

level that employees and lower level managers share in the decision making. Decentralization works on elimination of the barriers between levels placing the authority in the hands of staff so increasing the span of control.

Centralization maintains decision uniformity, it ensures better decisions to be taken since they are set from the upper management, unified resource utilization, better planning, directing and integrating activities as well as better coordinating between organizational departments with high flexibility (McCue & Pitzer, 2000).

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### **THE ROLE OF HUMAN CAPITAL IN TECHNOLOGICAL PROGRESS**

1. Introduction:

For appreciating the role of human capital in the technological progress or in a broader term the world in totality we need to have a better understanding of the following;

- What is the role of human capital in economic development?
- What are physical factors/passive factors of an economy?
- How is human capital formed?
- What are the problems with human capital formation in the least developed countries“LDCs”?
- What is the role of human capital in technological progress?

Finding the answers to these questions will give you a broader understanding of the world at large. How are countries' economies connected? Why are some countries growing faster than others? To answer these questions, we must broaden our understanding of human capital.

## 2. What is the role of human capital in economic development?

Human capital is the fundamental source of economic growth. It is a source of both increased productivity and technological advancement. In fact, the major difference between the developed and developing countries is the rate of progress in human capital. The underdeveloped countries need human capital to staff new and expanding government services to introduce new systems of land use and new methods of agriculture, to develop new means of communication to carry forward industrialization and to build the education system. Prof. Galbraith is right in saying that "we now get a larger part of economic growth from investment in men and improvements brought about by improved men."

Definition of human capital: Human capital is described as the skills, training, and health acquired through on the job training and education. Michael Pakistan Park defines it as, "The skill and knowledge of human beings." It is also defined as the "endowment of abilities to produce that exists in each human being."

### How Can a Country Increase Human Capital?

- It can be increased through formal education
- On-the-job training
- Improved health and psychological well-being.

To be more precise, if the people of a country are well educated, well nourished, skilled, and healthy, they are said to have more human capital.

As underdeveloped countries around the world make investments in human persons, they aim to increase their programming skills, social abilities, ideals, and health. These investments aim to increase productivity. The success of their economies depends upon increasing human capabilities. However, human capital does not exist in a vacuum. To better understand this complex topic, we must consider the physical/ passive factors that connect to a country's ability to make these investments.

## 3. What Are Physical/Passive Factors of an Economy?

Physical factors are considered "passive factors" of economic growth. They are not separate from each other, but hinge upon each other. These human resources are considered "active factors" of economic development.

While the active factors of a country include such important measurements as the size of a population's rate of growth in both urban and rural areas, passive factors include the availability of land in each of those areas. While the quality of a population, as measured by health standards, educational levels, and technology, is vitally important in influencing a nation's cultural and economic progress, the capital and land requirements for attempting these lofty improvements are inseparable from the equation.

A country which has developed the skills and knowledge of its

people can exploit natural resources, build social economic and political organizations, and carry forward national development. That said, a country which does not pay attention to the passive factors that influence these goals will struggle to see the rapid growth in human capital that they desire.

#### 4. How Is Human Capital Formed?

Definition of human capital formation: Human capital formation is the act of increasing the productive qualities of the labor force by providing more education and increasing the skills, health, and notarization level of the working population.

According to T.W. Schultz, there are five ways of developing human capital:

1. Provision of health facilities which affect the life expectancy, strength, vigor, and vitality of the people
2. Provision of on the job training, which enhances the skill of the labor force
3. Arranging education at the primary, secondary, and higher levels
4. Study and extension programs for adults
5. Provision of adequate migration facilities for families to adjust to changing job opportunities

#### 5 - What Are the Problems of Human Capital Formation in LDCs?

While there are many benefits to investing in the formation of human capital in LDCs (less developed countries), it is not an easy process. Large populations deal with large issues.

Problems of human capital formation in LDCs include:

1. Faster increase in population: The population of almost all developing countries in the world (including Pakistan) is increasing faster than the rate of accumulation of human capital. As a result, these countries are not making satisfactory use of sector expenditure on education (which has accounted for 2.5% of LDC GDP over the last five years).

2. Defective patterns of investment in education: In the developing countries of the world, the governments are giving priority to primary education for increasing their literacy rates. Secondary education, which provides critical skills needed for economic development, remains neglected. Another problem related to investment in education is that in the public and private sectors there is a mushroom

Growth of universities. These universities are a major cost to these countries. There are also mass failures at primary, secondary, and higher levels of education that result in the wasting of scarce resources that the country needs for other kinds of development.

3. More stress on the provision of buildings and equipment's: Another major problem countries run into when investing in human

capital in developing countries is that politicians and administrators lay more stress on the construction of buildings and the provision of equipment than on the provision of qualified staff. It has been observed that foreign qualified teachers and doctors are appointed in rural areas, where there is little use for them. This misallocation of educational resources can negatively affect economic growth.

4. Shortage of health and nutrition facilities: In less developed countries there is a shortage of trained nurses, qualified doctors, medical equipment, medicines, etc. Having less availability to health facilities poses a threat to millions of the people. The people are faced with unsatisfactory-sanitary conditions, polluted water, high fertility and death rates, urban slums, illiteracy, etc. All of these deficiencies affect the health of the people and reduce their life expectancy. This reduces the growth of human capital.

5. No facilities for on the job training: On the job training (in service training) is essential for improving or acquiring new skills. The result is that the efficiency of the workers and the knowledge held by the workers causes a growth in human capital. The competence of the workers is of the utmost importance for the efficient use of human resources.

6. Study programs for adults: Study programs for adults can also be introduced in order to improve a country's literacy rate. Study programs for adults have been introduced in many under developed countries around the world (including Pakistan). They provide basic education, which increases the skills of farmers and small industrialists. Unfortunately, this scheme failed miserably, as the adults showed no interest in getting such training.

7. Halfhearted measures for promotion of employment: Throughout most of the world, the ratio of unemployed or underemployed persons is very large. To increase employment and reduce under employment, proper investment in human capital is required. This is visibly lacking in LDCs.

8. Failure to plan for the best use of manpower: Due to the no availability of reliable data, there is little manpower planning in less developed countries. As a result, the demand for certain skills and the supply of those skills do not match. The result is that large numbers of skilled and highly qualified workers remain underemployed. The frustration and discontent among the unemployed and underemployed graduate and post graduates results in "brain drain." This is when skilled workers leave the country for better opportunities abroad. It is a huge loss in human resources for these developing countries.

9. Neglect of agriculture education: In LDCs where agriculture is the main sector of the economy, very little attention is paid to educating the farmers on how to use modern agricultural practices. Unless the farmers are provided agricultural education and training, they will not be able to raise

the agricultural output and balance supply and demand.

#### 6-What is the role of human capital in technological progress?

There are many examples among countries in the world that can answer these questions, and illustrate the impact of education and training of human capital on the progress and development in all fields, especially in the field of technological progress, which plays an important role in the progress of the country and raise its level and increase economic growth, such examples will mention the Japanese, and Korean experience.

##### 6.1 Role of human capital in technological progress In Japan

If we look at the depth of its scientific and technological progress, it is undoubtedly due to the following reasons:

1- In Japan, a course called "Path to Ethics" is taught in the first grade. Students learn ethics and deal with people.

2- There is no failure from the first primary to the third medium, because the goal is education and instilling concepts and building character, not education and indoctrination.

3- The Japanese, although they are among the richest people in the world, have no servants. The father and the mother are responsible for the home and the children.

4- Japanese children clean their schools every day for a quarter of an hour with teachers, and the result Japanese generation modest and clean.

5- Children in school take their sterile toothbrushes and clean their teeth in school after eating. They learn to maintain their health from an early age.

6- School principals eat the pupils' food half an hour before they can be sure of their safety.

7- The hygiene worker in Japan is called a "health engineer" with a salary of 5000 to 8,000 US dollars per month and is subject to oral and written tests prior to his / her assignment.

8- The use of mobile phones is prohibited in trains, restaurants and closed spaces.

9- If you go to a restaurant in Japan you will notice that everyone does not take the food except as much as he needs.

10- The rate of train delays in Japan during the year is 7 seconds per year.

From the above, it is logical that Japan is at the top of the world undisputedly, it is now the second largest economic and industrial power in the world and occupies the first step in the field of technological and industrial science. In the field of electronics and robotics, I have reached the point of astonishing even the Western world.

In short, Japan has become another planet that does not belong to our planet. This leads us to wonder whether any other country could ever reach



Japan or reach its destination.

Let us always keep in mind the Japanese Minister of Education's statement when asked about the secret of Japan's progress. He answered: The secret in education and the advancement of the curricula of our students. To be accurate in answering the teacher, the secret of each success and secret of success of the Japanese teacher is three things: We gave him the salary of the minister, the military authority and prestige of the judge.

It is widely known that Japan rose with a real development miracle after the Second World War when the US hit it with two atomic bombs. The Japanese economy ended clinically. Well, what happened was the recovery of the economy, not the revival. The real boom began about 100 years ago.

#### 6.2 Role of human capital in technological progress in Korea

"Korea is a country that founded technology, by teaching children from an early age. At school, the administration rewards its students with any invention they come up with, even if it fails."

For example, the Internet is one of the fastest growing networks in the world, with an Internet speed of 26.7 megabits per second, making it the first in the world, followed by Norway at 24.5 megabits per second.

#### Factors of success in the Korean experience

The most important factors for the success of the Korean experience are:

##### 1 - The human factor

Korean labor has played a crucial role in the success of the Korean development experience. In the absence of natural resources, geographical space and capital scarcity, the Korean leadership has relied on human capital as a resource for development. It has invested heavily from the outset in education and vocational training schools, to improve the productivity of its workers and improve their skills to cope with technological developments that accompanied rapid manufacturing processes. Thus, spending on education increased from 2.5% in 1951 to more than 23% of the budget by the 1980s. The State has also given great importance to training and vocational training, with a focus on science and technology. The number of students pursuing their studies in the technical and scientific sciences was 70% of the total number of students in 1980. The State has sent a large number of students and staff to study and train.

In addition to the educational and professional level, the working conditions were very unfair. Park issued an order prohibiting strikes, banning all trade unions, preventing workers from organizing under any framework or negotiating collectively. The working class found itself working longer hours, the industrial sector is 13 hours higher than in Japan and 6 hours higher than in Taiwan by 1986.

## 2- Giant companies

The Korean private sector was organized in the form of giant companies, engaged in all economic and commercial activities and accounted for a large part of total production, and thus a large part of exports. These private companies formed the executive arm of the state. The latter defined strategic choices and development plans. The private companies implemented them, and the latter benefited from government aid, from intensive industries to heavy industries in the 1970s, to electronics and advanced industries that needed for heavy capital by the third millennium.

## 3. Bureaucrats

The success of Korea's development experience is largely due to the role played by government officials in the Economic Planning Board, the Coordination and Planning Office and the Ministries of Finance and Trade. The planning and management units of each ministry were established. They had a clear economic vision and were keen on planning, setting goals and guidelines, implementing strategies to solve problems of development, education, eradicating poverty, and building a modern economy. A modern industrial and technological infrastructure, modernization and improvement of infrastructure, preparation of the Korean industry for entry into world markets and transformation of the country into a global economic and trade power.

## 4. External factors

The United States led the Allied forces in the Korean War, brought the Northern Forces back beyond Line 38, and then signed the Joint Defense Agreement with South Korea in 1953, and there are about 28,000 troops American forces in the south. Korean troops have been under US command since wartime and play a key role in deterring any possible military offensive from the north. US military and economic aid to South Korea in the period from 1947 to 1976 amounted to \$ 12.6 billion.<sup>15</sup> The volume of economic grants and loans was \$ 6 billion, nearly the total US economic assistance to all African countries (\$ 6.89 billion) USD) during this period. The United States opened its markets to Korean exports since the 1960s, with the US market accounting for 41.7 percent of total Korean exports in 1970 and about 35 percent in the 1980s.

## 6.3 Lessons learned from Korea's experience

The experiences of countries cannot be duplicated. Korea's circumstances and geographical location make the Korean experience unique and unique to the Korean people. However, this does not preclude the drawing of some lessons and lessons that could be useful to the Arab countries, which failed to achieve a comprehensive renaissance, although some of

them have substantial natural and financial resources and are in a better position than Korea after the Korean War. Better than Korea in the sixties and seventies of the last century such as Egypt, Iraq, Syria and Saudi Arabia, and the most important lessons in:

- The role of the state

The State played a large and positive role in the process of economic development. The interventions were based on solid and consistent political will and adopted long-term planning and sound development policies appropriate to Korean realities. The State was of the view that economic development would help it build its strength to confront the northern threat and not to repeat the experience of Japanese colonialism.

- Close collaboration between the public and private sectors

The Korean experience has shown that the government has been able to reduce coordination problems with the private sector and has been able, by the bureaucrats' relations with major corporations and banks, to obtain the necessary information to make investment decisions and direct resources to sectors that can contribute effectively to economic growth.

- Scientific Research

Korea has issued an arsenal of laws to promote scientific research, established several offices and bodies to coordinate research, and both the private and public sectors have spent huge financial resources to bridge the gap that separated Korea from developed countries and then is now spending to develop new technology and make further progress, Information technology, nanotechnology and biotechnology, to maintain its position as a technological force.

- Investing in the human factor

The Korean experience has shown that the development of people's capacities through education and training is necessary to create conditions that allow for keeping abreast of developments and competitiveness and improving productivity, which contributes decisively to development.

- Exploitation of international conditions

Korea has found itself stuck in the conflict between the western and eastern camps, exploiting its alliance with the United States to achieve economic development as part of building its overall strength and achieving political, economic, technological and industrial independence.

As a conclusion, the Korean experience, both at the level of promotion and at the level of the reconstruction experience after a devastating war, was successful but not ideal. The dependence on the giant companies led to the latter's entrenchment and monopolization of all activities at the expense of small businesses, Korea's development policies have been se-



verely disrupted in development between Seoul and other regions, and there has been a significant disparity in access to development opportunities between the poor and rich classes, making the working class pay high wages during the early years, stripped of almost all its rights.

The Korean experience remains an example of political will, peaceful planning, long-term planning, and resource use and, above all, self-development and critique of local values and culture,

## 7- Technological progress in different field

### 7.1 technological progress in Medical Science field:

New avenues in diagnosis and therapy are today increasingly being opened up as a result of sophisticated and advanced technology, and at the forefront of this are evolutionary developments in existing technology. Many medical devices and pieces of equipment are developing at lightning speed as a result of digital technologies, which enable new medical concepts, strategies, and visions to be implemented faster than ever before. This means that developments which previously took a decade to implement are now being introduced at a rate of one a year. Technology thus not only has a dynamic interrelationship with medicine; it influences and shapes modern medical science on the basis of new technical possibilities. First-class health care would be inconceivable without progress and innovation in the field of medical technology.

### 7.2 Role of technology in the Development of Living Standards.

Progress of technology and education and increasing knowledge and vocational skills helps in improving the living-standards of a person. The developments in economics, science and technology, medicine in brief over-all development of society develops the standard of living. Thus, technology plays an important role in making the living standards high. Any society can never be developed without the empowerment of women since women is the half part of the society.

### 7.3 Role of technology in the transport of future.

Transport needs in the coming years will be growing. Strong emphasis will have to be placed on servicing new patterns of trade and on meeting the requirements of increased activities in agriculture. Expenditures for transport will be large.

In dealing with transport, subject areas are the various modes, the two elements, infrastructure and equipment, and a range of interdependent items including development and construction, operation and maintenance.

The magnitude and complexity of forthcoming transport needs will call for application of powerful and efficient methodologies. Tools of the past will not be sufficient. Skills derived from the current state of science

and technology are available and they will have to be used.

Potential applications of science and technology are numerous. Foremost areas so far as infrastructures are concerned are conceptual orientation methods, modelling techniques, various tools for engineering investigations and controlled construction. As far as equipment is concerned, they include materials, tools, expertise and off-the-shelf components. Useful items are available for development, operation and maintenance of transport in all modes. Some aspects of transport are nevertheless neglected. Science and technology could beneficially target the field of intermediate transport technologies to suit the needs of developing countries and the field of energy where reduced consumption, cheaper energy and cheaper transport techniques should be sought.

Science and technology predominantly yield effective but sophisticated solutions. The use of these solutions in developing countries introduces a risk of increased dependence on the developed world. This risk should however be viewed against the advantages of accelerated social and economic development. Proper planning is clearly of the essence.

Science and technology provide a wide range of conceptual, methodological and implementation tools, including tools for eliminating prevailing gaps. Programmes are required to identify priorities, mobilize resources and proceed with action.

#### 7.4 role of technology in communication

Technology is extremely important in the workplace as a means of communication as businesses rely on it heavily. Technology allows many businesses to expand more quickly by having the proper means to promote. For example, almost every business will have a social networking website such as Twitter that will allow them to give updates to their audience. Businesses also use video conferencing, and virtual office technology that has essentially reduced the limitations that were previously set in the business world. You now find many virtual job positions available in companies due to current technology. In addition, technology is important because it can actually boost communication within the work place. For instance, colleagues are able to send instant electronic emails to each other and keep important conversations going throughout the day, while accomplishing the tasks set by their manager. Furthermore, technology within the workplace allows the hiring process to be more efficient and quick as you now have many platforms in which you can seek out potential candidates. Overall, incorporating technology within the workplace saves time as you can send important messages to colleague while remaining productive. In addition, it will essentially save businesses money as now you can have vir-

tual meetings instead of spending money for travel. Technology allows businesses to communicate at a cheaper cost and in a more convenient manner.

Technology is equally important within schools as it is used to communicate important information to students. The use of technology in schools are used as early as grammar school as they have websites such as Edline.com that allows students and parents to keep track of their grades. Along with this, teachers have the option to leave messages for the parents in case of a concern. This is truly an advancement in the school system with a special thanks to technology as before most teachers would wait until parent teacher conference, which was generally twice throughout the academic year to let the parents know of any issues. In addition to this, most colleges and universities use a website called blackboard.com that allows student to not only view their grades, but interact with their classmates. One of Blackboards best features is the option to host a discussion. This is an excellent way to keep the communication going beyond the classroom that will only further develop college student's communication skills. With that being said, technology is continuously playing a huge role in communication in regards to the school system.

Technology in the regards of communication is highly important as we have integrated it within our society overtime. We continuously rely on iPads, smartphones, and computers to interact with others. Technology is important because it allows communication to be more convenient and in some ways, more effective. We use it in the workplace to allow us to communicate with our colleagues, it saves time as well as money. We also use it within our schools as it establishes an effective parent-teacher relationship by allowing the parents to see their student's grades and communicate with the teacher through mail. Overall, technology will continue to be an essential part of how we communicate and interact with others.

#### 7.5 role of technology in business communication

Technology has altered modern life in many ways, especially in the workplace. The invention of computers, the miniaturization of electronics and the development of wireless communication have all altered the business world. Business communication, in particular, has seen some of the greatest advancements due to technological developments.

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