Chapter 2

Review of Literature

Section I

2.1 Introduction

"Practically all human knowledge can be found in books and libraries. Unlike other that must start a new with each generation, a man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of human endeavor" (Best, 1959). A literature review is an evaluative report of information found in the literature related to the selected area of study. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical base for the research and help the researcher to determine the nature of research. Works which are irrelevant should be discarded and those which are peripheral should be looked at critically. It is more than the search for information, and goes beyond being a descriptive annotated bibliography. All works included in the review must be read, evaluated and analyzed (which you would do for an annotated bibliography), but relationships between the literature must also be identified and articulated, in relation to your field of research.

Any worthwhile research study in any field of knowledge requires an adequate familiarity with the work, which has been already done in the same area. A summary of the writings of recognized authorities and of previous research provides authorities and of previous evidence that the

researcher is familiar with what is already known and what is still unknown and untested. Since effective research is based upon past knowledge, this step helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation (Best, 1982).

2.2 Purpose and Benefits of Literature Review

The purpose of a literature review is to describe the work that has been reported on a subject or field. It demonstrates an individual's ability to identify the significant information and sketch existing knowledge. It helps fill in the gap in the research that the work will address, and generates rationale or justification for the study. In other words the main purpose of a literature review is to demonstrate the scholarly capacity, identify information, and outline the presented knowledge.

It places each work in the context of its role to the understanding of the topic under review. It explains how the information in the report will be used to supplement the original purpose statement. The review is also useful in describing the relationships of each work to the others under consideration.

Machi (2009) asserts that it serves in identifying new ways to understand, and shed light on any gap in the previous research and position on the way forward for further research. Resolving conflicts among apparent contradictory previous studies too is a crucial purpose of the

review. It also identifies areas of prior studies to prevent duplication of the endeavor.

Cooper (2010) argues that combining data is justified, especially where a mathematical meta-analysis aspect like difference of the study is addressed. In addition there is a definite benefit in using the meta-analytic method in a literature review as it makes the evaluation more applicable. It combines studies from diverse environments, making generalization to other populations more justifiable. Its effectiveness is illustrated consistently across a range of studies.

Review of the related literature; besides, allowing the researcher to acquaint himself with current knowledge in the field or area in which he is going to conduct his research, serves the following specific purposes:

1. The review of related literature enables the researcher to define the limits of his field. It helps the researcher to delimit and define his problem.
2. The knowledge of related literature, brings the researcher up-to-date on the work which others have done and thus to state the objectives clearly and concisely.
3. By reviewing the related literature the researcher can avoid unfruitful and useless problem areas. He can select those areas in which positive findings are very likely to result and his endeavours would be likely to add to the knowledge in a meaningful way.
4. Through the review of related literature, the researcher can avoid unintentional duplication of well-established findings. It is no use to

replicate a study when the stability and validity of its results have been clearly established.

5. The review of related literature gives the researcher an understanding of the researcher methodology which refers to the way the study is to be conducted. It helps the researcher to know about tools and instruments which proved to be useful promising in the previous studies. The advantage of the related is also to provide insight into the statistical methods through which validity of results is to be established.

Keeping in view the need of the survey of the related literature, an attempt is made in this chapter to review the related literature. The chapter deals with the theoretical and empirical work in the area of human capital and economic growth. The chapter has five sections. Section first deals with the introduction. Section second provides with theoretical views on the human capital and economic growth. Section third provides empirical studies on human capital and economic growth. Section four of the chapter provides the studies related to India and section five provides conclusions of the chapter.

Section II

2.3 Human Capital and Economic Growth: - A Theoretical Approach

The concept of human capital is an old one. Perhaps the first to try to define and measure what we now call human capital was Sir William Petty (1623–1687) (Petty, 1690). The most prominent founder of the Political Arithmetic School of Economics and a forerunner of applied econometrics, Petty was concerned with the main national socioeconomic and political roles of human capital. He believed that labour was the 'father of wealth' and that a measure of its value should be included in the estimation of national wealth. Petty's thesis was that factors other than land and population were important in determining the wealth of a nation. Besides interest in demonstrating the power of the nation, there were other reasons for estimating the stock of human capital: for example, to measure the value of lives destroyed in war or the monetary loss due to deaths or associated with migration, or to offer a sound base for taxation.

Cantillon (1755) discussed the concept of human capital. Cantillon was more interested in defining the costs of maintaining a slave and his offspring than in estimating the value created by human capital.

Smith (1776) Smith's principal aim was not to measure the 'value of the stock of human capital' but to understand the reasons why there are different remunerations between different occupations. Smith envisaged five main circumstances which may give rise to differential pecuniary gains in employment: (i) The agreeableness or disagreeableness of different employments; (ii) The differing difficulty and expense of learning them; (iii) The differing job security in them; (iv) The differing amount of trustworthiness required for them and (v) The differing probability of success in them. Smith included the acquired and useful abilities of all the inhabitants or members of the society under the idea of capital. He wrote 'the acquisition of such talents, by the maintenance of the acquirer during his education, study or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were. The improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labour, and which, though it costs a certain expense, repays that expense with a profit' (pp. 265–266). 'The work which he learns to perform, it must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital. It must do this too in a reasonable time, regard being had to the very uncertain duration of human life, in the same manner as the more certain duration of the machine' (p. 101). Overall, it was Smith's belief that the growing system of capitalist factories would have the effect of devaluing human capital measured as skills and abilities because the factory system required only homogeneous unskilled labour.

J.S. Mill (1848), in his Principles of Political Economy (quotations from the 1909 edition), stated that we cannot define human beings as capital: ‘A country would hardly be said to be richer, except by metaphor, however precious a possession it might have in the genius, the virtues, or the accomplishments of its inhabitants; unless indeed these were looked upon as marketable articles, by which it could attract the material wealth of other countries’ (p. 48) (and for this reason Mill is considered a dissenter in the theory of human capital). But Mill goes further. Starting from the principle that we need a market in order to determine the value of a thing, he enquires whether there is a market for acquired abilities and skills. The answer is affirmative. Later in the same book, Mill argues that because acquired abilities are costly and make men more productive, they must be treated as capital, thus taking up a position similar to that of Adam Smith: ‘The human being himself I do not class as wealth. He is the purpose for which wealth exists, but his acquired capacities, which exist only as a means, and have been called into existence by labour, fall rightly, as it seems to me, within that designation’ (p. 47).

Alfred Marshall (1890), quotations from the 1920 edition) adopted a position similar to Mill’s in arguing that it is not possible to value human beings per se: ‘Where a sale of the article is scarcely conceivable, an appraisement is almost out of the question. To estimate the value of the Yellowstone Park is impossible, unless we allow ourselves a range of several hundred per cent. Similar wide limits must be allowed when we try to value free human beings. We can often give a lower limit, but seldom an upper one [. . .] It would be wrong, however, to conclude, as some writers

have, that because we cannot value them accurately, public parks or freemen cannot be called wealth' (p. 17). Marshall's conception of human capital is similar to Mill's: 'We may define personal wealth so as to include all those energies, faculties and habits which directly contribute to making people industrially efficient' (p. 58).

McCulloch (1849), instead of understanding capital all that portion of the produce of industry extrinsic to man, which made be applicable to his support, and to the facilitating of production, there does not seem to be any good reason why man himself should not, and very many why he should be considered as part of the national capital.

According to Nassau Senior (1790–1864), it may be useful to treat human beings as capital: from an economic point of view there is little difference between talking of the value of a free man and of a slave.

More recently, Dennison (1962, 1967), asked whether the value of an individual's useful abilities and skills and the value of that individual him/herself are the same thing. Given that the former are embodied in the human being, it is difficult to distinguish between the two.

Schultz (1961), one of the founders of the Chicago School of human capital analysis, noted that 'our values and beliefs inhibit us from looking upon human beings as capital goods, except in slavery, and this we abhor [but . . .] there is nothing in the concept of human wealth contrary to [the] idea that it exists only for the advantage of people. By investing in themselves, people can enlarge the range of choice available to them. It is

one way free men can enhance their welfare. Schultz's argument was in line with the new approach taken to the rational choice of investing in human capital. Instead of focusing on the state's aim of enhancing the wealth or power of the nation, the new approach sought to determine the reasons why an individual would decide to invest in his/her personal skills. The distinction between the value of the person, which extended beyond the economic dimension, and the value of his/her skills was thus made clearer.

Section III

Survey of Empirical Studies

2.4 Empirical studies

The literature of endogenous growth theory has stimulated economists' interest in the empirical evidence available from cross country comparisons, bearing on the main level relationship between human capital development and the growth rate of real output. In this section of the chapter the empirical studies related to the study are discussed.

Nelson and Phelps (1966), in a short paper entitled "Investment in Humans, Technological Diffusion, and Economic Growth," offered a new hypothesis to explain economic growth. Their explanation had two distinct components. The first component postulated that while the growth of the technology frontier reflects the rate at which new discoveries are made, the

growth of total factor productivity depends on the implementation of these discoveries, and varies positively with the distance between the technology frontier and the level of current productivity. The second component of the Nelson-Phelps hypothesis suggested that the rate at which the gap between the technology frontier and the current level of productivity is closed depends on the level of human capital. Nelson and Phelps make this point starkly in the concluding sentence of their paper: "Our view suggests that the usual, straightforward insertion of some index of educational attainment in the production function may constitute a gross miss-specification of the relation between education and the dynamics of production." made the link explicit in what they termed "investment in humans": workers needed education in order to utilize new technologies (the development of which is considered exogenous), thereby increasing total factor productivity and spurring economic growth.

Lockheed, Jamison, and Lau (1980), in their paper entitled Farmer Education and Farm Efficiency: A Survey summarizes 39 equations from 18 different studies in 13 countries, concluding that education has a positive effect on farm productivity. The original research said education makes a difference to farm productivity of about 10% in a modernizing environment. Education makes virtually no difference to farm productivity, the researchers argued, if the environment is non-modern [where agriculture is traditional and where there are no new methods and new crops being tried out]. However if the above research is used for policy without a reference to the crucial importance of context or environment, there is a danger of misleading the reader. The research was criticized on

the front that it may not be education alone, but a combination of effects, from the family's socio-economic environment, from the education received at school (including type and quality), that may result in these claimed outcomes.

Lucas (1988), in his paper entitled "On the mechanics of economic development" considers the prospects for constructing a neoclassical theory of growth and international trade that is consistent with some of the main features of economic development. Three models were considered and compared to evidence: a model emphasizing physical capital accumulation and technological change, a model emphasizing human capital accumulation through schooling and a model emphasizing specialized human capital accumulation through learning-by-doing. The paper revealed that the major importance of the educational system to any labour market would depend on its ability to produce a literate, disciplined, flexible labour force via high quality education. Consequently, with economic development new technology is applied to production, which results in an increase in the demand for workers and better education.

Romer (1990), in his one of the famous papers "Endogenous Technological Change" revealed that in building growth model growth is driven by technological change that arises from intentional investment decisions made by profit-maximizing agents. The distinguishing feature of the technology as an input is that it is neither a conventional good nor a public good, it is a non- rival, partially excludable good. Because of the no convexity introduced by a non-rival good, price-taking competition cannot

be supported. Instead, the equilibrium is one with monopolistic competition. The main conclusions are that the stock of human capital determines the rate of growth, that too little human capital is devoted to research in equilibrium, that integration into world markets will increase growth rates, and that having a large population is not sufficient to generate growth. The bottom line is creation of new ideas is a direct function of human capital, which manifests in the form of knowledge. As a result investment in human capital led to growth in physical capital which in turn leads to economic growth.

Mankiw et al. (1992), in their paper "A Contribution to the Empirics of Economic Growth" empirically examine the Solow growth model with and without human capital as a factor of production and find that the human capital augmented Solow model fits in explaining cross-country income variations. The study employs a data set of 121 countries from 1960 to 1985 and applies the method of OLS for estimation. The authors use Cobb-Douglas production function consisting of output as a dependent variable while labour, physical capital and human capital are explanatory variables. The study uses a variable "School" as a proxy for human capital. The variable School was constructed through taking the percentage of the people aged between 12 to17 enrolled in the secondary schools. This percentage was multiplied by working age population which is of school age (1 to 19). The augmented Solow model explained around 80% income variation across nations and the authors recommended this framework for further studies on economic growth.

Levine and Renelt (1992), in their work on A Sensitivity Analysis of Cross-Country Growth Regressions perform sensitivity analysis on the observed correlation between long run growth and policy variables in cross-country analysis. Their results suggest that regression that displays a positive relationship between human capital and economic growth are not robust to the inclusion of other relevant variables. They recommend a reasonable degree of skepticism about inferences from empirical studies linking human capital to growth.

Jenkins (1995), Uses annual data from 1971 to 1992 for United Kingdom and it proxies the stock of human capital by three series measuring workforce qualifications. These series are used as key determinants of aggregate output, alongside physical capital, total workforce, capacity utilization and a time trend. The overall result confirms the finding that investment in human capital increases productivity. Highly-qualified workers are found to contribute almost twice as much to productive efficiency as those with no qualifications at all. The relatively small number of observations means that the unrestricted estimates are imprecisely determined and such results cannot be regarded as robust.

Barro (1997), in his work Determinants of Economic Growth: A Cross-Country Empirical Study, using modified data in panel format and applying more sophisticated estimating techniques produces a similar set of findings that confirms human capital important factor of growth. The study revealed that an extra year of male upper-level schooling is associated with a 1.2 % increase in per capita GDP growth rate. Male

primary schooling is found to have no significant impact on growth and, again, female schooling at various levels has negative but insignificant coefficients in the various equations that are reported.

Fafchamps and Quisumbing (1998), in their paper Human Capital, Productivity, and Labour Allocation in Rural Pakistan, investigates whether human capital affects the productivity and labour allocation of rural households in four districts of Pakistan. The investigation shows that households with better-educated males earn higher off-farm income and divert labour resources away from farm activities toward nonfarm work. Education has no significant effect on productivity in crop and livestock production. The effect of human capital on household incomes is partly realized through the reallocation of labour from low productivity activities to nonfarm work.

Maudos et al. (1998), analyzed the role of human capital in the productivity gains of the countries of the OECD in the period 1965-90. The results showed that a higher level of human capital affects positively the rate of technical progress, associated with human capital. The authors analyzed the technical efficiency of vegetable base cropping system in Msinga district Kwazulu-Natal. The results indicated that high education and more off farm income decreased the efficiency of farmer. This was due to much constraint such as productivity, technology and market which leads to decrease the farmer's income in vegetable based cropping system. It was suggested that production of vegetable can increase if government provide appropriate incentive.

Burki and Shah (1998), in their work stochastic frontier and technical efficiency of farms in irrigated areas of Punjab in Pakistan presented new evidences by examining the cost behavior of 387 farms and whole farm data from five irrigated districts of Punjab. The results revealed that abundance of canal water and education has positive relationship with technical efficiency while age of farmers showed no effect on technical efficiency. It was found that small operating land farmers were more efficient than larger farmers. It means that there was an inverse relationship between technical efficiency and farm size. The authors suggested that technical efficiency can be increased by increasing technical efficiency of olive production investment in education and improving tractor power policies

Judson (1998), in his paper on Economic Growth and Investment in Education: How Allocation Matters, attempts not only to substantiate the role of increasing investment in education in promoting growth, but also to examine the importance of the allocation of this investment in the growth context. In addition to the familiar summers and Heston data, and the Barro and Lee human capital stock statistics, Judson uses UNESCO data on educational enrolments and spending to estimate the efficiency of existing educational allocations within countries. Overall, a 1% increase in human capital growth is found to be associated with an 11% increase in GDP growth rate. Judson applies a country comparative growth decomposition regression to show that the correlation of human capital accumulation is not significant in countries with poor allocations but it is strongly significant and positive in countries with better allocations (predominantly

richer countries). This finding that the contribution to growth of human capital depends on the efficiency with which it is accumulated has important policy implications in terms of the exact allocation of educational and training resources.

McMahon (2000), in his work The Impact of Human Capital on Non-Market Outcomes and Feedbacks on Economic development has argued that the direct effect of education on economic growth is separable from the indirect effect or externalities. Of these externalities, probably about 75 % are non-market outcomes which feed back into economic growth, but are not readily measurable in the same way as GNP. The main non-market externalities are: health, including longevity, infant mortality and fertility; environmental impact, including various forms of pollution and deforestation; crime, including rule of law, crimes against the person as well as property crime; better income distribution and the issue of poverty; and democratization, including human rights and political stability.

Sianesi and Van Reenen (2000), in their work "The Returns to Education: A Review of the Macro-Economic literature" concluded that an overall 1% increase in school enrolment rates leads to an increase in GDP per capita growth of between 1 and 3%. An additional year of secondary education which increases the stock of human capital, rather than just the flow into education, leads to more than a 1% increase in economic growth each year.

Abbas (2001), in a similar study entitled Endogenous Growth and Human Capital: A Comparative Study of Pakistan and Sri Lanka,

empirically investigates the effect of human capital on economic growth in Pakistan and Sri-Lanka. The production function used in the study is a standard human capital augmented production function in which the output growth depends on labour, physical capital and human capital. The OLS method was applied on an annual data series from 1970 to 1994. Enrolment rates at primary, secondary and higher secondary levels were taken as a proxy for human capital in the study. Human capital was found to be positively related with economic growth in Pakistan at 1% level of significance and at 5% level of significance in case of Sri-Lanka at secondary and higher secondary level respectively.

Wang and Yao (2001), in their research work Sources of China's Economic Growth, 1952-99 incorporating human capital accumulation, analyzed China's rapid growth as a result of factor accumulation as well as Total factor productivity (TFP) growth in the post reform period of 1978 to 1999. The study used an annual data set from 1953 to 1999 and employed growth accounting technique in which growth in labour; capital and human capital are inputs while the residual captures growth in TFP. The study used average schooling years of population aged between 15 to 65 years as a proxy for human capital. They conclude that in the pre reform period (1953 to 1977) growth was factor led and TFP growth was negative while in post reform period, factor accumulation as well as TFP growth played a role in the robust growth.

Kurosaki (2001), in his work Effects of Human Capital on Farm and Non-Farm Productivity in Rural Pakistan studied the Effects of human capital on farm and non-farm productivity by using micro panel data of

rural households in the North-West Frontier Province of Pakistan. The human capital effects are estimated both for wages (individual level) and for self-employed activities (household level) on the one hand and both for farm and non-farm sectors on the other hand. Estimation results show that private returns to male education are significantly positive in outside labour markets for non-agricultural work, with higher reward for higher education levels; the effects of human capital are weak on agricultural wages; productivity of non-farm enterprises rises with education levels of family workers involved; and the effects of primary education on crop productivity are positive and stronger at the farm level than at the individual crop level, but with no additional gain from higher education. These results imply that more educated household members have comparative advantages in non-farming, which is consistent with our observations on labour allocation in the field.

Bernanke and Gurkanak (2001), re-examine the Mankiw, Romer and Weil (1992) framework, (henceforth MRW 1992) framework with an extended dataset and concluded differently. They also apply OLS method on an extended annual data set from 1960 to 1995. This study also uses a Cobb- Douglas production function with the same variable "School" as a proxy for human capital as used in the MRW (1992) framework. The results on the extended data set was not in line with augmented Solow model and it was also found that long run growth rate is correlated with behavioral variables (like saving rates) so they end up with the conclusion that long run growth is endogenous, not exogenous.

Loening (2002), investigates the impact of human capital on economic growth in Guatemala during 1951-2002 using an error-correction methodology. The results show a better-educated labour force having a positive and significant impact on economic growth. Consistent with microeconomic studies for Guatemala, primary and secondary education are most important for productivity growth. These findings are robust while changing the conditioning set of the variables, controlling for data issues and endogeneity. Due to an environment of social and political conflict, however, total factor productivity has been slightly negative for the past decades, and there is evidence of a missing complementarily between the country's skills and its technology base. The author presents a growth-accounting framework which takes into account quality changes of physical capital, and differentiates by level of education. It shows that the human capital variables explain more than 50 per cent of output growth. Of these, secondary schooling is the predominant determinant of growth.

O'Mahony and de Boer (2002), in their work Britain's relative productivity performance: Updates to 1999, confirms that the UK continues to lag behind both Germany and France in terms of labour productivity, and this gap is primarily explained by differential rates of investment in both human and physical capital. This predominantly statistical study compared labour productivity not only across the aggregate economy but also over some 10 broad industrial sectors. It applied education and training statistics, divided into higher, intermediate and lower level qualifications, to quantify comparative workforce skills in the different countries. It identified a significant association between

labour productivity and measured workforce skills across the different industrial sectors of the comparator countries.

Wilson and Briscoe (2004), examine the links between education and training in a country and its macroeconomic growth. An initial analysis of broad statistics for all EU Member States suggests a loose correlation between investment in human resources and growth in gross national product (GNP). The study confirms that increased investment in education is shown to lead to higher productivity and earnings for the individual and similarly, such investment results in significant social rates of return. Applying econometrics, the sector's output is regressed on labour, fixed capital and human capital. From the regression results, it follows that for example a 1% increase in the average level of human capital in the secondary sector yields a direct output growth of 0.076% in this sector.

Tamura (2004), in his study Human Capital and Economic Development develops a general equilibrium model of fertility and human capital investment with young adult mortality. Parents maximize expected utility producing a precautionary demand for children. Because young adult mortality is negatively related to average young adult human capital, human capital accumulation lowers mortality, inducing a demographic transition and an industrial revolution. Data confirm the model prediction that young adult mortality affects human capital investments. The model prediction of a positive relationship between infant mortality and young adult mortality is confirmed. Further, the data indicate a negative relationship between total factor productivity growth and accumulation of schooling.

Bratti et al (2004), estimated a model of economic growth and human capital accumulation based on a sample of countries at a different stage of development. Their result revealed that the increase in the primary and secondary level of education contributes to an increase in productivity. They posit that human capital accumulation rates are affected by demographic variables. For example, they established that an increase in life expectancy at birth brings about an increase in secondary and tertiary education while a decrease in the dependence rate negatively affects secondary education. Finally, they added that geographic variables have a considerable importance in the human capital accumulation process. Nevertheless, studies differed on the impact of human capital on productivity growth.

Izushi and Huggins (2004), conducted study for European regions. This empirical analysis shows that investment by individuals in human capital formation has distinct patterns. Those regions with a higher level of investment in tertiary education tend to have a larger concentration of information and communication technology (ICT) sectors (including provision of ICT services and manufacture of ICT devices and equipment) and research functions. Not surprisingly, regions with major metropolitan areas where higher education institutions are located show a high enrolment rate for tertiary education, suggesting a possible link to the demand from high-order corporate functions located there. Furthermore, the rate of human capital development (at the level of vocational type of upper secondary education) appears to have significant association with the level of entrepreneurship in emerging industries such as ICT-related

services and ICT manufacturing, whereas such association is not found with traditional manufacturing industries. In general, a high level of investment by individuals in tertiary education is found in those regions that accommodate high-tech industries and high-order corporate functions such as research and development (R&D). The empirical analysis demonstrates that the rate of economic growth is determined by the accumulation of human and physical capital, not by level of their existing stocks. They found no significant effects of scale that would favour those regions with a larger stock of human capital. The primary policy implication of the study is that in order to facilitate economic growth, education and training need to supply human capital at a faster pace than simply replenishing it as it disappears from the labour market. Given the significant impact of high-order human as well as the increasingly fast pace of technological change that makes human capital obsolete, a concerted effort needs to be made to facilitate its continuous development.

Heckman (2005), in his article ‘China's human capital investment’ discussed human capital investment in China. China's current policies favored physical capital investment over schooling and urban human capital investment over rural human capital investment. Current migration policies discriminated against children of migrants. A more balanced investment strategy across rural and urban regions and types of capital is appropriate. Private funding for education through tuition and fees should be encouraged and can supplement government funding and make schools more financially self-sufficient. However, if this policy is enacted, capital

markets for financing education needed to be developed to avoid discouraging students from poor families from attending school.

Bergheim, (2005), approved that Education which is probably the most important determinant of human capital affects the output through various channels. It increases knowledge which helps to produce more output in relatively smaller time and also it is intuitionally suggested that an educated person could learn much faster. Increase in the level of education also leads towards better health due to an increase in the awareness of the benefits of healthy living, which in turn increases the output. Moreover, education also enhances the labour force participation in an economy particularly in the case of female participation and output increases further, due to the higher labour force participation rate. Along with education, the role of experience is also very important in productivity growth. Experience generally reduces the chances of errors and increases the output in a given time period.

Oketch (2006), in his article titled Determinants of human capital formation and economic growth of African countries expressed that rapid economic growth and improving living standards have benefited almost all regions of the world since the industrial revolution. Africa stands out as one regional exception. While several factors such as civil wars and rampant corruption have been associated with poor economic performance of the African region in the international community, the main focus of the research was to explore the role that human capital should play in improving the region's economic productivity. The study identified the two-way link between human resource development produced by formal

schooling and economic growth, measured in per capita terms, and between investment in physical capital and growth. It then estimates this three-equation structural system by two stage least squares (2SLS). The study concluded that the sources of labour productivity growth in the medium term in African nations are high investment in physical capital and in human capital. This is consistent with the hypothesis that both human and physical capital investments are necessary if Africa is to attain industrial development. The hypothesis that per capita growth was a determinant in turn of investment in education was consistent with the ordinary least squares and 2SLS estimates, implying a two-way causal flow. Also confirmed is the hypothesis that human resource development is a determinant of investment in physical capital, which contributes significantly to per capita growth in the next round.

Duma (2007), studies the sources of growth in Sri Lanka using annual data from 1980 to 2006. A human capital augmented Cobb-Douglas production function was used in the study where output growth was taken as a dependent variable while growth in labour, growth in physical capital and growth in human capital were taken as explanatory variables. Total factor productivity is the residual in the equation which captures all the unexplained variations in the output growth. The author found a very low contribution of human capital to growth. From 1980 to 2006, human capital only contributed around 10% of output growth while physical capital and labour contributed 17% and 27% respectively. The major contribution to growth was TFP which contributed around 46%. The author justified the results on the ground that in the period after the 1980's

there was a slowdown in the labour intensive product line along with a rapid growth in the output of capital intensive industries with higher productivity level. The study ended up with the conclusion that in explaining Sri Lanka's sources of growth after the 1980's, TFP played a significant and dominating role.

Abbas and Foreman-Peck (2007), use the co-integration technique for estimating the effect of human capital on economic growth of Pakistan in the period 1961 to 2003. In their study, the stock of human capital was used as a proxy for human capital which was calculated through the perpetual inventory method by using the secondary enrolment data. Another proxy for human capital used in the study was health expenditures as a percentage of GDP. They found an increasing return to physical and human capital specially in case of investing in health sector.

Fleisher, Li and Zhao (2007), study the dispersion in rates of provincial economic- and TFP growth in China. The results showed that regional growth patterns can be understood as a function of several interrelated factors, which include investment in physical capital, human capital, and infrastructure capital; the infusion of new technology and its regional spread. They find that human capital positively affects output per worker and productivity growth. In particular, in terms of its direct contribution to production, educated labor has a much higher marginal product. Moreover, they estimate a positive, direct effect of human capital on TFP growth. This direct effect is hypothesized to come from domestic innovation activities. The estimated spillover effect of human capital on TFP growth is positive and statistically significant, which is very robust to

model specifications and estimation methods. The study concluded that investing in human capital will be an effective policy to reduce regional gaps in China as well as an efficient means to promote economic growth.

Maria and Stryszowski (2008), in their article titled Migration, human capital accumulation and economic development studied how the possibility of migration changes the composition of human capital in sending countries, and how this affects development. In their model, growth was driven by productivity growth, which occurred via imitation or innovation. Both activities used the same types of skilled labour as input, albeit with different intensities. Heterogeneous agented accumulate skills in response to economic incentives. Migration distorts these incentives, and the accumulation of human capital. This slowed down, or even hinders, economic development. The effect was stronger, the farther away the country was from the technological frontier.

Chi (2008), in his article titled the role of human capital in China's economic development: Review and new evidence, utilized empirical methods and measurement, and found that the effect of human capital on China's economic growth may be indirect through physical capital investment. This result is different than that found for OECD countries and has not been suggested by previous studies. In addition, in determining physical capital investment, workers with college education played a more significant role than those with primary and secondary education, suggesting the possibility of capitals kill complementarity. This founding has implications for China's future regional growth inequality: the inequality may increase rather than decrease, because physical capital

investment continued to accumulate faster in the eastern area where the human capital stock is larger and thus leaded to greater economic growth in the east.

Escosura and Roses (2010), in their article titled Human capital and economic growth in Spain investigated human capital accumulation in Spain using income- and education-based alternative approaches. They, then, assessed human capital impact on labour productivity growth and discussed the implications of its alternative measures for TFP growth. Trends in human capital are similar with either measure but the skill-premium approach fitted better Spanish historical experience. As education is a high income elastic good, human capital growth computed with the education-based approach seems upward biased for the recent past. Human capital provided a positive albeit small contribution to labour productivity growth facilitating technological innovation.

Kottaridi and stengos (2010), in their article titled Foreign direct investment, human capital and non-linarites in economic growth made a contribution to the existing literature on the foreign direct investment (FDI) and economic growth nexus by contrasting past empirical evidence and conventional wisdom and arriving at some interesting new results. By applying non-parametric methods, and thus taking into account non-linear effects of initial income and human capital on economic growth, they explored the FDI effect on growth in much greater detail than previous studies. Their founding not only confirmed the non-linear effect of human capital in the presence of FDI inflows but also suggested that FDI inflows

are growth enhancing in the middle-income countries while there is a 'two regime' FDI effect for high-income countries.

Shaheen, Sial Sarwar and Munir (2011), conducted a study to determine technical efficiency of cauliflower farmers in "Soone Valley". The study used data collected from two villages of Soone Valley of district Khushab, Punjab. Frontier production function was used and its parameters were estimated with maximum likelihood estimator. The results of production coefficients showed that tractor hours, seed, plant protection measures, irrigation and labour had positive impact on cauliflower production. The results of technical efficiency showed that education and experience had positive affect on technical efficiency. But age had negatively related to the technical efficiency. Mean technical efficiency was 51 per cent indicating that there existed a great potential to increase cauliflower production, with available resources and technology.

Qadri and Waheed (2011), in their study entitled Human Capital and Economic Growth: Time Series Evidence from Pakistan regarded that Human capital is generally considered as a positive contributor in the economic growth. In the study, they estimate this relationship using time series data of Pakistan for the period 1978 to 2007. A health adjusted education indicator for human capital was used in the standard Cobb-Douglas production function confirms the long run positive relationship between human capital and the economic growth in Pakistan. A sensitivity analysis was also performed in order to check the robustness of the initial findings. The estimation results supported the findings of the previous

studies that human capital is positively related to growth and also that the results are robust. The health adjusted education indicator was found to be a highly significant determinant of economic growth, which indicates that both the health and education sectors should be given special attention in order to ensure long run economic growth.

Ojo Johnson (2011), in his Human Capital Development and Economic Growth in Nigeria, study shows the relevance of human capital development to the growth of the economy. The study evaluates human capital development and economic growth in Nigeria by adopting conceptual analytical framework that employs the theoretical and ordinary least square (OLS) to analyze the relationship using the GDP as proxy for economic growth; total government expenditure on education and health, and the enrolment pattern of tertiary, secondary and primary schools as proxy for human capital. The analysis confirms that there is strong positive relationship between human capital development and economic growth. Following the findings, it was recommended that stakeholders need to evolve a more pragmatic means of developing the human capabilities, since it is seen as an important tool for economic growth in Nigeria. Also proper institutional framework should be put in place to look into the manpower needs of the various sectors and implement policies that will lead to the overall growth of the economy

Zhang and Zhuang (2011), in their article titled the composition of human capital and economic growth: Evidence from China using dynamic panel data analysis examined the effect of the composition of human capital on economic growth in China, using the Generalized Methods of

Moments (GMM) method. The results showed that tertiary education had played a more important role than primary and secondary education on economic growth in China.

Section IV

Empirical studies related to India

Battese and coelli (1992), in one of their study related to India estimated technical efficiency by using panel data of paddy farms in India. The result showed that technical efficiency increased with time. The result showed that education has positive relation with technical efficiency.

Abbas (2000), uses a growth accounting framework to compare the effect of human capital on economic growth in Pakistan and India using OLS method on a dataset of 25 years from 1970 to 1994. The equation consisted of output as dependent variable while labour, physical capital and human capital were used as independent variables. In this study, enrolment rates at primary, secondary and higher secondary levels were taken as a proxies for human capital. The results varied with different proxies of human capital taken in the study (like primary schooling, secondary schooling and higher schooling). The secondary schooling was found to be positively related and significant in both the countries however primary education was found to be positively related in case of India at 1% level of significance.

Haldar and Mallik (2009), examines the time series behavior of investment in physical capital, human capital (comprising education and health) and output in a co-integration framework, taking growth of primary gross enrolment rate and a dummy for structural adjustment programmer (openness which has been initiated in 1991) as exogenous variables in India from 1960 to 2006. The results suggest that physical capital investment has neither long-run nor short-run effect but the human capital

investment has significant long-run effect on per capita GNP; the stock of human capital measured by primary gross enrolment rate (lagged by three years) and openness is found to have a significant effect on growth of per capita GNP. The Generalized Impulse Response Function confirms that the innovation in per capita GNP growth can only explain the movements of the growth of per capita GNP (itself) and investment in education human capital positively and significantly only for a short period of time but does not explain the movements of the investment in physical capital and health human capital. Moreover, the innovation in change in education human capital investment significantly and positively explains the movement of the changes in education human capital investment (itself), health human capital investment and growth of GNP per capita; the innovation in health human capital investment significantly explains the changes of education and health human capital investment only.

Mukherjee A.N (2007), in his study Public Expenditure on Education: A Review of Selected Issues and Evidence discusses the role of education in economic development which has been recognized in mainstream economic literature. Divergence between the private and social rate of return from education is the rationale for intervention by the state in ensuring equity in opportunity across the population. The 'New Growth Theories' predict that higher levels of schooling and better quality of workforce will lead to an increase in the growth rate, further strengthening the case for public expenditure on education. The outcome of such research has implications for the financing of education. However, the effectiveness and efficiency of resource allocation by the government has generated

considerable debate, both from ideological and technical points of view. It is widely acknowledged that there is a large scope for improvement in both the level and the quality of publicly funded education. New institutional arrangements are being designed to address the deficiencies in incentives and monitoring, thereby improving quality.

Amin and Aaditya (2003), in their working paper entitled Human Capital and the Changing Structure of the Indian Economy by Using panel data for the fourteen major states of India over the 1980-2000 period, the authors estimate the effect of human capital endowment on the performance of the state economies. They find that greater availability of skilled workers had a positive and significant impact on output in the service sectors. They do not find any such effect for the manufacturing sectors. The paper shows that the differential effect on services and manufacturing arises because service sectors are more skill intensive

Kochar et al. (2006), showed that India's share of output in skill-intensive industries is higher than that of China and comparable to that of much richer countries like Malaysia and Korea.

Ahluwalia (2000), do include measures of human capital to analyze variations in growth rates across Indian states in the post 1980 period but the study rely entirely on literacy rates. A second problem with the study is that it does not address the problem that endowments of human capital could be endogenous.

Tilak J.B.G. (2002), analyzed the various parts of the Indian population, which spent more budget on education and endeavors to evaluate education economic determinants. Specifically, it examines the

degree to which the amount spent on education by household reacts to changes in families' income level and spending in education by the government. The study comprised of 1994 data on human development in India supplemented by different sources. He concluded that government expenditure and household expenditure on education are complements to each other. An increase in government spending on education will become the cause to increase in household spending.

Ojha and Pradhan (1987), in one of the study, entitled Human Capital Formation and Economic Growth in India : A CGE Analysis, used a multi-sectorial neo-classical type price driven CGE model, with the additional feature that it includes a mechanism by which public education expenditure to build human capital augments the supply of educated/skilled labour, is used to analyses the impact of an increase in the former, financed by an increase in direct tax rates, on economic growth and income distribution in the Indian economy. The simulation results suggest that it is possible to increase investment in human capital in the resource constrained fiscal environment of the Indian economy, and reap the benefits in terms of a faster economic growth and a better income distribution. The results also suggest that secondary education needs to be accorded higher priority, though, not necessarily, at the cost of higher education. Finally, to maximize the benefits in terms of economic growth it is desirable that investment in physical capital be increased simultaneously with investment in human capital.

Pradhan (2002), finds an interesting paradox in the growth process of the Indian economy, namely, that there is not much change in income

inequality even though there are large changes in the educational levels of the population over time. He tries to resolve this paradox by using an applied general equilibrium model to simulate the impact of large changes in access to education on wage inequality. The model results clearly showed that even for very large increases in access to education the wage inequality remains unchanged. Apparently, the dominant effect on the skilled labor wage rate is that of the changes in the relative product prices in the world market (i.e., the trade effect), rather than that of increased relative supply of educated labor ensuing from enhanced access to education.

Pradhan and Singh (2004), in their study do not find a strong influence of public expenditure per child and the rate of growth of expenditure on the enrolment rate for 16 major states of India. However, this is because the varying degrees of 'efficiency' of expenditure across states are not taken into account. The efficiency of expenditure is defined as the technical efficiency of the inputs – the number of schools and the number of teachers – in generating educational output, such as enrolment. Using Data Envelopment analysis (DEA), they rank the states by their levels of technical efficiency. Having thus ranked the states by their levels of technical efficiency, they find stronger positive association between public education expenditure and enrolment for the relatively efficient states as compared to the relatively inefficient states. In other words, once the efficiency of expenditure is taken into account, the effect of public education expenditure on enrolment is seen to be stronger.

Madsen et al. (2008), in their study the Indian growth miracle and endogenous growth studied Indian growth using a data set of 1950 to 2005 and a data set of 590 firms from 1993 to 2005 to find evidence of endogenous growth in India. A human capital augmented production function was used in the study and the method of co-integration was adopted for estimation. They found very little support to the endogenous growth hypothesis as the TFP and research activity were not found to have a long run relationship. Instead of endogenous growth, the study showed that Indian growth could be characterized as Schumpeterian. They found a long run relationship between the research activity and the product varieties. The study also found Strong international spillover effects on the Indian economy.

Section V

Conclusion

2. 6 Bridging the Research Gap

The empirical implication of these studies is that human capital development, to a large extent affects economic growth positively. In a relatively poor country, higher investment in human capital can enhance growth in the economy. The broad interpretation of these findings in the context of recent growth models is that raising the general level of educational attainments interacts positively with other forces among them, the accumulation of complementary physical capital and the application of new technologies. Higher human capital intensity thus permits countries to accelerate their productivity growth rate and narrow the relative size of per capita real income gaps separating them from the leading economies.

Maintaining a high average level of educational attainments and correspondingly high rates of investment in other forms of human capital (e.g., health, internal, spatial and occupational mobility) would appear to serve as stability force, although not a guarantee against continuing secular decline in a country's relative per capita income position. Most of the theoretical literature on economic growth focuses on the role that investment in formal education and plays in modern economies. It therefore becomes pertinent to examine them empirically.

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