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The Role of Education in Knowledge Economy: Comparative Study of Selected Countries

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Abstract

"Knowledge Economy" is a term used to describe an economy in which knowledge and innovation play a significant role in economic growth. The growing importance of knowledge as a factor of production, as well as its considerable impact on qualifications, training, organisation, and innovation, characterises the growth of the knowledge economy. For becoming a successful knowledge-based economy, nations must act simultaneous on their information and communication infrastructure, education, innovation systems, economic and institutional regime. A country's education system determines its economic growth and development. A global knowledge-based economy fuelled by modern technologies is today's popular vision. The development of higher education and the central role of higher education in national and European economic policy reflect this viewpoint. The aim of this research is to study knowledge economy in Indian education context and compares it with selected nations to provides a useful benchmark.

Keywords: *Knowledge Economy, Innovation systems, European economic policy etc.*

Introduction

The knowledge economy was first introduced by economist in 1962 [9]. The knowledge economy is defined as "An economy, which has the ability of knowledge, production, dissemination and use; whereas knowledge is an important factor in wealth creation, growth and employment and human capital is the driver of innovation, creativity and generation of new ideas, with the dependence and interconnection of information and communication technology (ICT)." A knowledge economy is one that develops, disseminates, and applies knowledge to further its progress and development. Knowledge economy transforms raw data into useful information utilising its technology, analysis tools, and human intelligence, so fostering economic production.

Not only in the global economy, but also within and between educational institutions, has globalisation heightened rivalry. Educational changes have been adapted to the new realities by putting in provide frameworks in education systems that enable for national and regional educational performance to be evaluated, compared and ranked. India is a developing country with a low income. There is little question that approximately a quarter of the country's population is impoverished. In India, poverty is not only acute, but also persistent. This idea of the learning economy originates from [9] Information economy are significantly more prone to include a more extensive definition. Knowledge, along with land, labour, and money, was recognised as a key element of production.

World Bank, OECD and APEC agreed upon the fact that the growth of economy depends on production, distribution and use of knowledge. The developing countries should focus on embarking on innovation and knowledge- based development process.

Measuring of knowledge economy is complicated since it entails changes in many different elements of the economy. As a result, the World Bank Institute has developed a set of indicators that provide direction in this area, while measurement is still a matter of judgement for each economy. Because the main goal of measuring the knowledge economy is to analyse progress in a certain economy (over time) or region (over space), these indicators are more useful as benchmarks for comparison than absolute metrics [13]. For becoming a successful knowledge-based economy, nations must act simultaneous on their information and communication infrastructure, education, innovation systems, economic and institutional regime. Education for a knowledge-based economy has become a buzzword in education policy debates around the world, particularly in industrialised and transition economies, but also in poor

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countries. Math and science, information and communication technology, fundamental literacy knowledge and abilities, and the development of interpersonal skills are typically the focus of education reform aimed at servicing knowledge-based economies. Furthermore, a thriving knowledge economy necessitates the supply of advanced secondary and tertiary education capable of increasing labour productivity, research, and innovation.

Knowledge economy is based on education and human capital at every sector like primary sector, secondary sector and tertiary sector. If we make big investment in educations, creation of knowledge and research institutions than possibility of raising living standards of the country for long period. Education is one of the strongest pillars of the knowledge economy for the increase in the level of the society in technology and some other fields.

Review of Literature

Provides an overview of the most recent developments in India's ICT sector and their implications for the country's transformation towards a knowledge economy [16]. There is an emphasis on how to increase higher education and the significance of the knowledge economy, as well as the impact of technical advancements on the expansion of the knowledge economy. The quality and pricing of a product are entirely dependent on the skills and aptitude of the individual. Higher education is expected to reduce economic disparity and increase skill levels [13]. India has further bolstering its good fortune a major pool of knowledge labourers like researchers, engineers and scientists. Researcher investigates the difficulties and openings on the pathway to India's voyage towards turning into a worldwide pioneer in learning economy regarding the four columns as denied by the Knowledge Assessment Model (KAM) of the World Bank, to be specific, monetary and institutional routine, training, data and correspondence innovation, and development [2]. Education, skills, information, and innovation are crucial in the knowledge economy, which offers a variety of opportunities and demonstrates various methods for large-scale production and sales while minimising costs and identifying customer needs. In addition, the knowledge economy is dependent on education, skills, and information [5].

Improvements to the Indian education system are needed at all levels, from elementary schools to universities and national research agencies. At all dimensions, there is a need to improve both access and magnificence [12]. Inquires the education goals in the present context with reference to Indian examples. Author tries to interrogate this new outlook of education, specially focusing on higher education in India with the help of secondary resources. The present study inferred that education is one of the critical areas that satisfy the need for ample growth of a country [10]. Education makes it a very much required component of the knowledge economy. Focus on two point's information that is valuable when we know what is relevant for us and how to use it and communication technology helps to solve all of the problems and helps to access to information. And there is also require learning about the new technology so that easily access to the information. Also takes example of provide training about computer and its good result find out after the training and then implementation of new technology [17]. Concluded that not only is education necessary for the development of intellectual ability, but it is also necessary for economic growth and advancement. Indian education system also facing a lot of the problems and the issues for the process of the study. Training for the information-based economy has turned into a trendy expression in instruction arrangement talk all through the created world and the progress economies yet in addition progressively in creating nations [14].

There is primary, secondary and tertiary education is very much required for the development of the country. There are four necessary pillars of knowledge economy economic and institutional regime, education and skills, information and communication infrastructure, innovation system. Objective is to improve literacy rate and try to stop the cultural problem because of their different religion and more focus on the education [18].

States that improvement of solid education system, including specially advanced education and the research system, is a fundamental essential for advancement of an information society. Institutions of all over the world are also very active for the improvement of knowledge and economy directly and indirectly. The study argues that to make a knowledge society it require a lot of efforts this is not being in overnight it takes time and also a strong national system and education system is very necessary for it [15]. Gives preference to the education and it suggests that such social changes and the development of the Knowledge Economy will involve an alternate education and schooling system [8].

Information technology plays a crucial role in the knowledge economy [4]. In Indian views, it should be to develop the capability of national education at all levels, as the author stated important thrust areas for reinforcing human assets for knowledge economy needs. Another priority should be to train human resources in a skill development framework that prepares them to work in high-tech enterprises and provide high-tech services. Furthermore, according to the study, the training and education system should allow a larger number of people to pursue knowledge-based industries such as software development, research and development, and technology-based front- and back-office positions [1].

Examines the national and international status of India as a knowledge-based economy and identifies the obstacles that prevent India from becoming a knowledge-based economy. India is very capable of establishing itself as one of the developing nations on the international

stage, but transforming itself into a knowledge-based economy is extremely difficult in the rapidly evolving global technological environment [6]. Examined the role of science and technology parks in the growth of a knowledge-based economy. In a knowledge-based economy, institutions provide major competitive advantages, which is a desirable characteristic [7].

Database and Methodology

This study analyzed the impact of education on the growth of the knowledge-based economy. To measure the growth of India in comparison with some leading economies in knowledge economy variables are Adult Literacy rate, Secondary enrolment rate, Gross tertiary enrolment rate and Public spending on education as a % of GDP. Ten years' data from 2009 to 2018 has been taken as time frame from world bank data, UNESCO, OECD, UNDP as the primary source. The percentage of adults aged 15 and up who can read and write short, simple phrases that we use in our daily lives is known as the adult literacy rate. The Gross Secondary Enrolment Rate is a measure used in education to determine the number of students enrolled in secondary school.

The Gross Tertiary Enrolment Rate (GTER) is a statistic used in education to calculate the number of students enrolled in post-secondary education. Public spending as a percentage of GDP: The proportion of a government's budget allocated to education in relation to GDP.

After data collection, the collected information is organized in tabular form. The data obtained were tested using the ANOVA test. ANOVA test is used to see if there is a difference between the samples.

Data Analysis

Adult literacy rate

Further Education rate plays an important role in the economic growth of any country. A better rate of literacy ensures a highly educated manpower that operates on logical thinking and decision making. For India the rate of literacy has remained a challenge. However, there is a significant growth observed in this sector. Following charts and graphs present the results.

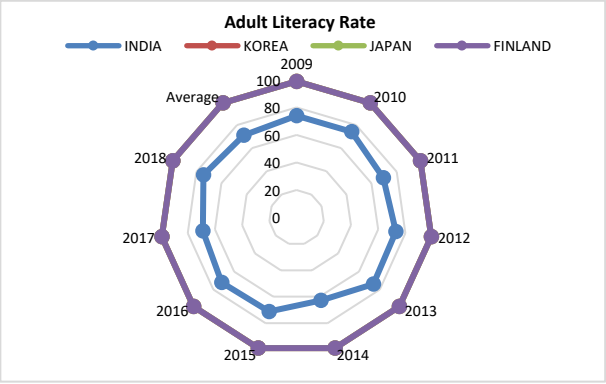

Figure – 1

Table – 1 Summary Statistics of Rate of Literacy

Groups	*Average*	*Variance*
INDIA	71.37	13.17
KOREA	99	0
JAPAN	99	0
FINLAND	99	0

Table – 2 Null hypothesis H_{01}: The difference in literacy is not significant

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5725.62	3	1908.54	579.56	0.00	2.86
Within Groups	118.55	36	3.29			
Total	5844.17	39				

It can be observed that in all countries apart from India literacy rate is nearly 100% and India is progressing in literacy rate but failing to cope with the growing population. This may be the cause that despite of several government initiatives the literacy rate is hovering around 74%. It can also be observed that in past decade the average rate of literacy remained around 71%. The significance difference between literacy rate can be observed from table -20 and the hypothesis $H_{01}$is rejected.

Gross secondary enrolment rate

One of the major impacts on economic development of any country is of its Gross Secondary Enrolment rate. As a higher GSER results in learned manpower and that ensures a high intellect contribution to the GDP of the country and hence the economic development. Owing to the need of analysing GSER of the countries the data from the past decade of competitive economies is analysed. Following chart and tables present the results.

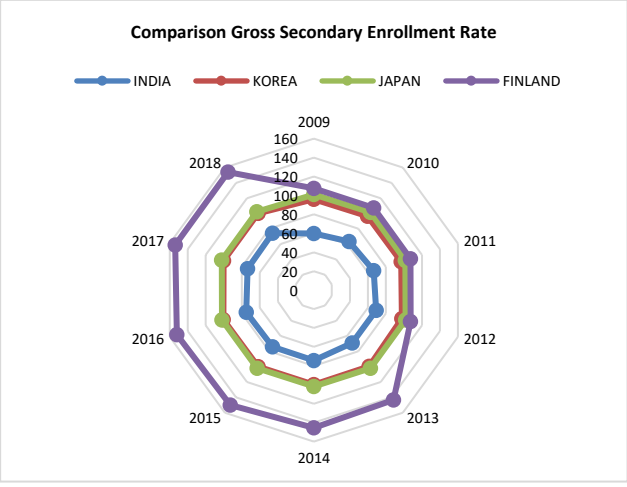

Figure – 2

Table – 3 Gross Secondary Enrolment Rate

Groups	*Average*	*Variance*
INDIA	69.9	28.4
KOREA	98.7	3.2
JAPAN	101.8	0.1
FINLAND	132.8	490.3

Table – 4 Null hypothesis H_{02}: The difference in GSER is not significant

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	19878.8	3	6626.266	50.771	0.000	2.866
Within Groups	4698.454	36	130.513			
Total	24577.25	39				

India remains the bottom throughout the decade, when it comes to GSER. Finland remains the highest in GSER followed by Japan and Korea going neck to neck. This shows that India is struggling to maintain the high GSER in comparison to any of the given countries. The variance also remains highest in case of Finland with a score of 490.3 followed by India with a score of 28.4. However, when it comes to average scores of GSER the scores are significantly different from each other and null hypothesis $H_{02}$is rejected. Finland has the highest GSER average rate with a score of 132.8 and India has the lowest GSER of 69.9.

Gross tertiary enrolment rate

The enrolment rate in higher education plays a vital role in providing an intellectual and skilled workforce to any country. The workforce thus produced impacts the economy of any country directly. Tertiary is also called as the higher education or university. Gross Tertiary Enrolment Rate (GTER) is an important component to study. The countries under study are compared with respect to GTER. Following charts and tables present the result.

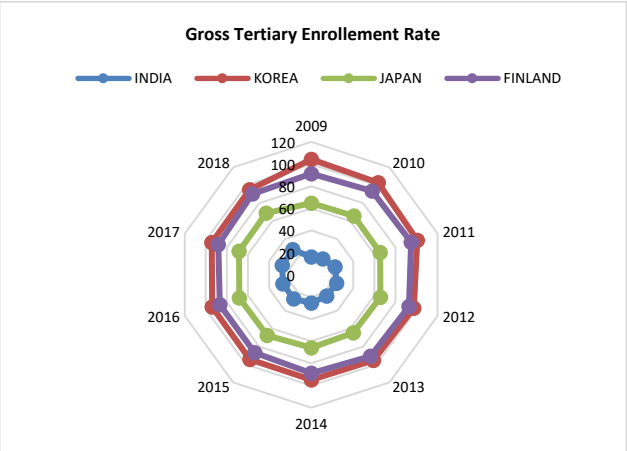

Figure – 3

Table – 5 Summary Statistics GTER

Groups	*Average*	*Variance*
INDIA	23.92	16.57
KOREA	97.32	14.85
JAPAN	66.54	2.49
FINLAND	90.43	7.66

Table – 6 Null hypothesis H_{03}: The difference in GTER is not significant

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	30183.33	3	10061.11	56.30	0.00	2.87
Within Groups	6433.86	36	178.72			
Total	36617.19	39				

It can be observed that Korea has the highest rate of GTER with an average score of 97.32 followed by Finland with a score of 82.62 and Japan with a score of 66.54. India on the other hand has the lowest average score of 23.92. The variance of enrolment is highest in India with an average variance of 16.57 over the years while the Japan has the lowest variation with a score 2.49. This shows that India needs to work on getting the students enrolled for university education. The good schooling enrolment may enforce a literate workforce, but schooling doesn't provide the skill set an intellect to compete at the global level. Further when null hypothesis $H_{03}$is tested, it is found that the difference in mean scores of GTER is statistically significantly different from each other and hence the null hypothesis is rejected.

Public spending on education as % of GDP

Despite of government making efforts to raise the enrolment ratio, if the people do not consider education as a valuable investment the efforts can be subdue. This is very important factor in economic growth of any country. This important factor and its impact on economy is studied with respect to all countries.

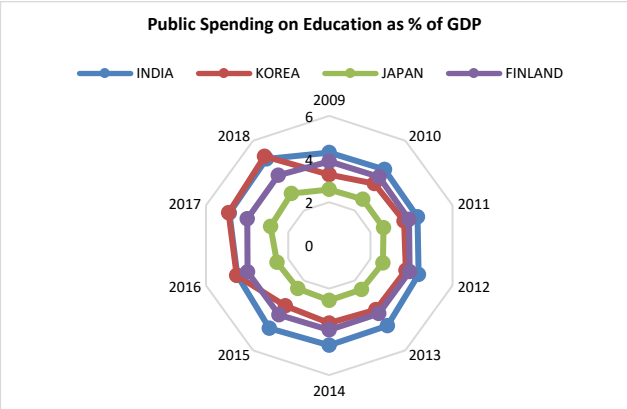

Figure – 3

Table – 7 Summary Statistics

Groups	*Average*	*Variance*
INDIA	4.553	0.056
KOREA	3.941	0.415
JAPAN	2.641	0.025
FINLAND	3.934	0.002

Table – 8 Null hypothesis H_{04}: The difference in Public Spending in Education is not significant

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	19.445	3	6.482	52.062	0.000	2.866
Within Groups	4.482	36	0.124			
Total	23.927	39				

It can be observed that, Indians are spending substantial amount on the education and find it worthy investment. In fact Indian people remain highest in investing on education till 2015. 2016 onward Korea matched up with India. Japanese people however invest lowest on education in comparison to all other countries. There may be multiple factors that are impacting the movement of data in such way. This could be possible due to sponsored higher education system and free schooling. Indian people with an average score of 4.5 remain the highest investors in education. However, the people from Finland shown the highest consistency with the minimum variance of 0.02. When the significance difference amongst the mean scores is checked it is found that the difference amongst the means is significant.

Conclusion

India needs to work on its rate of literacy and GSER. These two educational components play a major role in the economic development of any country. There are several schemes that are launched by the government. However, these schemes may not be successful due to higher rate of population growth or lack on required infrastructure for implementation of the schemes. NEP 2020 is a scheme that is launched to address these two problems of the Education as well. Along with the lowest enrolment ratio in school India also has the lowest higher education enrolment ratio. This could be due to lower social security, unavailable infrastructure to support the enrolments and poorly designed curriculum at the university level. It is recommended that in order to have better economic growth India needs to work on increasing GTER.

Despite of high investment on education Indian enrolment rations in school and higher education remains lowest amongst all countries. This might be due to the high population. Hence despite of high investment on education and government taking several efforts for enrolling more and more students in school and college education the things are not moving in right direction. This leaves a negative impact on the economic growth.

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Links from where data is collected

1. Adult literacy rate: https://data.worldbank.org/ indicator/SE.ADT.LITR.ZS
2. Gross secondary enrollment rate: https://tcdata360.worldbank.org/indicators/entrp.lit?country=BRA&indicator=3421&viz=line_chart&years=2012,2016
3. Gross tertiary enrollment rate: https://tcdata360.worldbank.org/indicators/entrp.lit?country=BRA&indicator=3421&viz=line_chart&years=2012,2016
4. Public expenditure on Education: https://data.oecd.org/eduresource/public-spending-on-education.htm