs. Under this condition, the output level per worker in the model can be shown as follows with the aid of the figure.

In the case of the law of diminishing returns for capital, the increase in output per worker is not constantly increasing. When the amount of capital per worker (k) increases by one unit in the model, the output level per worker increases as much as the marginal product of the capital. At the same time, any point in the *production function* equals the marginal product of the capital.



Solow Production Function

4.1 Consumption and Saving Function:

Under the assumptions that it is closed and out of government, the output or income level is used for consumption and investment purposes.

Y=C+I

Moving from this, the output per worker is equal to the sum of per capita consumption and investment per worker.

Y/L= C/L+ I/L

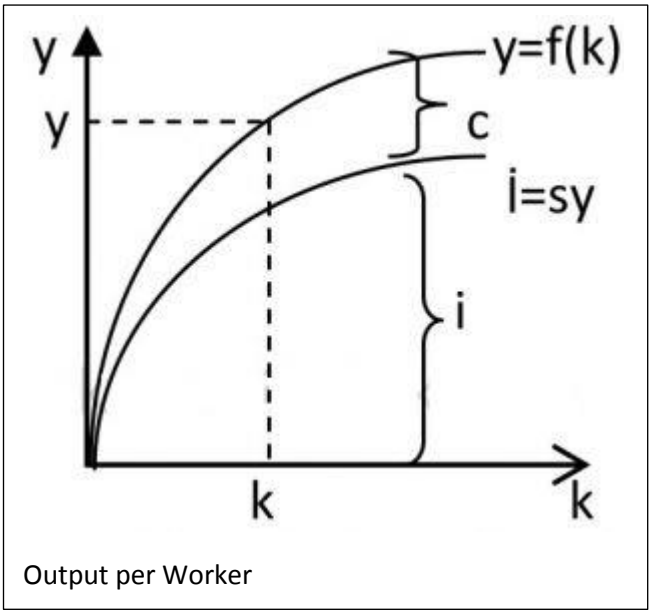
C=(1-s)Y ⇒ C/L= (1-s) Y/L ⇒ C=(1-s)y

If we replace the last equation obtained in the per-worker output function.

Y=c+i ⇒ y=(1-s)y +i ⇒ i=sy

i = s.y expresses the investment function per worker, while the saving equals to the product of the output per employee. Equation also refers to the level of savings per worker at the same time, since the assumption is that investment equals savings at the same time. According to this, investments are a function of output per worker while saving money is a data. This situation is expressed as follows with the aid of the figure.

The output per worker is expressed as y = c + i and the investment per worker (at the same time the level of savings) is seen.



4.2 Capital accumulation per worker:

The rate of population growth in the model indicated by n, where the depreciation of the capital is denoted by d, the capital accumulation per worker is written as follows.

$\Delta k=sy-(n+d)k$

By equality, the change in the level of capital per worker (Δk) equals the difference between investment per worker (sy) and the decline in capital per worker depreciation due to population growth $(n + d)k$.

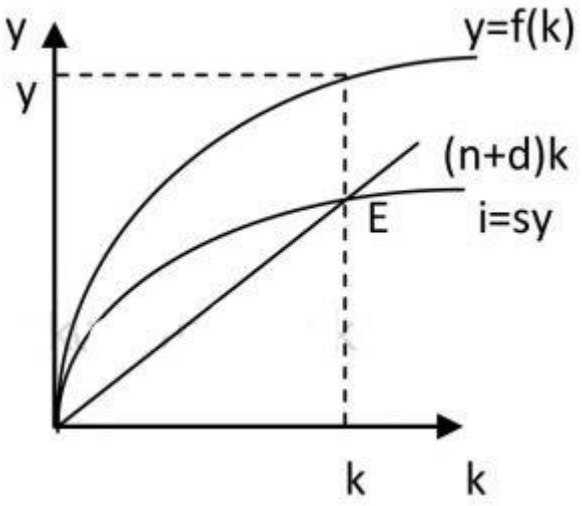
- If the investment per worker in the economy is greater than the decline in capital per worker due to the depreciation of the capital and population growth $(sy > (n + d)k)$, growth per worker will occur while the amount of capital per worker increases. This situation is called capital deepening.
- In the opposite case, the investment per worker is smaller than the decline in capital per worker due to capital depreciation and population growth $(sy < (n + d)k)$. The amount of capital per worker will decrease.

- The situation in which the investment per worker in the economy is equal to the decline in labor due to capital depreciation and population growth $(sy = (n + d)k)$, that is, the capital per worker does not change $(Ak = 0)$ is called the steady state balance.

In the steady-state balance, the level of investment in which the capital per worker is fixed is called the necessary investment or break-even investment. Breakeven investment equals to the value of $(n + d)k$ term. Since the amount of capital per worker does not change in the steady state equilibrium in the Solow model, the output level per worker will not change $(\Delta k = 0)$, so growth per worker will be equal to zero.

4.3 Solow's stationary balance:

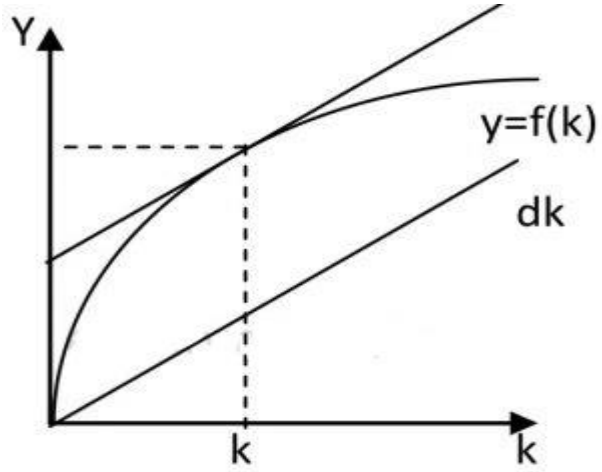
This is shown on the next picture. This situation, where the level of capital per worker does not change ($\Delta k = 0$), is equal to the decrease in capital per employee due to capital depreciation and population growth ($sy = (n + d) k$). This point is provided at the E point of investment per worker and break-even investment function.



Steady State Balance

4.4 The Golden Rule of Capital:

Consumption per worker represents the maximum. level of capital that stands still.



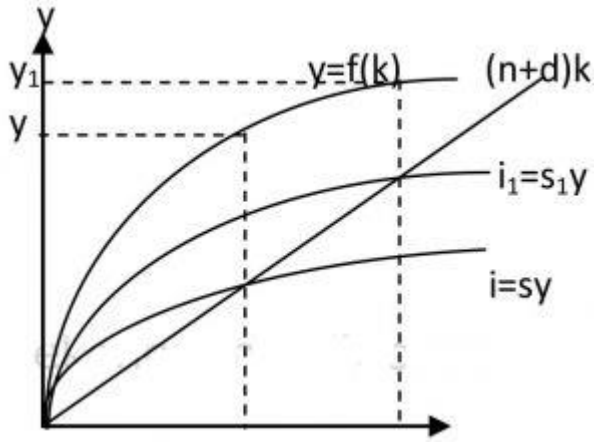
The equilibrium state where the maximum expenditure per worker is balanced is represented by the point where the gap between the output function per workforce and the investment function per worker is the greatest. This point is indicated by a line parallel to the investment function per worker and tangential to the output function. At this point, the capital, output, consumption and saving of gold is provided.

According to the figure, the rate of population growth in the economy of the capital does not have the gold prime level, the marginal product of the capital is equal to the trend of wear is achieved.

MP_k=d

Saving increasing and Growth: The level of savings in the Solow model is the main determinant of the stationary state capital stock and hence the per capita output level. According to the Solow model, if the savings rate in the economy increases, it has a greater capital stock and output level.

However, this growth will continue until a new steady-state situation is reached.



If the steady-state equilibrium at the beginning is E at the beginning, then if the savings rate increases from s to s1, then the investment per worker curve will shift upwards to level i1 from i. In this case, the level of capital per worker will go from level k to level k1, while output level per worker will rise from level y to level y1.

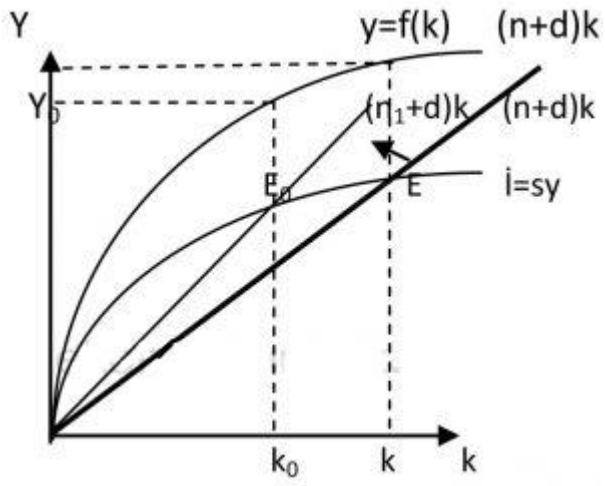
It is necessary to state that this growth is not continuous, while the amount of capital per worker and the output level per worker increases with the increase in the saving rate.

Growth per worker, which will be driven by the increase in savings, will come to an end when a new steady state situation in the economy comes to an equilibrium.

In the model, the increase in savings leads to growth in the short term per worker, while in the long run the growth of the stationary situation and the increase of the capital stock is called Solow Paradox. The higher the savings in a country than in the Solow model, the higher the level of capital and output per worker in the stationary state in that country.

4.5 Population increasing and Growth:

The increase in the population growth rate causes the investment function to shift to the left and decrease the output per capita and labor per worker. Population growth will affect growth negatively. In countries with high population growth rates, the amount of capital per worker is lower, while countries with a rapidly growing population grow more slowly.



With the head-to-head investment line shifting to the left, the economy's stationary state balance will come to E0 from E point. At this point, growth per worker in the economy is still zero. However, with the increase in the population growth rate, the level of capital per worker and output per worker is decreasing in the economy's new steady state equilibrium.

In an economy where there is an increase in population, the capital of the capital is provided by the fact that the marginal product of the capital is equal to the sum of the increase in population and the increase in population.

$MP_k=d+n$

4.6 Solow Artifact - Technological Development and Growth:

In the Solow model, it is analyzed from which elements the increasing level of output with technological development is analyzed as follows. The analysis on the measurement of technological progress in the model is based on the production function. The production function in the model is expressed as follows.

$$\mathbf{Y= A\times K^{a} \times L^{1-}}$$

The a and 1-a parameters involved in the Cobb-Douglas production function are respectively the production elasticity values of capital and labor inputs, ie their proportions. The A parameter technology in the production function also expresses the total factor productivity. The growth rate of the production function is equal to the sum of the growth rates of each term in the function. In this case, the output growth rate of the economy is expressed as follows.

$$\mathbf{\Delta Y/Y=\Delta A/A \; . \; a \; \Delta K/K \; (1\text{-}a) \; \Delta L/L}$$

In the case of technology development, the capital is provided by the golden rule, the marginal product of the capital is depreciated, the population growth rate and the technological progress equal to the sum of the ratios.

$$\mathbf{MP_k= d+n+g}$$

4.7 Solow Model and Convergence

According to the Solow model, countries with the same savings rate, depreciation rate, population growth rate and technology level face the same steady state level and have the same output level per person. This means that the poorer than the countries with the same steady state balance, that is, the lower output per capita, will catch the other country

after a while. This phenomenon is expressed as an absolute unconditional convergence hypothesis. The absolute convergence hypothesis states that the poorest of the countries facing the same steady state will grow faster than the rich.

However, the two countries with the same output level and lagging behind their stationary status have a higher investment rate, and the country is growing faster than the country with low investment rate in the transition period to the stationary state. This phenomenon is called the conditional convergence hypothesis. According to the hypothesis, it is not a necessity for the poor countries to grow faster than the rich countries, nor is it necessary for the poor countries to catch rich countries. The growth rate of countries that increase the saving investment rate will always be higher.

4.8 Summary of Solow model:

Solow model contained by three specific factors on the economy and mathamatics of Solow model: eL- Labor force and e is the educated Labor, K- our factories and tools, A- Ideas(R&D) and demonstrate how regulate capita, labor, factories and etc.

Now lets put investment and depreciation on the same place. Depreciation is growing at the same rate as the capital stock grows. Each new unit of capital creates an eual amount of depreciation. When investment is greater than depreciation, that meant the capital stock must be growing. We are adding more units of capital than are depreciating. Bur as the capital stock grows, investment and depreciation they are on crash course to intersect. This is a steady state point. When we reached steady state of capital we have also reached steady state level of output. There is no doubt that higher level of education correlate with higher

level of economic output. But just like physical capital , human capital is subject to diminishing return. Now turn to what rescue countries from reach and catch their steady point and stop increasing economic growth. Can ideas keep us growing? Better ideas mean that we get more bang for our buck, more output from the same inputs of capital and labour. Alternatively, we can think about this as increasing our productivity. Henry ford , for example, took ideas from lots of other industries, like meatpacking, bicycle making and brewing and he combined them in a way that had never before used in the manufacturing automobiles. This novel combined of ideas sparked a dramatic increase in productivity. That is transformed the world.

The result of this model we face that International competition and sustainable growth have increased the importance of Research and Development (R&D) expenditure. So for this, a good R&D level is required for whole countries. The increase of the R&D level forms a basis for the innovation to move. The main scope of this study is to investigate the relationship between R&D and economic growth. In this educational thesis, firstly approach is analyzed about the innovation and afterward is focused on R&D expenditures and economic growth corresponding with innovation and their relative influence on some developing and developed countries in the world.

CHAPTER II

5.0 Empirical Relation between R&D and Economic Growth

By and large, interest in R&D has been viewed as one of the key techniques to secure mechanical potential, and along these lines

development and monetary development. Innovative work (R&D) incorporates inventive work embraced on a methodical premise keeping in mind the end goal to expand the load of learning, including information of man, culture and society, and the utilization of this supply of learning to devise new applications (Torun ve Cicekci,2007) . Accordingly, R&D speculation builds the likelihood of accomplishing a higher standard of innovation in firms and locales, which would enable them to present new and prevalent items as well as procedures, bringing about larger amounts of pay and development. Endogenous development demonstrate pioners, Romer (1990) and Lichtenberg (1992) have brought up that the connection between interest in innovation and R&D use prompts expands efficiency, and accordingly development (Bilbao-Osorio and Rodriguez, 2004).

In this specific situation, there are numerous investigations that endeavoring to clarify the connection between interest in R&D and development. Lobby (1996) is one of the scientists that uncovered in his article that interest in R&D is decidedly connected with firms' efficiency and benefit, and delivers a generally high private rate of return. Scherer (1982), Griliches and Lichtenberg (1984), Aghion and Howitt (1998), and Zachariadis (2003) give solid proof that R&D venture and development are emphatically related in the US economy (Rabiei, 2011).

In this specific circumstance, there are numerous investigations that endeavoring to clarify the connection between interest in R&D and development. Corridor (1996) is one of the specialists that uncovered in his article that interest in R&D is decidedly corresponded with firms' efficiency and productivity, and produces a moderately high private rate of return. Scherer (1982), Griliches and Lichtenberg (1984), Aghion and Howitt (1998), and Zachariadis (2003) give solid proof that R&D

venture and development are emphatically related in the US economy (Rabiei, 2011).

What's more, Sadraoui and Zina, (2009) inspected the dynamic connection between participation in R&D and financial development by utilizing the Generalized Moment Method and board information from an example of 23 nations in the vicinity of 1992 and 2004. Results recommended a positive and noteworthy connection between R&D collaboration and financial development for every one of the nations tested .

In addition, Griffith, Redding and Van Reenen (2004) asserted that innovative work (R&D) has two countenances. The main face is in invigorating advancement and second face is in encouraging the impersonation of disclosures by others. They investigated this thought experimentally utilizing a board of ventures crosswise over twelve OECD nations. They found that R&D is measurably and monetarily imperative in both mechanical make up for lost time and development.

Further, Wakelin (2001) broke down connections between efficiency development and R&D consumptions in 170 firms cited on the UK securities exchange. The examination discoveries demonstrated that a has a positive and huge part in impacting its profitability development.

Then again, Samimi and Alerasoul (2009) explored the effect of R&D on financial development in creating nations. They utilized an example of 30 creating nations for which the vital information is accessible for the period 2000 to 2006. As indicated by their investigations, the low R&D consumptions of creating nations have no noteworthy impact on monetary development.

In this sense, Ulku (2004) examined advancement impacts on per capita yields of both created and creating nations. She examined patent and R&D information for 20 OECD and 10 Non-OECD nations for period 1981 to 1997. As per the outcomes there is a positive connection between per capita GDP and advancement in both OECD and Non-OECD nations, while the impact of R&D stock on development is huge just in OECD nations with substantial markets.

Then again Zachariadis (2003) expressed that R&D power identifies with protecting, licensing to mechanical advance, and innovative advance to monetary development. He utilized yearly information on licenses, R&D consumptions, net yield and efficiency development. Following from this, his observational research comes about demonstrated that there is a positive effect between R&D consumptions, protecting and efficiency.

From an alternate perspective, Lerner audited huge changes in patent law in excess of 70 nations more than 150 years and related them with the quantity of licenses allowed in these nations. He found that reinforcing patent rights produced an expansion in patent recording and enable patentees longer to place licenses into impact (Pouris and Pouris, 2011).

A standout amongst the most imperative markers of development is number of workers in the R&D division. Analysts are the focal component inside innovative work frameworks. They are characterized as experts occupied with the origination and formation of new information, items, procedures, strategies and frameworks and also the individuals who are specifically engaged with the administration ventures (Griffith et. al., 2004).

Romer (1989) finds a positive connection between's the quantity of researchers in the territory of innovative work and the development rate of yield in an example of most created economies (Grossman and Helpman, 1991). Additionally, another examination made by Pianta showed that development positively affects creation and on work. As per Pianta this positive effect happens in light of the possibilities of new apparatus, new items, diminished costs, expanded benefits and speculation, higher profitability, salary impacts and general development of interest. Furthermore, Pianta additionally underscores that, for the propelled economies in 1990s, the segments demonstrating the most astounding rates of venture and development experienced more prominent development of yield and work (Pianta, 1998).

6.0 The Relationship between Technological Development and Growth

The level of technology possessed as a whole of the knowledge, skills, techniques and methods required for production leads to long-term growth as a competitive position indicator and to less favorable utilization of production factors than before. Thus, more output is generated by using the same amount of inputs, new production methods are formed, and efficient budgeting of resources is provided. With the increase of total factor productivity, institutional and management skills are increasing and products can be produced in line with consumer desires (Karşıyakalı, 2008: 23).

6.1 Characteristics of Transition Countries

The concept of transition economics is used to describe countries that have emerged from the collapse of the "corruption revolution" in Europe and the Soviet Union, and are in the process of transition from a planned economic structure to a market economy. In the past, organized economies were treated as transition economies because they were out of categories such as underdeveloped or developing countries and liberalization policies such as free trade and limited state intervention

were proposed for these countries. These policies towards the neoliberal approach are an element of the globalization process (Sakınç, 2005: 5).

After the disintegration of the USSR, 15 republics, including 3 Baltic States and 12 Independent States (CIS) members, came to the scene. Other transition economies under the influence of the Soviet regime are Central and Eastern Europe (CEE) countries. Besides these countries such as China, Lao People's Republic, Mongolia, Cambodia and Vietnam have experienced the transition period, but they have aimed market socialization, not liberal market of these countries.

The transition from central planning to the market economy is a broad process, including political, economic, social and institutional changes (Havrylyshyn, 2001: 54). Poverty, underdeveloped infrastructure, a strong and rigid command system, and the constantly growing public sector problems have been common features, although transitional countries have experience of different market economies. In central planning, the central authority gains importance, not the free will of the individual. In the market economy, the purchase and sale of goods and services, and production-consumption activities depend on the market mechanism. In this respect, transitional countries on the one hand have tried to restrict the state's duty to the economy, while on the other the economic institutions and the rules have put very important duties on the state in their efforts to harmonize with the market system. These countries have adopted policies based on liberal principles of globalization, such as alleviating the barriers to foreign trade and capital movements among countries (Dural, 2007: 34).

6.2 Reasons of different performance:

In the transition period, CEE countries performed better than CIS. CEE and the Baltic republics, which adopted the socialist system relatively late, differ from the CIS countries. The reasons for this are as follows (Krueger and Ciolko, 1995: 722-723):

- Geographical superiority and proximity to relatively developed European countries.
- The reform process begins earlier.
- Relatively clear economic structure and potential before the transition period.

- In the last days of the collapse of the Soviet Union, inappropriate economic conditions and the transition of CIS countries in high volume of external debt and turmoil.

The negative initial conditions led to a low level of growth in the CIS countries in the first years of independence. In subsequent years, the increase in commodity prices played an important role in the growth of growth rates. However, since it is not sustainable and growing based on natural resources, it has been observed that there have been declines over time.

6.3 Role of technology and human capital on transition countries:

Technology and human capital are the most important infrastructure components for the best transition of these countries. The concept of human capital is concerned with people's lives and freedoms and draws a framework for the human side of economic growth. It is not very meaningful to evaluate economic development in transition economies only considering income level. Because the transition to the market economy is still going on and the income level is not enough to determine the welfare of the citizens.

Table: R & D and Innovation Indicators in Transition Economies.

Countries	R & D expenditures Share in GDP (%) 2000-2013	Innovation Capacity Index 2005-2011
CEE COUNTRIES	**0,81**	**3,4**
Bulgaria	0,504	2,87
Czech Republic	1,319	4,19
Hungary	0,938	3,54
Macedonia	0,258	2,78
Poland	0,65	3,38
Romania	0,441	3,04
Slovakia	0,584	3,17
Slovenia	1,738	4,42
Croatia	0,862	3,21
CIS Countries	**0,506**	**3,16**
Azerbaijan	0,245	3,61

Armenia	0,242	3,08
Russia	1,138	3,48
Belarus	0,693	-
Moldova	0,403	2,62
Ukraine	0,923	3,66
Georgia	0,194	2,62
Kazakhistan	0,213	3,09
Transition Economies	**0,658**	**3,28**

Note: Values close to 1 in the innovation index indicate that firms in the country acquire technology through licensing or imitation, while closeness to 7 indicates that they have acquired new products and processes under their own initiative.

6.4 Innovation capacity index:

The share of R & D expenditure in GDP and the Innovation Capacity Index for the transition countries subject to analysis in the table are presented as average values for years 2000-2013 and 2005-2011 respectively. Looking at the share of R & D spending in GDP, CEE countries seem to be in better position with an average value of 0.81%. In particular, R & D spending is higher in Slovenia, the Czech Republic and Hungary. Although R & D spending in CIS countries is relatively limited, Russia rises to 1.13% in these countries. The lowest value for this indicator is in Georgia with 0.19% of CIS countries and 0.25% of Macedonia among CEE countries.

According to the index of innovation capacity, CEE countries are better. The country with the highest index value in this respect is Slovenia with 4.42, Czech Republic with 4.19. In the CIS countries, Ukraine is 3.66 and Azerbaijan is 3.61. Moldova is the country with the lowest index value.

7.0 Innovation and Research & Development

In the Oslo Manual published jointly by the OECD and the European Commission, the innovation is "a new or significantly modified product

(goods or service) or process; a new marketing method; or a new organizational method in business practices, workplace organization or external relations ".

7.1 Innovation and economic growth:

Innovation is considered to be one of the most fundamental elements of economic growth and development, and therefore prosperity and quality of life, for both countries and companies to gain competitiveness in the national and international arena, to increase productivity. According to the OECD's findings, the contribution of innovation in the economic growth of the developed countries especially in the last 25 years is more than 50% (Soyak, 2008).

Innovation and invention are concepts that are intertwined. The invention is the first time to develop an idea for a new product or production method. Innovation is the first commercialization of an idea. However, invention and innovation can sometimes be closely related and it can be difficult to distinguish one from the other. Biotechnology is an example of this (Fagerberg, 2003: 3).

7.2 R&D and development

R & D; It is made up of regular creative work to increase knowledge, including knowledge of society, culture and people, and to use it in new applications. In the narrow sense, R & D is the whole of systematic and creative works aimed at finding new products and production processes in enterprises (Demirci et al., 2006: 74). According to another definition, R & D activity can be achieved by obtaining new knowledge to develop science and technology, or by producing new materials, products or tools with existing information, creating new systems, processes and services, including software production, (Kavak, 2009: 619). The information

obtained as a result of R & D activities is used to develop a new product and production method and to uncover a new market. This information contributes to the development of firms by increasing their competitiveness. The information produced at a firm is rapidly spreading to other firms in the region thanks to technology and network systems, contributing to the development of the region.

R & D expenditure is a key indicator of the efforts of the private and public sectors to gain competitive advantage in science and technology. R & D includes creative work that increases knowledge stock, uses this knowledge for new applications, and is based on a systematic basis. R & D; basic research, applied research and experimental development. The basic research includes theoretical and practical studies to obtain new information under the phenomenon and observable facts, without any application or usage view. Applied research is also concerned with specific research conducted to obtain new information, but research is being conducted for specific practical purposes or targets. Experimental development is a systematic work and an activity in which research and practical experience is gained. These studies are based on producing new materials, new products or devices, developing new production methods or systems, or moving these already produced and developed processes to further dimensions. The share of R & D expenditures in GDP is used in international comparisons. R & D expenditures; domestic companies, research institutes, state laboratories, universities, etc. (OECD, 2010: 150), which is the sum of R & D expenditures made in places.

Despite the fact that university-industry cooperation is a very important issue for regional development, it is possible to say that our country is far behind the desired point in this regard, but the targets set forth in the future are promising in terms of understanding certain aspects of this

subject. As a matter of fact, although the share of R & D expenditures in GDP is 0.73% in 2008, the target of 2013 is set at 2%, which is an important sign (Akay,2009).

CHAPTER III

8.0 Regional Innovation System

Companies that target profitability and sustainable development through innovation have an impact on the innovation performances of the regions where they operate and the quality of the facilities provided to them. Innovation activities carried out in cooperation with external institutions, including competitors in a region; The decrease in R & D and market entry costs brings with it a variety of advantages such as reducing risks, securing scale economies, shortening the innovation cycle. It is possible to find out that the significance of innovation cooperation at the regional level is made for the Silicon Valley, which is the starting point of innovation-based regional development models: "Competition in the region required the need for continuous innovation; and continuous innovation has made cooperation between firms compulsory ". The existence of institutions that have the potential to cooperate in innovation in a region is very important. This means that there is a need to develop a system that is called a "Regional Innovation System" and which is designed to support the development and operation of businesses, universities and educational institutions, research institutes, public institutions, financing institutions, intermediary institutions (innovation and business support centers, technology transfer offices, etc.) (eg, technoparks, incubators, etc.) that support the technological

infrastructure, and a structure that is defined as an environment in which the interaction between them occurs (Elci et al., 2008: 13).

Regional innovation policy; is defined as policies and strategies applied to reduce the imbalances between the regions, to attract innovation-based firms and qualified labor force and to increase the competitive power of companies. Investments must be made in physical, social, human and financial capital that the region possesses so that a region develops in accordance with innovation and the level of wealth can be raised.

While firms in a region are able to increase their competitiveness in using new knowledge in product, service or production processes as a result of efficient R & D work, this can also make a significant contribution to the development of the region. Nowadays, as the prospect for the development of innovation grows, the consciousness of this situation has begun to give more importance to innovation. Within this scope, national and regional policies that will increase innovation activities have been determined. One of these policy tools is the regional innovation system.

8.1 Regional innovation system:

regional innovation, technology, networking, clustering and so on. it is a strategic approach used to build the foundations of tools. Nowadays, innovation has begun to be acknowledged, which is shaped by mutual interaction and with many actors such as technology-market-firm-client-supplier. The acceptance of the regional innovation system by the stakeholders in the region is the basis for regional planning studies and regional development operations. Moreover, in order to design regional innovation strategies, it is necessary to support the establishment of a system of regional innovation or the formation of a system that is

compatible with the strategy developed according to the situation (DPT, 2008: 32).

8.2 Theoretical approaches to regional dimension of innovation systems:

There are two theoretical approaches to explain the regional dimension of innovation systems: the first is the approach that establishes the relationship between closeness and information type and the interaction within the innovation system, and the other that emphasizes the relationship between innovation and the local environment. Regional development efforts based on increasing the competitiveness of the region, institutional development, development of innovation capabilities and intensification of regional cooperation need to be supported by the regional innovation system. The regional innovation system has three main actors: Supply, Demand and Mediator. While the supply side of the system (such as researchers, universities) creates the necessary information for innovation, the scientists and technologists (such as firms, innovator market) constitute the demand side. The actors (such as innovation support organizations, regulatory agencies, and financing institutions) that bridge the supply and demand sides form the intermediary of the system (Durgut, 2007: 8-10).

8.3 Main reasons that regional innovation systems are important:

There are two main reasons that regional innovation systems are important for countries: First, this system is a strong dynamic of innovation formation in regions to reach national innovation policy objectives. Second, innovation performance can contribute to the improvement of general economic competitiveness of regions by increasing firms' productivity (OECD, 2008: 1).

9.0 Innovation climates in developing countries

9.1 Significant shortcomings in the general condition:

Advancement atmospheres in creating nations are first hampered by shortcomings of other key components of learning based economies as characterized in the WBI four column system, specifically levels of instructive fulfillment, the business condition and the data foundation.

Instructive levels are low in creating nations, and, this is a noteworthy obstruction to the advancement and dissemination of development in these countries6. Actually, one can build up a reasonable connection between instructive necessities and the distinctive periods of industrialization. In the pre-modern stage, instructive requirements request just essential education. In the modern stage, more expert and medium-level abilities are required. In the post mechanical stage, there is a requirement for a critical offer of a populace with tertiary instruction, with whatever remains of the populace having at any rate useful education.

The impact of the nature of the business condition, connected to administration conditions, on advancement exhibitions is likewise obviously illustrated. In any case, there is a need to approach with some alert the energy about business condition. The quality ought to be seen from the viewpoint of nations themselves with their own qualities and social specificities. An absence of monetary straightforwardness isn't really an issue in various societies, as examined later. Then again, a bureaucratic atmosphere which powers a business person to acquire a hundred approvals to set up his/her undertaking is an issue, whatever the way of life being referred to. All the more for the most part, when judging the nature of a business domain it is of critical significance to go

past the formal appearance of laws and to look at how laws are connected by and by in assessing the pretty much casual relations controlling exchanges among financial operators.

At long last, there is the issue of an absence of foundation. Of essential significance is, obviously, the mobile foundation. The phone is the most critical apparatus for (potential) business people. Cell phone innovation has changed the states of media communications in creating nations. However, the tele-thickness stays powerless in various creating nations, mediocre compared to what might be viewed as the insignificant edge for take-off (around 30 percent). Advance made with cell phone innovation can prompt fast upgrades in availability, nonetheless it doesn't explain the need for more noteworthy web infiltration – something which remains very low in most creating nations. Infrastructural requirements for advancement in creating nations are, be that as it may, not constrained to media communications. Street and other transport foundation are of essential significance, and additionally sanitation, water, and different frameworks.

9.2 Innovation systems

As a result of this general hazardous condition, advancement frameworks in creating nations are ineffectively built and are exceptionally divided. On the venture side, by and large an expansive number of miniaturized scale undertakings work in the casual economy, and a pretty much vital number of outside based firms, which tend, be that as it may, to be separated from whatever is left of the economy.

On the learning side, there is for the most part a constrained research group, working ordinarily in an ivory tower, and a college framework inadequately associated with nearby substances, especially to work

advertise requirements and openings. Especially tricky are the absence of innovative help administrations and foundation (metrology, quality control, measures, and so on).

Open segment establishments have a tendency to be various, including those supporting the advancement of big business improvement, trade, outside speculation, and so forth. In this regularly packed emotionally supportive network, it is difficult to set up new, effective associations for the advancement of development. Where this is conceivable, the associations are once in a while proper, without the adaptability and drive significant for business.

These general conditions keep advancement frameworks into a low harmony trap. They are portrayed by low levels of R&D in the business area, with the greater part of national R&D exertion borne by the administration, and with sketchy pertinence for the economy.

Because of a want not to agitate existing conditions and the inclination of key on-screen characters to keep profiting from personal stakes and secured circumstances as opposed to going out on a limb of unchartered waters, change is typically troublesome.

9.3 Innovation processes:

The conditions evoked above make innovation processes particularly difficult. Success stories present generally the following features:

- Ventures are borne by extremely inspired people or little gatherings of individuals who advantage from both a) the help of remote accomplices who get some back, innovation, or market system, and b) the help of neighborhood lawmakers – who are

very much established in national power systems, and who help to beat bureaucratic or institutional hindrances.

- Activities have a tendency to be amassed in all around characterized regions, as in the created world, where these individuals can discover, abuse or make a separated favorable position and after that produce, by their illustrations, a procedure of copying and replication among the encompassing groups. The underlying separating preferred standpoint can be identified with the nearness of a solid college (e.g. Bangalore in India, or Campinas in Brazil) or a dynamic modern group (Monterrey in Mexico), and may prompt endeavors of extensive importance. It can likewise be because of the nearness of a solid horticultural group, or a rich social heritage, as represented by various urban areas of the Third World which have turned out to be exceptionally powerful visitor goals.
- Dynamic, early ventures, and related business groups, are proficient section focuses into development frameworks; they can achieve change and animate required changes or speculations. In numerous nations, such passage focuses are regularly constituted by IT related enterprises and administrations which give the greater part of innovative novelty

It is on account of this foundation that suitable strategies must be outlined. The initial step is to have a clearer comprehension of what advancement implies in creating nations.

9.4 Innovation needs and opportunities in developing countries:

Development ought to be comprehended as something new to a neighborhood setting. This relativity to the setting is essential and

especially pertinent for creating nations. In a worldwide point of view three types of development can be recognized. The first identifies with neighborhood upgrades in light of the selection of advancements which are pretty much accessible worldwide or locally ("innovation appropriation" from a worldwide point of view). The second kind of advancement emerges in the working up of focused exercises with some adjustment made to existing advances ("innovation adjustment"). The third kind of advancement is the outline and generation of advances of an overall hugeness ("innovation creation" from a worldwide point of view).

9.5 Local improvements:

Right off the bat there is a significant need to enhance welfare conditions in creating nations, outstandingly with respect to medical problems (one ought to recollect that death rates have expanded in various nations because of HIV/Aids). Farming profitability and execution can likewise profit extensively from mechanical changes, as outlined by the green insurgency in India. So also, the dispersion of innovations and best practices in characterized portions of a given economy is the most proficient approach to expand the execution of firms, and to produce riches and employments.

There is, nonetheless, a should be practical about what is conceivable and the difficulties which stay to be tended to in specific settings, even with evidently exceptionally straightforward advances. An a valid example is the dissemination of gas consuming methods in Africa, as portrayed in the case beneath.

9.5.1 Gas burning techniques in Africa:

The dispersion of gas consuming procedures to warm family units in African towns set up of woodbased flames would have significant effect on individuals' wellbeing, timberland preservation, and so forth. Be that as it may, the broad presentation of such a procedure requires building up, without any preparation, conveyance frameworks of little gas tanks, making support shop arranges by encouraging getting by potential business people (conceivably through miniaturized scale fund), setting up controls to keep the utilization of wood, and building up a proficient implementation system. All these straightforward issues are at present distant for various African nations.

9.6 Development of competitive industries:

A moment type of advancement is the improvement of aggressive enterprises (counting administrations) which exploit separated favorable circumstances, for example, modest work, decent scene or social heritages (for tourism purposes). This requires the adjustment of advancements which are locally or internationally accessible. To a specific degree, the prologue to a nation of a movement (assembling or administrations) by a remote undertaking, to abuse shoddy work or different points of interest (closeness of dynamic markets), can be considered as a development for the nation in which this action happens, regardless of whether, in itself, there is just the same old thing new in this action.

To stay aware of the opposition and to bit by bit climb the esteem chain, enhancements will be fundamental in quality, showcasing, association, coordinations, and so forth and these can be considered as evident imaginative advances. It is even conceivable to create advancements of

overall essentialness in exceptionally focused enterprises, in exploiting those advantages imported by multinationals. For example in the auto business, imaginative plan in mono-space auto was produced by Turkey for Fiat (Doplo show) and by Slovakia for WW (Touran).

One may, be that as it may, question the broadness of chances offered to the greater part of creating nations with regards to the expanding pieces of the overall industry being taken by a couple of substantial nations, for example, China in the assembling area, and India in IT administrations. Also, with the improvement of broadcast communications and transport, there is an expanding instability of FDI, which is winding up progressively delicate to the span of the market and the nature of the business condition. This issue is examined in the area on testing worldwide patterns.

Note that various creating nations can, and should, misuse the interesting separating points of interest achieved by their climatic and land positions for tourism, and in addition by their social inheritances. This, be that as it may, requires supported endeavors for quality upgrade, the change of security, and framework improvement

9.7 Innovations of global significance:

Open doors for such advancements are less regular in creating nations, and have a tendency to be discovered more in medium-salary than in low pay nations. A few nations have likewise increased exceptional, extremely progressed logical or mechanical information which can be abused for the presentation of radical new developments. That is outstandingly the instance of Russia and various nations which profited from noteworthy R&D venture inside the previous Soviet coalition. The encounter appears, notwithstanding, that because of a poor

entrepreneurial atmosphere, these nations have not possessed the capacity to take awesome preferred standpoint of these circumstances.

Another type of advancement is the improvement of advances to fit the nearby conditions, the advancement of advances which meet the particular highlights and difficulties of creating nations. A run of the mill illustration is innovation which keeps up the self-governance of nearby groups, for example, independent wellsprings of vitality and ease proficient telecom framework and in this way keeps the destructuring of social orders through urban focus.

9.8 From foreign technologies to indigenous knowledge:

Obviousl forming nations should take advantage of the enormous information and innovation accessible worldwide by adjusting these assets to their necessities and capacities. They ought to compose themselves in result with proper components for exploring, screening and changing remote innovations, including by figuring out. The past experience of Asian nations shows the preferences to be picked up and advance which can be made by taping into Western learning and innovation and utilizing this as a wellspring of intensity.

Furthermore, creating nations have a particular resource as indigenous information getting from people groups' involvement, aggregated and transmitted over ages. This learning concerns numerous strolls of life and is an exceptionally important resource as a wellspring of advancement, both innovative and authoritative.

Truth be told advancement is frequently conceived out of the mixing of indigenous information with mechanical and hierarchical contributions from the created world. The key is to encourage the best possible misuse

or reconciliation of such indigenous learning and know-how in ventures significant to the nations concerned.

9.9 Indigenous Knowledge:

Indigenous learning in creating nations identifies with the know-how, strategies and advancement frequently non-recorded and held by neighborhood groups. This learning is immense and generally concerns: an) an extensive potential in biodiversity and treatment of ailments, and b) country information and customary cultivating strategies adjusted to nearby rural needs.

Notwithstanding the plenitude of Western pharmaceutical, customary healers stay key to the wellbeing framework in African creating nations. Over the African mainland, it is evaluated that customary healers deal with around 70 percent of all ailments. Such medications have ended up being exceptionally fruitful to the shock of numerous doubters who faulted customary healers of charlatanism. Customary healers have just helped world medication with their insight into home grown medicines, which could conceivably assume a basic part in characterizing antibodies and propelling world therapeutic information.

Advancement aspirations and approaches must be adjusted to levels of improvement and instructive bases. Contrasts in institutional capacities (solid, constrained, feeble) require likewise to be taken in thought.

Support ought to be at first centered around most encouraging locales and businesses to assemble an atmosphere of self-assurance through examples of overcoming adversity, and after that encourage a more extensive change process.

9.10 Low-income countries:

• In low-pay nations, where the institutional capacities are restricted, approaches should center around fundamental interest in innovation foundation and exhibit activities of "essential" developments which can add to upgrades in welfare, training, and farming. This is essential for setting up a dynamic innovation part and for advancing innovation drove advancement which goes past addressing the need to survive. A case is furnished by Uganda which started with a decent speculation advancement office, utilized particular favorable circumstances at a low innovation level (e.g. with developing blossoms and sending out them in European markets), made fitting changes in the instruction framework at all levels, and profit by rational help from contributors. In this manner Uganda has continuously possessed the capacity to construct a practical way toward advancement.

• Where institutional capacities are generally solid, there is the likelihood for a more far reaching, dynamic and organized approach. An illustration is given by Vietnam. A firmly explained approach was set up to grow new societies taking focal points of the climatic highlights of the nations: espresso, cotton, and so forth in giving the essential specialized help, arranging transport and coordinations for sends out. On the cutting edge front, incredible moves were made for building up a focused programming industry in chose specialties, in expanding on State possessed ventures and making great utilization of government acquirement. In the interim different changes were bit by bit actualized in numerous other key territories, for example, training, fund or exchange, making a more extensive condition more helpful for advancement.

9.11 Medium-income countries:

• For medium-pay nations with no S&T ability however with some institutional limit, strategies can center around cultivating the advancement of fresh out of the box new exercises – administrations and IT arranged – of world class. A decent illustration is given by Dubai which, by drawing in both remote financial specialists and an informed work constrain (prominently from the Arab nations and from India), has possessed the capacity to build up starting with no outside help an arrangement of web and media urban areas. Key for this was the vision and drive gave by the initiative and the foundation of effective offices ready to follow up on all fundamental frontsTP 17PT.

• For medium-salary nations with a generally solid S&T work compel yet low institutional ability (Russia, Argentina), the street ahead is by all accounts through the improvement of self-ruling development advancement foundations, oversaw as private division associations, and concentrated on setting up reasonable groups of inventive firms (along the lines of the Fundacion Chile as depicted later). A noteworthy issue looked by such nations is protection from changes, and troubles in changing existing RD associations and renewing the whole RD framework which is in rot. Therefore, there is a requirement for marshaling entrepreneurial capacities around existing innovative and logical resources, and drawing on the help gave by bodies which are light-footed and not got in the administration hardware.

• Lastly, in medium-wage nations with a solid S&T capacity and a moderately decent institutional ability (Chile, Poland), there is a need to enhance the science base. Open speculation can be prescribed as a way

to this end, giving that the business condition is sufficient for private area to put altogether in RD. The best approach to make the ST and instructive structures more receptive to advancement needs of the encompassing business groups lies in the difference in subsidizing systems.

9.12 High-income countries:

High-income nations are, from multiple points of view, stood up to by issues like those of medium-pay nations. These nations need to move to a more elevated amount of indigenous development execution. Ireland and Korea have been gone up against, each in their own particular manner, by this test. Ireland, which constructed its advancement framework to a great extent on FDI pulled in by solid motivating forces and a top notch instructive foundation, is tending to this test by trying to reinforce its examination base through gigantic speculation, strikingly through an as of late settled Irish Science Foundation. Korea, which had established its financial development and modern advancement in expansive aggregates (Chaebols), is trying to expand its science base and broaden its monetary structures through an incredible development drove territorial strategy approach.

9.13 Multi-level situations:

Issues turn out to be significantly more mind boggling while considering substantial nations which incorporate distinctive levels of advancement. Common cases incorporate China, India, Brazil and Mexico. Here, the key is to abuse dynamic locales of various levels of advancement and with separated near focal points efficient support for innovators

9.14 Stimulating and supporting enterprise innovation:

Making an atmosphere helpful for advancement in creating nations requires first the acknowledgment of the extremely exceptional nature and creation of the endeavor area. A huge piece of the segment is made of miniaturized scale ventures which are working in the casual economy and which have a low innovation competency, assuming any. A less critical portion is made out of SMEs with negligible mechanical capacities. An considerably littler portion is constituted of innovation equipped ventures. At long last, there is modest number of R&D rich undertakings.

What is essential is to have: 1) plans adjusted to the distinctive kinds of ventures, 2) plans handling the different needs: specialized, business, lawful, and so on. 3) plans installed in more extensive activities went for overhauling the general administration of ventures.

To the extent monetary help is concerned, this takes different structures and is for the most part given as appropriations for the essential strides of advancement ventures. At that point, for all the more exorbitant periods of improvement and commercialization, and when there is a littler danger of disappointment, subsidizing typically appears as reimbursable sponsorships or awards. In more complex conditions, there are likewise plots, regularly monetary, to draw in investment. The utilization of expense motivations is, be that as it may, not especially suggested for most creating nations, eminently in low-pay nations, due to the way that there is a huge casual segment and an ineffectively prepared assessment organization.

9.15 Flexible and autonomous agencies:

A key factor for giving proficient help is that it is conveyed in a coordinated and cognizant path with a greatest level of adaptability. This subsequently requires associations with coordinating qualities. An especially decent case is given by the Fundacion Chile, an open office, however with an autonomous, business situated approach, which has thus possessed the capacity to play a dynamic and unequivocal part in the improvement of asset based enterprises, for example, the wine and salmon ventures, by utilizing diverse instruments, exploring suitable innovations around the world, making new organizations, and so on.

9.16 Mobilizing local communities:

As examined before, encounter demonstrates that development prospers in all around characterized districts where there is a grouping of ability, vitality, and vision. It is likewise essential that help be conveyed as close as conceivable to undertakings, as they are scattered on the region. For this it is vital to prepare neighborhood groups to make a solid possession. There are different approaches. In created nations, the instruments frequently utilized include: the foundation of reception apparatuses of focal organizations which appreciate enough independence for venture determination and financing, and coordinating assets by which neighborhood experts are animated to spend assets on foundation and other advancement programs. These methodologies should work in creating nations as well, as long as they are actualized with straightforward techniques and implies in a specific straightforwardness.

9.17 Research and technology infrastructure:

As beforehand in created nations, the foundation of innovative parks or uncommon mechanical zones is a favored model in various creating

nations. The encounter has demonstrated that achievement is a long way from being ensured and approach producers ought to in truth continue circumspectly and bit by bit. A correct approach is to manufacture such techno-stops near colleges and partner dynamic business groups to their improvement. It is imperative likewise to maintain a strategic distance from the utilization of monetary, quite impose impetuses, which would offer to undertakings and their faculty working in such techno-parks unreasonable points of interest which would be seen as undue and out of line by alternate parts of the business or scholarly groups. It is obvious from the discourse of advancement openings and necessities directed in segment 2 that there are couple of fundamental capacities that must be satisfied for this.

The first concerns the dispersion of innovation and learning. This is finished by various key exercises including: metrology, models and quality control, augmentation administrations (for assembling and horticulture), data and preparing projects, showing and pilot ventures. Key for the proficiency of such plans is the nearness to the neighborhood business people, planning trend-setters and populaces in general. Note the significance of every one of these administrations which do satisfy elements of open administrations and hence ought to be supported properly. This applies especially to associations for principles and standards which ought not be privatized.

A moment work is the working of proper research structures. Research exercises, from essential to more connected, should be adjusted to nearby needs and abilities. Truth be told, a noteworthy issue in various creating nations is the need of interfaces between inquire about bodies and neighborhood groups. Enhancing linkages depends fundamentally

on the states of financing of such research bodies. A key run the show of thumb, represented by the encounters of the created nations, is the arrangement of an unmistakable offer of ensured assets (center financing), extending from 50 to 70 percent to the aggregate accessible spending plan, and 30 to 50 percent of more unstable assets (contracts). Some creating nations have possessed the capacity to change vast areas of their examination structures thusly. India is an a valid example as represented underneath

Indian example: In the India of the 1980s, there was a significant pool of good scientists, many well equipped institutes which turned out some good basic research and a number of spin-offs, but which were held back by projects with little commercial value, a protectionist lobby which sought to further its own interests, and an antagonism towards industry. An Abid Hussein Commission, created in 1986, put forth strong recommendations in an attempt to push for reform of India's research system. In particular, it recommended the promotion of better research-industry collaboration, the increase in contract revenues, and by offering them a share of the consulting and R&D revenues, the provision of incentives to staff working on a particular project. Through top level commitment, the provision of incentives (interest free loans) to institutes demonstrating leadership and capability, the introduction of business plans and by emphasizing common interests and objectives of industry and researchers, India succeeded in turning around its research institutes, and, thus, in upgrading a vital player in the innovation network.

9.18 The legal and regulatory environment:

A considerable lot of the significant deterrents to advancements in creating nations are identified with the institutional condition:

government approvals of different sorts, government acquirement, specialized standards and principles, rivalry, traditions, industryuniversity relations, fund and saving money, scholarly and other property rights, ..without tallying those snags of a more casual nature. Such obstructions are no on a very basic level not the same as those to be experienced in the created world, yet they are substantially more hard to address, strikingly on account of the nonappearance of an effective legal framework.

There are a few conceivable ways which can be considered to enhance this circumstance:

- Firstly, the fortifying of important built up organizations to give them the important freedom, legitimate and money related assets to achieve accurately the capacities they should satisfy. For example, various nations have rivalry laws, however there are no systems and fitting associations to guarantee their authorization.

- Secondly, the foundation of proficient counter powers, made prominently of clients of the general population administrations, including business visionaries, to improve working, less touchy to defilement, and so forth. Such activities have eminently been actualized in the training division to guarantee a suitable utilization of open funding20 and could helpfully be reached out to different divisions, for example, open acquirement to guarantee more straightforwardness in financing assignments and choices of suppliers.

- Thirdly, the execution of institutional reviews, concentrating on innovationrelated impediments. Such reviews could be fabricated, or joined, on those more extensive studies actualized by the World Bank to assess the business environment21 or administration conditions22. Such reviews – to be executed by abnormal state, autonomous bodies - ought not be considered as one shot occasions, however ought to be planned as procedures, through which proposals made by the significant bodies would be followed-up and checked in their applications and impacts. Note that these reviews could likewise be executed by global occasions, displayed on the companion audit systems set up in Africa inside the NEPAD for administration and majority rule government issues

10 Conclusion and suggestion

R & D and innovation are becoming more and more important in our country. The private sector also has to leave this way. We need a strong "innovation manifesto" in the world that is reshaping with Industry 4.0 and artificial intelligence.

The World Economic Forum is publishing the "Global Competitiveness Report", which lasts for over 40 years. One of the most important parts of the final report prepared in cooperation with 160 institutions of 137 countries is the Global Competitiveness Index.

The World Economic Forum takes into consideration the following key criteria when calculating countries' scores: Innovation capacity, the quality of scientific research institutes, the money that companies allocate to AR-GE, the government's advanced technology investments, the number of engineers and scientists, and patent applications. According to the report, Japan and South Korea are still in this area.

China, India and Indonesia are rising by investing in these areas. Especially as a center of innovation in China and India, the prospect is increasing.

Let's look at another index: Global Innovation Index published this year in cooperation with Cornell University, INSEAD (The Business School for the World) and World Intellectual Property Organization (WIPO). The index examines the economics of 128 different countries, from patent applications to infrastructure and training spending, from innovation systems to human resources.

The way of economic growth and development as a country goes through the competition. In the globalizing world, 'innovation' has become a key factor in increasing the competition power of the countries. The competitiveness of an country is determined by its ability to direct its production facilities to productive activities and to raise its standard of living. So when comparing and comparing the competitiveness of countries, two key elements come to the forefront: production efficiency and technological innovations.

Increasing competition power is; educated and qualified human resources; efficient use and development of natural resources; and technological advances are quickly connected to adaptation.

Although our fast-growing economy, our strong export figures, our developing infrastructure, the share of advanced technology products in our exports is only 2.5 percent.

Yes, there is a very rapid technological change and transformation process in the world. Numerous innovations such as Internet of objects, artificial intelligence, unmanned vehicles, energy and environmental

technologies, on the one hand, are restructuring traditional sectors; on the other hand, leads to the emergence of new professions.

When we look at all these numbers, it is not possible for anyone to adapt to this change and transformation process; we do not have the luxury of not watching global trends. Therefore, both the private sector and public policy need to prioritize those that are based on the future and that aim to increase the competitive power of our country. Because when we look at the world, we see R & D and innovation as the basis of prosperity, competitiveness and sustainable economic development.

10.1 What can be done to transform into a R & D and innovation-based economy?

- First, an economic development model based on global competition needs to be established. The place where the world is going is very clear. We also need to create value by investing in high technology in order to be able to walk on this path, because now it is important not to produce a large number but to produce high value added products. Therefore, high technology investment to create added value must be government policy. identifying priority areas for Turkey's competitive and focused on those areas of R & D and innovation activities need to turn to.
- Encouragement of entrepreneurship is one of the priority steps to support the skills our country has for the development of R & D and innovation ecosystem. Incorporation of innovation and entrepreneurship into the curriculum is another priority for the formation of this system. We will provide the sustainability of the system if we have the opportunity to develop new ideas for young people, to give them the

opportunity to pass on their ideas. young population reaches 13 million people aged 15-24 in Turkey. Half of our population is 30 years old and 64 percent is under 40 years old. The creation of a strong entrepreneurial ecosystem to transform such wealth into the most productive value added; idea, product; The entire process from the product to the market must be supported. Universities need to serve as 'incubation machines' for new sectors that are developing in the world. Therefore, the researches carried out at universities should be designed to meet the needs of the industry; the development of university-industry cooperation is of great importance. It is necessary to encourage entrepreneurship, work, invention, innovation in both universities and society. Encouraging creative thinking, harmonizing education and business life, preventing brain drain, encouraging engineering science and technology departments at universities, supporting technology-producing young people, and early adopting technology literacy are the first steps to be taken.

- Another issue of importance in this context, on the one hand, while increasing the number of entrepreneurs in our country, on the other hand also of foreign technology companies to create a robust ecosystem that will allow you to come to Turkey and make the necessary arrangements. In the process of supporting renewal and facilitating business processes, the public sector will have important tasks in this process. And, of course, public-private partnership will also be inevitable.
- Today, where natural resources are rapidly consuming, the most important element of sustainable development is productivity. Increasing productivity in welding and in production is possible with innovation. Therefore, increasing awareness in the business world and in society; it

is of utmost importance to support the process of creating more added value with less resources.

- In the market conditions where diversity is rising, competition is hot and the borders are in the midst, the main focal point of sustainable production emerges as R & D and innovation. Every changing arena brings radical changes, from changing customer needs and even the emergence of new needs, from raw materials to logistics, from marketing to production. So R & D and innovation are emerging as the only way to respond to this change. Companies and countries that can use innovation as a kind of "leverage" in this process make a difference. Turkey's robust in nature will help in moving up the global value chain innovation ecosystem development is gaining more importance every day.
- An important area where R & D and innovation should be supported is SMEs and of course startups. Because they are in fact more advantageous than big companies in terms of flexibility, ability to adapt quickly to market conditions and solutions. The biggest problem is the difficulty of accessing the financial resources needed for investments in R & D and innovation. Therefore, at this point, the incentives and funding sources should be increased; Reducing the costs of R & D-focused enterprises; the development of angel investors and intermediary institutions is important.

Innovation and entrepreneurship are two complementary concepts. Because if we define innovation as a "new idea and process of developing this idea"; entrepreneurship also means "to offer this new thing in the best possible way". Entrepreneurship is both involved in the emergence of innovation and its success. Initiatives that want to produce a new solution or product that responds to customer's changing demands are accomplished through innovation. This innovation brings

transformation in the sectors. As companies develop their innovation capabilities, they are improving the trends in the society and their ability to offer solutions. Innovation also comes to the forefront as a way to respond to consumer needs without sacrificing quality.

As a result, when we look into the world, we see that R & D and innovation are solutions to many problems. Costs are reduced through R & D and innovation; new products and services are being developed and diversified; product and service quality is increasing and competition is gaining strength.

Innovation is not a mechanical process, but a multi-dimensional and continuous process. It is necessary to build a strong ecosystem and make as many people as possible as part of this system. Of course, it is important not to make innovations in R & D and innovation in this area. This is not possible either. identify and correct the competitive sector of Azerbaijan in the global arena, we need to focus on this area.

Recently, the contribution of our country to R & D and innovation has increased considerably. The private sector also has to go this way. In a world where Industry 4.0 and artificial intelligence are preparing to become judges, our country also needs a strong "innovation manifest".

References:

Björn Johnson, Charles Edquist, & Bengt-Åke Lundvall. (2003). *Economic Development and the National System of Innovation Approach* .

Burcay Yasar, & Elcin Simanoglu. (2015). *INNOVATION AND THE EFFECT OF RESEARCH AND DEVELOPMENT (R&D) EXPENDITURE ON GROWTH IN SOME DEVELOPING AND DEVELOPED COUNTRIES*.

Chris Freeman. (2002). *Continental, national and sub-national innovation systems—complementarity and economic growth*.

Ebru Beyza, & Fulya Tasel. (2012). *Research and Development: Source of Economic Growth*.

Esra Ballı. (2017). *TEKNOLOJİ, İNOVASYON VE EKONOMİK BÜYÜME İLİŞKİSİ: ÜST VE ÜST ORTA GELİR GRUPLARINDAKİ ÜLKELER ÜZERİNE BİR İNCELEME*.

Gökhan Özkul, & Emre Örün. (2016). *Girişimcilik ve İnovasyonun Ekonomik Büyüme Üzerindeki Etkisi: Ampirik Bir Araştırma*.

Kristian Uppenberg. (2008). *Innovation and economic growth*.

Nathan Rosenberg, & OECD. (2014). *INNOVATION AND ECONOMIC GROWTH*.

Orkhan MAMMADOV. (2016). *Teknolojik Gelişmenin İktisadi Büyüme Üzerindeki Etkisi: Geçiş Ekonomileri (MDA ve BDT ülkeleri) örneği*.

Phd. Erhan DUMAN. (2017). *An Examination Of The Relationship Between Innovation And Economic Growth* (3rd ed.).

Romuald I. ZALEWSKI, & Eulalia SKAWIŃSKA. (n.d.). *Impact of technological innovations on economic growth of nations*.

Samuel MAHMUDLI. (2017). *Beşeri Sermayenin Ekonomik Büyümeye Yansıması: Azerbaycan Örneği*.

SOUTH EAST ENGLAND Partnership Board. (n.d.). *Economic growth and technological innovation*.

Stephen Feinson. (2016). *National Innovation Systems Overview and Country Cases*.

Xavier Cirera, William F. Maloney, & World Bank Group. (2017). *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up*.