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JOURNAL OF ECONOMIC DEVELOPMENT

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Determining the Effective Education Policy - An Indian Perspective

Archana Dholakia*

Introduction

Education policy of a country is guided by its economic, social, cultural and political environment. Although some basic tenets of economic theory do contribute for framing the policy the above mentioned factors generally outweigh these principles. What is more important to note is that for a given country the policy changes take place over a period of time depending on the demand and supply conditions of education. Hence it is impossible to have a unique policy model which can work for all the countries for all the time.

Moreover for implementation of the policy and getting the desired outcomes the factors like characteristics of labor, level of corruption among teachers and taught in public and private institutions, incentive structure for the pay & punishment of their employees, regulatory requirements of the government etc. play a very important role. Though the policy would have been designed with a good intention, these factors can make it more or less effective in real life.

The present paper attempts to take up the issue of effectiveness of education policy in In India and gives a few suggestions to improve the outcomes of the policy. Section II briefly discusses the broad policy choices available to the policy makers, namely Human Capital ((HK) and Physical Capital ((PK) and that how different state governments in India chose different strategy for development in the past.

It must be noted that though education is a state subject, the central government does provide prescription, guidance and money for implementing certain action plans. Since education is the most important pillar of the human capital strategy, in section III we discuss some theoretical aspects of economics of education which have directed the empirical research and thereby also the education policy of different countries. Section IV discusses the problems and prospects of effectiveness (or absence of it) of education policy adopted in India during the last five decades. Critical analyses and observations are also made with a view to improving the situation. In section V some inputs are provided to design a more effective policy which may help to overcome at least a few of the problems discussed earlier. Section VI finally presents the concluding remarks.

Policy Options for Development

At an aggregate decision level any country in question has to basically make a strategic choice of investment between the two competing sectors namely Human Capital (HK) and Physical Capital (PK). This is a strategic decision which indicates the preference of the government 'on margin'. To elaborate it further when the government chooses the strategy of Physical Capital (PK), it does not mean that it will scrap all its expenditure on Human Capital. It

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only means that hence forth the government will devote its additional resources (either in real terms or percentage terms) to Physical Capital items like water, power, transport, communication, industry, minerals and so on by giving them higher priority. Similarly if the government chooses the strategy of HK, it will spend 'its additional resources on health, education, nutrition etc. by giving them greater priorities over the Physical infrastructure. Thus the choice is never either or. It is always more or less in such matters (Dholakia, 1990; Farukee, 1979).

For example, during 1970-2000 the states like Gujarat, Maharashtra, and Punjab& Haryana adopted the developmental strategy of emphasizing the PK (Dholakia, 1990; Dholakia and Dholakia, 2015). They increasingly spent additional resources on construction of roads, bridges, water dams and financial infrastructure like cooperative banks and institutions. The resources spent on schools, colleges, universities, hospital, nutrition etc. did not grow as much as on PK. On a priory consideration this strategy assumed that PK, through overall economic growth and development process can cause a trickle down impact on development of HK (Dholakia, 1990). The states like Kerala and Tamil Nadu (TN) on the other hand, had adopted the strategy of HK by spending more and more resources on schools, colleges, hospitals, medicines, medical education and so on. The assumption was that this will cause overall development of the economy and in the process cause growth of PK as a trickledown impact (with some lag!).

Interestingly one can also observe the different outcomes of the two alternative strategies. The data suggest that Gujarat, Maharashtra, Punjab and Haryana achieved higher growth of per capita income and employment during last few decades. Urbanization and Inflow of migrants to these states increased at a rapid rate and poverty decreased too. However, health indicators like Infant Mortality Rate(IMR),Birth Rate(BR), Death Rate(DR), Maternal Mortality Rate (MMR) etc. did not show significant improvement hence the human development index of these states remained relatively low until late eighties (Dholakia and Dholakia,2015).

Whereas southern states like Kerala and Tamil Nadu achieved positive results in terms of health and education parameters with relatively higher level of Human Development Index. There was substantial decline of IMR, BR, DR and increase in literacy rate, graduation and post-graduation rates and so on. Unfortunately this improvement was accompanied by outmigration of people from these states to other states/ countries. Also relatively high crime rate was reported in these states due to lack of employment opportunities. (Dholakia, 2002)

In other words, the western and Northern states of India adopted PK strategy and southern states adopted HK strategy for development for five decades after independence and the outcomes suggest that both these strategies have their advantages as well as disadvantages. So the scientific choice of the strategy for a given state could be made by using the latest available information and data on achievements in terms of various socio-economic indicators. The data could be analyzed by applying alternative econometric techniques like for instance simultaneous equation model, recursive models or factor analysis discussed in standard textbooks of

econometrics (Gujarati, 2011). The estimated parameters of the model could then help to choose the appropriate set of expenditures to meet the state specific targets. However discussion of such models is beyond the scope of the present paper.

Irrespective of the overall development model of the government, the education policy assumes great importance as the latter also impacts social development in general and empowerment of different vulnerable groups of the society (including women) in particular. This is the reason why economics of education has retained its importance till today. The next section is devoted to some of the theoretical aspects of economics of education being discussed in the literature (Meier, 1999). Various empirical studies based on them are also referred as they have been useful in guiding the policy decisions relating to education in different countries including India.

Theory and Policy

As mentioned above, though educational policies of different countries are coloured by the interest groups, vested interest groups and politicians, they do derive a lot of guiding inputs from the research based studies in the field consisting of theoretical models, analyses and empirical estimates. Since the discussion on economics of education started more than four decades ago, the literature consists of a large number of studies covering different aspects of it (Meier, 1999). We can summarize these studies as follows:

(a) Demand and supply of education and the factors governing them.

(b) Education as an investment and as a consumption variable and factors determining them. Such studies also estimate the personal and societal returns on investment from primary, secondary and/or tertiary education. Externality issues are considered and estimates of both internal and external benefit of education are generated by using empirical data.

(c) Total costs of education including the opportunity costs and variations in them across the nations, states, gender and different socio- economic groups are studied.

(d) Revenues and cost recovery rates on education sector at different level of education, viz. primary, secondary ,tertiary and professional education streams like medical and engineering. Such studies estimate the explicit and implicit subsidies flowing to education sector in a given region.

(e) Production function model on education- its theoretical specification, econometric specification and empirical estimation with the time series and/ or cross section data for a given geographic region(s). In such models education is treated as an output or a dependent variable and different factors affecting the level and types of education are treated as inputs or independent variables. Often such studies include the estimation of simultaneous equation models.

(f) Studies showing the relationship between education, productivity and economic growth& development. The extent of relationship and causality issues are studied by those working in this area.

(g)   Financing of education and public v/s private sector provision.

(h)   Inequality in access to education, investment in education and returns to education.

(i)   Market failure, externality and educational attainment as a way of signaling the productivity.

(j)   Brand development, signaling, rating requirement and accreditation of educational institutions to improve the quality of education and mitigation of the problem of asymmetric information faced by potential students and employers.

(k)   Political goals & objectives impacting the outcomes of education.

A large number of empirical studies have been carried out at the international as well as national and state level. Various hypotheses are tested and scholars have evolved some common methodology to carry out these exercises. Traditionally, for instance returns on education are measured in terms of wage differential between groups with different levels of education (Kothari, 1995; Hall and Jones, 1999).

By using international data Hall and Jones (1999) estimated that returns on education are 13.4% p.a. for first four years of schooling, 10.1% for next four years and 6.8% for each year beyond eight years of schooling. His estimates thus implied that a person with twelve years of schooling will earn about 3.16 times as much as someone with practically no schooling.

One of the early works for India on returns to education was done by Kothari in 1967. (Kothari, 1995). The author used the survey data of Mumbai collected for this purpose. He estimated the costs for different levels of education as well as earnings differential between different levels of education and also prepared the age-earning profile. The results showed that social monetary returns for high school were 20%, college of all type were 13%, Arts and Science college10%, technical and engineering education 22%. (Kothari, 1995).

Similarly another study concluded on the basis of empirical exercise carried out for developed nations that human capital formation due to education is quite substantial which get reflected in the earnings of people with different levels of education (Weil, 2009). The author observed that about two thirds of the total wages (65%) are paid to the qualified workers with high human capital formation and remaining only one third (35%) went to raw unskilled labour.

Quite a few studies on education try to examine the relationship between GDP and education. Interestingly such studies differ in terms of their emphasis on the role of education. For instance Hall and Jones (1999) argue that there is a strong correlation between the level of the GDP and the level of Education and that latter causes the former. Daniele (2006) also worked on impact of education on growth. He observes that country like US, with high enrollment in higher education and higher graduation rate have grown faster than without. He concludes that if gender differential in education is less the level of development and growth tend to be higher.

Weil (2009) on the other hand, using the same set of data used by previous authors argue that though GDP varies with education, the variation in the latter explains only some but

not all variations in the GDP. In their perception, apart from education there are other- may be equally or more important variables which could explain large variations in the GDP hence they should not be ignored.

In view of Kling et al. (2009) also educational advances is not the only variable for growth. In fact it explains hardly 14% of the average annual increase in labour productivity over 1915-2005. The authors infer that the main skill and capabilities come by way of learning outside of traditional /formal education. The implication is that emphasizing education policy alone may not turn out to be the best strategy to achieve higher economic development and growth. However some studies still put great emphasis on education saying that it not only plays a determining role in improving growth but also in reducing income inequality.

While examining the demand and supply factors for education an interesting issue often discussed in the literature is whether education should be considered as a consumption good having positive externality or should it be treated as investment whose returns in the short run and long run determines its demand or should it be considered as falling in both the baskets.

Studies by Becker (1993) and Schultz (1961) have generally treated education as an investment. While talking about its determinants Flug and Wachtenheim (1998) conclude that volatility of unemployment and volatility of GDP are the two most important factors negatively affecting the investment in human capital namely education. Since education is considered as an important investment, 5% of GDP of the EU is spent on education by the governments. If the opportunity costs (including personal and societal costs) are also considered, the figure would be around 10% or so of the GDP of EU countries for2005. (Eurostat, 2008).

Shultz (1961) and other scholars also considers education as an item of consumption (Kodde and Ritzen, 1984). Compared to prediction of HK approach incorporating the consumption aspect leads to longer study terms. Also this view yields another explanation for the observable positive income effect with respect to the demand for education. Since it is also demanded for the sake of status or has positive income elasticity, some scholars consider the relationship between GDP and education as 'two way causal' relationship. They argue that people in highly developed nations can afford to consume educational services hence education could be considered as a function (dependent variable) of GDP and not necessarily the other way round!! Some scholars on the other hand study two way causality between these two variables namely education and GDP to understand what causes what (Dholakia, 1990).

Thus for studying the demand for education three alternative approaches based on the three functions of education exist. First is manpower planning, second is human capital formation noted above and third is screening (Kothari, 1995; Meier, 1999). A model for demand for education for screening purpose is based on the economic theory of signaling. A high demand for education for education can also signal a high productivity and ability to potential employers. (Arrow, 1973; Stiglitz, 1974; Johannes, 2008). This may sometimes lead to overinvestment in education by some. However under various circumstances screening can have positive impact

on productivity and can avoid misallocation of different types of individuals. Especially when markets are imperfect due to asymmetric information this screening method would prove to be cost saving. However, in its extreme, this theory of credentialism denies that education provides any useful cognitive skills!! (Kothari, 1995).

Another set of studies on education belongs to an interesting area of externality. Lucas (1988) points out that returns on investment in education are not only high for the person who obtains it but also for the economy as a whole. Education also causes better utilization of other resources of production which we may call as positive externality. These benefits might arise with some lag but nonetheless they do arise and are substantial in magnitude. Thus a combination of an educated worker with other resources like land, capital and technology raises the productivity of workers giving rise to increase in output by multiple times. Also the adoption of technology by an educated labor is much faster compared to less educated people (Burt, 2005). Thus it leads to efficient input combination for the production processes.

A few of the scholars also talk about negative externality due to possible congestion effect in human capital production. If individuals neglect the decreasing productivity of education, it can lead to higher pupil-teacher ratio. This implies that people may demand too much education!! (Meier, 1999). In a dualistic economy of a third world country this leads to overinvestment in education causing 'education Inflation' (Kothari, 1995).

Some economists attempted to estimate the impact of tax and tax credits on investment in education. If public and private education are perfect substitutes, an increase in government spending on education financed by taxes will increase demand for human capital, but may depress output growth due to a slower physical capital accumulation. (Meier, 1999). The counter view is that in private education system also if the burden of repayment of credit (bank or other type) falls on the middle aged people same problem of sacrifice of PK may arise. In fact in such conditions this group advocates for public education as it can do a better job of stimulating capital accumulation.

Economists have tried to identify factors like resources spent on the students by the government or parents, educational attainment of the latter, ease in the geographical access to educational institutions, kind of facilities available to students, and so on for explaining the variations in the demand for education. Whether added funds to schools are likely to produce high achievement has thus entered into policy debates. Evidences in several cases remain inconclusive though. Evidence also suggest that success in school also depends on talent and IQ in the class and not necessarily on the resources spent on education. There is a peer group effect which is stronger for weaker students (Meier, 1999). It is also observed that while initial wealth has no impact on the decision on receiving education (under perfect information), the corresponding demand elasticity is positive under uncertainty about future wages (Kodde, 1986; Meier, 1999)

A relatively recent study of Krauss (2013) also assesses demand -supply factors for education and infers that addressing issues like rural-urban gap, population growth and inadequacy

of infrastructure, child labor etc. would have greater impact on attainment of education than the supply side factors.

A growing area of research also relates to financing of education, its impact on demand and supply of educational services and so on. It is argued that fees are only the direct costs which at the most the government could meet. Costs of uniform, stationary, food, appliances, transport, tuitions, and sacrifice of labor hours which otherwise could have contributed toward the family income are all the costs which the family has to bear. To meet all these costs the students have to depend on the family or the banks.

In the third world countries access to credit market is often not available to students due to absence of security and existing moral hazard. Hence they have to borrow from parents and if that is not possible complete dynasties may remain in poverty traps. (Meier, 1999). Similar things happen if the interest rate on loan exceeds the interest rate on savings. Underinvestment in HK also occurs. (Meier, 1999). Countries with uneven distribution of income may also experience fall in total income below the efficient level, on account of credit constraints in education sector. (Fernandez and Rogerson, 1995). A country in which liquidity constraints reduce the demand for education will generally exhibit a comparative advantage for goods produced by low skilled workers. Hence exports remain primary types and less competitive (Meier, 1999).

In India also financing to aspiring students has remained a major hurdle for the demand for education. During the pre-reform period most of the educational institutions were either completely or partially (through aid) financed by the government. Capacities were low and financial costs were relatively low. But as noted above the cost of education for a student or his family also involves the opportunity costs. The studies reveal that for third world countries, in fact these factors are more important determinant of education than the supply side factors (Krauss, 2013).

The area where there are large number of disagreements among the social scientists in general and economists in particular relate to public versus private sector provisioning and financing of education at primary, secondary and tertiary level. There is a group of scholars who believe that education is the government's responsibility either partially or fully depending on the level of education we are talking about. In their opinion education is a merit good generating large amount of positive externality hence it is a candidate for government provisioning or subsidy at the least. They also contend that public education promote equality of opportunity and social cohesion and generally leads to higher GDP growth rate than a private education regime (Glomm,1997).

However another group of scholars argue by using the theory of public choice and a few country studies that generally the quality of education provided by the government is relatively inferior implying that price per unit of quality is quite high in such cases. Opponent of public provision advocate vouchers so that students can exercise their choice in selecting the school or the college (Borooha, 2005; Browning and Browning, 1994).

The educational institutions owned or sponsored by the governments suffer from 'principal -agent problem' commonly discussed in the literature on economics of information and public choice theory. (Pindyck and Rubinfeld, 2002). Often too much support by the government would crowd out private investments in education. (Meier, 1999)Unfortunately private education sector at higher education and school level also played a very disappointing role in India as would be discussed later.

The studies in India also suggest that the cost recovery rates in education sector are quite low indicating huge implicit subsidies to this sector (Dholakia, 2000). This phenomena not only make the reinvestment in this sector more and more difficult but they also lead to misallocation of the scarce resources and create distortionary impact on different groups of people. The government wants 20% of cost recovery rates from education like in Australia but in India government aided institutions had recovery rates of less than 5 percent (Dholakia, 2000).

An interesting area of work which uses quite a lot of econometrics is estimation of the production function of education (Coleman, 1966; Hanushek, 2008). In this model educational outcome is treated as a dependent variable and type of family, type of facilities, income of the family, characteristics of neighborhood of the students, education of the parents and subsequent likelihood of labour market success are treated as independent (explanatory) input variables. With available data set the scholars have also estimated the marginal impact of each of the input variables on the educational outcome (Hanushek, 2008)

The data requirement of such models is considerable though. Besides this the real problem is regarding dependability on the results of such models in the context of countries like India. First because the model assumes that the inputs are efficiently utilized for producing the educational outcomes. Secondly the empirical studies generally assume that the estimated production function of education remains stable temporally, across the states as well as for various socio-economic groups including the gender. Thirdly the empirical estimation is based on the assumption of absence of corruption, malpractices and leakages arising from bureaucratic aptitude and attitude of the service providers. These assumptions sound quite unrealistic for a developing country like India (Dholakia, 1990; Dholakia, 2002) if estimates based on such models are used for policy purposes it would amount to throwing a baby with the bath water!!

In the case of the first world countries it is generally observed that degree of corruption is less, efficiency of resource utilization is higher and most importantly the prices of inputs are market determined. This is unlike India where the prices of inputs like salaries of the teachers and staff, fees for the students, are administered. The applicability of such models for third world countries is thus quite limited. Nevertheless, the studies based on theoretical models and their empirical estimates are proved useful in shaping up the education policy of different countries including India.

Having understood the theoretical underpinnings of some of the educational policies adopted by different countries including India we now need to consider the criteria to measure

the progress or effectiveness of the policies in achieving the welfare and wellbeing of the people in general. However as a prelude to this it would be relevant to note down a few changes occurred in our education system.

Growth in private unaided colleges occurred since 1979 (Kothari, 1995) but that of private aided institutions took place during the post reform years (Tilak, 2014). Around early nineties a large number of scholars in India and abroad advocated liberalization of education sector to have greater participation from the private sector so that quality of education can improve along with reduction in the financial burden of the government (hence the tax payers!!). During the post reform period India has brought about many changes in its policy for primary, secondary and tertiary education. The composition of public and private sector institutions providing educational services has also undergone significant change (Tilak, 2014).

Eleventh plan also explicitly stressed on privatization of education at all levels of education in a country. Until this plan the approach of the government was that schools can run on the basis of only not-profit trusts. But around this time they allowed for-profit schools also (Tilak, 2014). Simultaneously RTE was introduced and became operative from April 2010. The declared objective of the RTE is that every child must have a right to free and compulsory education until eight years of schooling. But this is not through public funding. Private schools are required to provide 25% seats to relatively low income people and these costs are reimbursed by the government. This subsidization has promoted profit maximizing schools.

A large number of private sector participants entered the market to maximize the profit but the market has remained completely mismanaged and unregulated till today. The size of the private sector is now about twice that of the public sector in terms of number of students enrolled as well as institutions. Despite such an alarming growth of the private educational sector, the problems of quality of education, scarcity of professional teachers, asymmetric information and other market imperfections continue to haunt a common man and the policy makers (Tilak,2011;Tilak,2014)

As some scholars say Indian policy makers believe in 'administering' rather than 'managing' resources hence quantitative growth has not brought the quality improvement. The admissions standards and passing standards are lowered to attract more students. This has harmful effects in the short as well as long run on outmigration and overall standard of education. It may also cause overinvestment in education (Meier, 1999).

It is interesting to note that in India, the private education sector since 1990s is highly subsidized and substantially funded by the government. We have more than 100 private institutions, large number of private aided colleges and self-finance colleges- in fact one of the largest education system in the world. However a few scholars see much benefit in such publicly funded private education because the wide spread prevalence of malpractices in such institutes is difficult for the government to curb (Tilak, 2014). In their opinion the track record of the government in terms of making strict regulations and enforcing them sincerely is far from satisfactory (Tilak,

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2011).Though these institutions are privately managed they are supposed to follow all rules and regulations regarding fees, salaries, admission processes, scholarships faculty recruitment, syllabi etc. applicable to government run institutions. Thus but for the management they are nearly equivalent to government run institutions. They also find out their own ways of flouting norms and not becoming accountable to the government (Tilak, 2011; Tilak,2014).

In short very few quality checks for setting up the institutions, political interference in awarding the licenses and absence of independent regulatory authority are some of the reasons for this mishap. Unfortunately the policy model for education followed by us since 1990s combines worst of both the world- public sector and private sector.

The question which arises is are such policy changes effective enough to give us the desired results? In this context how do we define 'effectiveness' of the policy? What parameters we should consider for this purpose? In the next section we take up this discussion in brief.

Defining Effectiveness of the Education Policy

As mentioned in the previous sections, India's education policy for all the levels of education namely primary, secondary, tertiary including vocational, professional & technical education has undergone changes from time to time (Tilak, 2011, Tilak, 2014; Kothari, 1995) During the first three decades of post-independence the reliance on public provision was significant but post 1991 this changed and private sector institutions grew at an epoch making rate. So the total number of educational institutions per square kilo meter as well as per lakh of population is much larger compared to pre- reform era. Moreover the per capita expenditure on education also shows increase in nominal as well as real terms over the years. Despite this the issues relating to cost, price, access, quality and utility of education remain burning issues till now. This raises doubt about the capability and effectiveness of the measures undertaken by governments from time to time.

The first logical question in this regard is what is exactly meant by the word 'effective'? How do we measure it? And which is a better way to measure it given the socio-economic and political environment of our country? Traditionally the economists used to do a simple exercise of considering education expenditure in per capita (often real) terms or as a fraction of GDP. Along with this the number of schools/ institutions, staff and teachers per lakh of population, student teacher ratio, facilities like toilets and drinking water were etc. were considered as essential inputs and regions ranking higher among them were assumed to be better off in providing education to their people. This is an input based approach and many early studies on development also used these input parameters along with others for measuring the human development in different states (Dholakia, 1990)

However some scholars found no relation between these inputs and the educational attainment and human development of the states. Hence some other indicators measuring the output of education sector were included in the list. Thus during eighties and nineties the researchers

emphasized the use of enrolment data for primary, secondary and tertiary level of education along with dropout rate in each category. These data were studied along with the worker participation rates among (WPR) children of age group 5-9 and 10-14. Sample data on the attendance of the students and teachers in the schools, and number of working days per year were being analyzed. Soon the social scientists realized that these data do not necessarily correlate with the percentage of highly qualified people, availability of quality jobs, employment rate and overall development of the states under the study. In other words these so called output data did not capture the real picture of the states. Either the data were cooked at the school or panchayats level and/or measured with significant errors rendering them completely unreliable. Thus the output approach also suffered from severe limitations in measuring the effectiveness of the educational policy.

Logically, the most relevant criteria for measuring the effectiveness could be in terms of outcome of education. During the last two decades or so the researchers are focusing on this kind of an approach. The direct outcomes could be in terms of number of people graduating every year per thousand of eligible population in that group. Alternatively direct outcome could be measured in terms of attainment of specific skills and abilities supposed to have been provided by the education. In direct outcome approach the reading and mathematical abilities of primary and secondary students are gauged through specific tests given to them. For example in India an organization called Pratham regularly conducts the survey based study of the students of different standards to measure their skill level of math and language. The survey results reflect the direct impact of teaching on students of different states (Dholakia and Dholakia, 2015)

Indirect outcomes are difficult to measure but are more relevant as the effectiveness of policy is measured in terms of concrete achievements attributable to education. That is the effectiveness is measured in terms of employability among youngsters, reduction in incidence of child labour, crime rate, birth rate, child mortality rate, increase in the mean age at marriage and non- agricultural employment especially for women and last but not least arresting the trend of brain drain of young scientists and technocrats. The math is clear. If the educational policy is not able to affect the above parameters in a positive way it is an inefficient, ineffective redundant and hence a failed policy.

As a logical fall out the current, overall socio-economic scenario of the country is pathetic and gives an impression that both public and private institutions have failed to achieve the stated objectives of the national education policy. The following indicators tell the real story about our non-performance of education system in this respect.

Indicators Implying the Flowed Education Policy and Implementation:

(A)   Very low or often no employability of a large number of so called educated youth due to poor skill levels & productivity. This in turn results into high incidence of unemployment and working poverty among them. Reports of the Pratham organization, NASSCOM and knowledge commission clearly spell out the issues of employability. Rather than the

lack of opportunities the un-employability is a major cause of unemployment. Kothari (1995) argued that education policy has to be integrated with the labour market and the structure of the economy and must be aimed at reducing the dualism.

(B) Mismatch between demand and supply of students in various disciplines. Similarly a big gap is observed between the need for certain facilities for study and the supply of those facilities.

(C) Corrupt and unethical practices by private sector institutions. Hefty premium or capitation fees charged by them for certain high demand services like medical education.

(D) Significant outmigration of students to other countries after the higher secondary board exams as well as after completion of undergraduate and post graduate courses. Most of the students leave the country to never return back. Unfortunately the outflow of students to other nations has been rising over the years indicating low expected earnings and opportunities in India as perceived by them. Studies suggest if brain drain is partially discouraged or restricted it can increase growth in developing countries as a higher share of high skilled workers is associated with a positive externality (Meier, 1999).

(E) Supply of 'overqualified' people for the simple jobs of clerk, cleaner, sweeper, driver, peon accountant etc.

(F) Despite the low nominal fees charged by the government owned/ aided schools or colleges the students and their parents largely prefer private institutions. This clearly indicates that in case of the former the price per unit of quality perceived by the service users is very high. Such phenomena make the government's provision of educational services redundant for whom they are intended. The only beneficiaries would be the employees of such institutions!!

(G) For years the government has been undertaking a large number of affirmative measures to help the social and economically backward groups of people in India. However, till today the poverty rate and illiteracy rates among these vulnerable groups has remained quite high compared to other groups indicating that benefits of education policy have accrued to non- targeted groups to a large extent.

(H) Many studies have brought out that female education generate huge external benefits in terms of health, nutrition and other welfare aspects of families besides making the women economically independent and empowered. Unfortunately our education policies have not been able to remove the male- female differential in literacy rate, non- agricultural job participation and professional & technical employment.

(I) Moreover the labor laws of India are too obsolete and complex to facilitate a rational policy of hire and fire, which can ensure efficiency among teachers and staff. This limitation creates quality issues regarding soft skills on one hand and financial burden of the non-performing employees on the other. This in turn have short term as well as long term negative impact on the employability of those passing out from the educational system.

This in turn reduces expected gains from the education and thereby discourages future investments in education.

The situation described above reflects poor performance of several past policies including the education policy. Since the latter also affects health, productivity and efficiency of people there is hardly any option but to redesign it properly. In our personal view the answer does not lie in reverting back to public provisioning of this merit good but it lies in taking some tough policy decisions as already noted above. In the subsequent section we give some inputs regarding possible measures which can mitigate at least some of the limitations of the existing system and make it more conducive to the need and progress of the country.

Where Do We Go From Here?

In the previous section we discussed some of the unresolved issues which can be addressed through a well-designed education policy at national as well as sub- national level. It is important to note that in India education is largely the responsibility of the latter. In the present section we can consider various alternative, feasible measures, which are corrective in nature and can go a long way to improve the education system.

There are quite a few economist who believe that education is a public good, rather a 'merit good'(non-primary) creating significant positive externality hence the government must spend a large chunk of resources for either their direct provisioning or for 'subsidy'. The standard economic theory also talks about use of subsidy for correcting the so called 'market failure' in internalizing the gains and potential underestimation of the benefits of education. However the later work in public choice theory shows as to how it is difficult to estimate such benefits and more importantly ensuring that they go to the intended beneficiaries. In Indian situation also one finds that more often than not the benefits of subsidies of various types accrue to relatively better off people and targeted groups end up getting either low or no benefits. The basic purpose behind the government subsidy thus gets defeated.

In fact quite a few economists would like to argue that if the market fails that does not mean government would succeed. It MAY succeed (Mankiw, 2012). In my perception however if market fails the government is most likely to fail!! Indian data provide enough evidences for this. Take the examples of public sector banks, schools and hospitals, Food Corporation of India, water departments and so on and so forth. There are ample stories to prove problems of inefficiency, leakages, corruption, red tape and bureaucratic attitude. They create unsustainable burden on the exchequer hence people like us suggest systematic shift to private sector.

However, as noted earlier the profit maximizing private education sector has resulted into compromise of quality of students, teachers and technical staff. Unduly liberal criteria for admission and unethical practices to attract, retain and pass the students at any costs are problems which are also known.

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Though emergence of a large number of private educational institutions have created greater space to accommodate larger number of students the fees charged by them is relatively high implying that the opportunity cost of education has not declined till today. A large number of aspiring students have to depend on their parents for financing their education. When parents can't afford to pay and the probability of getting loan from the banks remains low the aspirations don't get translated into reality. Most of the banks in India are public sector banks hence are too cautious to give loans for this purpose without collaterals.

In advanced nations on the other hand financial issues of the students are resolved through easy availability of credit from the banks at a softer interest rate as well as through 'earn and learn' models in which on- campus jobs are given to needy and deserving students. Also the academic institutions use the cross subsidization model in which well off students end up paying more than the marginal costs and the less well-off students pay less than the marginal cost of producing educational services by them.

Banks in developed nations are willing to finance education because they have access to a unique legal document namely social security number of these students. Hence tracking of the loan payments become easy. Also the default of payments are recorded in the social security history which affects the credit and crime history of the borrowers. This information is also available to potential employers and the academic institutions which were involved in recommending the loans. Such mechanism reduces the probability of default of loan payments. Also the system of recovery agents is very effective which discourages unfair practices on the part of the borrowers.

What is most important to know is that rate of interest is generally low in the advanced nations as is the rate of inflation. Since the real rate of interest is generally meagre, it imposes much less financial burden on the borrowers, namely students. In Australia for instance tuition fees cover 20-25% of the cost of education, interest rate equals rate of inflation and repayment does not start before the income of recipient exceeds the average wage income in the economy. (Chapman, 1997)

Moreover, the role of counsellors of universities/ institutions is to provide guidance to students in financial matters and they often act as a link between the lending bank and the borrowing students. The students are helped to get the best deals in terms of interests and moratorium period. Because the banks are able to track the borrowers easily their risk assessment is low and hence they allow the students to start the repayment of the loan after the latter get the jobs in their hands.

Unfortunately in India 'despite the efforts of the policy makers, the 'Aadhar' could not become a legal and mandatory unique identification number like SSN in developed nations, otherwise banks would have found it quite easier to lend money to students or their parents.

In this context it would be relevant to talk about the current policy of the government in which PSBs are mandated to give educational loans without any collaterals up to a certain

amount and at a lower rate of interest to aspiring students. The targets are given by the government to all PSBs in this regard and non-achievement of the target may attract penalty or strict actions from the former. Though the intention of the government is good here, in absence of any tracking possibility either through unique identification number or through collaterals, banks would be reluctant to lend. The NPA in the banks would rise on this account if banks are forced to meet the targets. In the current scenario the students can borrow without any collaterals and then disappear after some time or refuse to repay without facing great consequences. Policy makers must be aware about these unintended consequences of the well intentioned policy.

These are some of the serious issues affecting education sector in India. But answer certainly does not lie in going back to public provisioning of education. We have to correct the irregularity of private education sector by setting up independent regulatory authority. Its members could be nominated from the top level academic institutions like IIM, IIT, IISc etc. as well as from industry, autonomous bodies, executives of banking and one or maximum two persons from top level bureaucracy. Avoiding political intervention is the most important but perhaps most difficult in this context.

Another similar step could be asking all institutions to be accredited by independent agencies. For example we have S&P, Moody's, Fitch, ICRA, CRISIL rating agencies for financial sector. Why not the education institutions be required to have star ratings from private independent rating agencies of national and international repute? There might be some initial hiccups but in the long run it will make the market more competitive and asymmetry in information would mitigate. Ratings will help students and parents to take informed decisions so that they don't feel cheated after they take admissions to private colleges or institutes. This is a common practice followed in North American universities and that is why we hear of IV league universities and four stars and five star universities. The rating agencies even give stars to departments of different disciplines within an organization. We can certainly draw learning lessons from such systems to make our system robust. Parliament has passed some bills for setting up of proper accreditation mechanism and curb unfair practice by private sector in the recent past but no one knows about its implementation and effectiveness.

This is not to imply that we have to close down all the existing institutions owned or sponsored by the government. What is needed is that additional supply should now come from the private sector, privatization of existing public institutions should be facilitated and that all must be rated and made accountable to regulatory authority. Ratings in terms of syllabi, teachers' qualifications, exam systems, pedagogy, and campus- placements are obtained and used by a few institutions currently also to inform and attract the students. But what is required is that across the institutions including public ones the practice of obtaining comparable and consistent rating and publishing them regularly should be made compulsory.

Even at primary and secondary school level following a national level curricula, stricter standards for passing and retention, stringent measures for absenteeism of teachers& staff are

some of the steps which could make a positive difference. Until the vicious circle of bad teachers-bad students- bad teachers is broken the system is bound to remain weak and flawed. Adoption of Rational criteria for admissions at higher educational level rather than caste based policy may go a long way to break this vicious circle.

It would be relevant to discuss a recent move of the central government of opening more and more IIMs and IITs. As reported, this is done with a view to improve the educational standards because the above institutes have earned their brand names through producing good quality students. However such a step could be counterproductive. In fact it would distribute the existing small pool of highly qualified teachers among larger number of institutions. Thin spreading of resources would dilute the quality of teachers available to these institutions. This in turn would be reflected in the quality of training available to students which may further negatively affect the salary package available to them. Such intervention is not warranted.

The government has to play an enabling role by encouraging, facilitating and properly regulating rather than intervening in the above matters. It is easier said than done in a democratic environment though. As mentioned earlier it is very difficult to bring overhaul changes in any system whether we talk about judiciary system, health system or education system. Reforms are advocated and appreciated my many for obvious reasons but they hurt the vested interest groups who would use all their muscle power to hinder them.

The theory of public choice states that like consumers try to maximize utility, producers try to maximize profits, the politicians try to maximize votes through pleasing interest groups and bureaucrats try to maximize their power& budget. Thus a common man's gain is completely ignored in the whole process. The scholars believing in this theory claim that most of the politicians don't contest election to make/ implement policies. Rather they design policies to win the election!! The rationality would make them design only those policies which would maximize their votes. For instances promises of tax relief, waivers and affirmative actions for select groups thus become trump cards for winning elections rather than bringing about real change in the economy (Borooh, 2005; Browning and Browning, 1994).

Conclusion

Economics of education has been an important area of research for more than four decades now. Various theories and models are developed on demand, supply, investment, consumption, cost & finances, input-output relations, externality, role of the government and several such economic aspects of education. Scholars have also empirically tested various hypotheses for India and other nations. There are still a large number of issues which are unsettled due to ideological and empirical differences though. The present paper tries to address an issue whether the education policy adopted in India so far has been effective enough to achieve the laid down objectives of education. It also discusses as to why certain methods of measuring educational progress of India fail to depict true picture.

It is argued that the input and output approach of measuring the educational progress of the national or sub- national population do not provide concrete guidance for designing the future education policy. An outcome based approach is therefore advocated.

While evaluating the policy by using outcome approach, it is felt that the past education policies- though they did create some positive impact, have failed to achieve the objectives of creating a large pool of skilled and employable people, eliminating the male -female differential in literacy/education, arresting the trend of brain drain to other countries and enabling economical access to higher level of education for most people including the vulnerable groups. Growth of private sector in education sector has improved the quantity but quality of education still calls for additional policy measures. Setting up of independent regulatory body, insistence on accreditation of institutions by independent rating agencies, complete accountability in terms of syllabi, teachers' qualifications and grading pattern, making Aadhar a legal instrument like social security number in US (to encourage the banks to give finance), emphasis on market led policy rather than affirmative policy are some of them. The last but not least is to adopt minimum political intervention and optimum regulation, implying maximum market based approach. Though it is easier said than done some conscious efforts by the politicians and policy makers together can go a long way to make our education system robust, efficient and effective.

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Secondary & Higher Secondary School Education in India: Efficiency Appraisal Using Data Envelopment Analysis Approach

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Abstract:

The role of school education is crucial in augmenting the competitiveness of an economy. Enhancing the efficiency of a school education system becomes essential input for overall growth and development. The robust education system being the driving force of economic prosperity, a question pertaining to: what determines educational efficiency? is of special significance. The school education can be considered to be efficient if with the optimum use of resources, its students can achieve the maximum academic result. The efficiency level of the school education is highly affected by its resources and academic practices. School education differ most often in terms of facilities (inputs) provided as well as in achievements (outputs) attained. It is possible that school education system may have less inputs in terms of academic staffs and physical facilities but still it might turn to be more efficient and vice versa. Therefore, the discrepancy between lower performance of school education and higher performance of school education can be better analysed by efficiency scale rather than the usual performance-based evaluation. In line with the Rashtriya Madhyamik Shiksha Abhiyan scheme of India launched in March, 2009 that placed considerable emphasis on making secondary and higher secondary education available, accessible and affordable, all the states/ union territories of India are putting substantial efforts for achieving the desired educational targets like enrolment rate to be increased to 75% from 52.26%; removing gender, socio-economic and disability barriers, providing universal access to secondary level education and achieving universal retention. Therefore, the systematic appraisal of the efficiency of secondary and higher secondary school education in the states/union territories of India can reveal the states'/union territories' relative positions in terms of performance. This paper applies Data Envelopment Analysis (DEA) for efficiency appraisal of secondary and higher secondary school education in the states of India. Each state/union territory is considered as a Decision Making Unit (DMU) that uses similar inputs to attain similar outputs. The efficiency of DMU is determined relative to other DMUs, which are similar in terms of ability to transform inputs into desired outputs. Relatively efficient and relatively inefficient states/ union territories in terms of provision of secondary and higher secondary school education in India are identified as a feedback to the educational development initiatives in India.

Introduction

Education play a vital role in long-term economic growth as it generates skill manpower for economy. The role of school education is crucial in augmenting the competitiveness of an economy. Enhancing the efficiency of a school education system becomes essential input for

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overall growth and development. The robust education system being the driving force of economic prosperity, a question pertaining to: "what determines educational efficiency?" is of special significance (Tsakiridou & Stergiou, 2014). The school education can be considered to be efficient if with the optimum use of resources, its students can achieve the maximum academic result (other things reaming constant, ceteris paribus). The efficiency level of the school education is highly affected by its resources and academic practices (Raposo & Menezes, 2011). The school resources are related to student achievement and therefore the school education system should focus on delivering good quality education optimising the use of resources. School education differ most often in terms of facilities (inputs) provided as well as in achievements (outputs) attained. It is possible that school education system may have less inputs in terms of academic staffs and physical facilities but still it might turn to be more efficient and vice versa (Nauzeer, Jaunky, & Ramesh, 2018). Therefore, the discrepancy between lower performance of school education and higher performance of school education can be better analysed by efficiency scale rather than the usual performance-based evaluation.

The school education delivery systems in developing countries face various issues such as huge number of students and shortage of infrastructure. The importance of educational infrastructure in the growing economy like India is of prime concern due to the nation's increasing demand of educational facilities. In line with the Rashtriya Madhyamik Shiksha Abhiyan scheme of India launched in March, 2009 that placed considerable emphasis on making secondary and higher secondary education available, accessible and affordable, all the states/union territories of India are putting substantial efforts for upgrading and achievement of desired educational targets. This requires addressing the fact of fully utilizing the existing capacities of school education in the most efficient manner apart from creating capacities by way of additional infrastructure and services. It is essential to continuously assess the efficiency of school education system that allows the decision makers to develop a better understanding of the competence and to provide useful insights for improvement of resource allocation. Therefore, the systematic appraisal of the efficiency of secondary and higher secondary school education in the states/union territories of India can reveal the states'/union territories' relative positions in terms of performance. This paper applies Data Envelopment Analysis (DEA) for efficiency appraisal of secondary and higher secondary school education in the states of India. Each state/union territory is considered as a Decision Making Unit (DMU) that uses similar inputs to attain similar outputs. The efficiency of DMU is determined relative to other DMUs, which are similar in terms of ability to transform inputs into desired outputs. Relatively efficient and relatively inefficient states/union territories in terms of provision of secondary and higher secondary school education in India are identified as a feedback to the educational development initiatives in India.

The remainder of this paper is organised into further five sections. The second section explores the literature review, while the third section highlights Data Envelopment Analysis (DEA) Approach. The fourth section deals with efficiency analysis of secondary and higher secondary

school education in states/union territories of India, whereas the final section summarises the results and discussion.

Literature Review

The efficiency analysis has been extensively used for monitoring the efficiency of school education systems in various countries. According to Eberts, Schwartz and Stone (1990) the school size may affect the efficiency, while Carty and Yaisawamg (1993) studied efficiency of public schools and determined that the differences in school performance were explained and related to the social-economic level of students' family. Duncombe, Miner and Ruggiero (1997) found that the size of the primary school has a positive effect on efficiency, whereas, Tyagi, Yadav and Singh (2000) determined that the larger the school size is, the higher the rate of efficiency, while Borge and Naper (2005) investigated the efficiency in the lower secondary schools in Norway.

Educational efficiency appears to be moderated largely by socio-economic and parental factors which lie largely beyond the control of local public schools (Conroy and Arguea, 2008). Zhang (2010) analysed elementary schools in Taiwan to investigate the relative efficiency by using two-stage DEA, while Agha et al (2011) applied DEA method to evaluate the relative technical efficiencies of academic departments at the Islamic University of Gaza.

Nazarko (2014) analysed efficiency of public higher education Institutions by application of DEA method, whereas Kecek and Demirag (2016) applied DEA approach to primary schools in Kutahya province in Turkey to measure the relative efficiency.

Data Envelopment Analysis (DEA) Approach

DEA is a linear programming based non-parametric method to measure the relative efficiency of the decision making units (DMUs) that use similar multiple input(s) to produce similar multiple output(s). Charnes, Cooper and Rhodes (1978) extended the Farrell's (1957) work of measuring technical efficiency and introduced the data envelopment analysis, later on called as the DEA-CCR model, which investigated efficiency assuming constant returns to scales. Banker, Charnes and Cooper (1984) extended the CCR model which was called the DEA-BCC model that investigated efficiency assuming variable returns to scales. The DEA asserts that efficiency of any DMU is verified by its ability to convert inputs into outputs.

According to this approach, the efficiency is always less than or equal to one due to some energy loss that occurs during the transformation process. The nonparametric computation in DEA, the prior knowledge of weights for the inputs and outputs is not required. In DEA, a single 'virtual' output and single 'virtual' input is obtained without estimating the production function. The ratio of sum of weighted outputs to the sum of weighted inputs is used to measure the efficiency.

Suppose there are *'n'* number of DMUs, each consumes varying amount of *'m'* different

inputs to produce $'s'$ different outputs. Specifically, $DMU_j(j =1,\ldots,n)$, consumes $X_j = \{x_{ij}\}$ amount of inputs $(i = 1,\ldots,m)$ and produces $Y_j = \{y_{rj}\}$ amount of outputs $(r =1,\ldots,s)$. The $m \times n$ matrix of input measures is denoted by X and $s \times n$ matrix of output measures is denoted by Y as represented below.

X is an $(m \times n)$ Input Matrix

$$X = \begin{pmatrix} x_{11} & x_{12} & x_{13} & \cdot & x_{1j} & \cdot & x_{1n} \\ x_{21} & x_{22} & x_{23} & \cdot & x_{2j} & \cdot & x_{2n} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ x_{i1} & x_{i2} & x_{i3} & \cdot & \boldsymbol{x_{ij}} & \cdot & x_{in} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ x_{m1} & x_{m2} & x_{m3} & \cdot & x_{mj} & \cdot & x_{mn} \end{pmatrix}$$

Y is an $(s \times n)$ Output Matrix

$$Y = \begin{pmatrix} y_{11} & y_{12} & y_{13} & \cdot & y_{1j} & \cdot & y_{1n} \\ y_{21} & y_{22} & y_{23} & \cdot & y_{2j} & \cdot & y_{2n} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ y_{r1} & y_{r2} & y_{r3} & \cdot & \boldsymbol{y_{rj}} & \cdot & y_{rn} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ y_{s1} & y_{s2} & y_{s3} & \cdot & y_{sj} & \cdot & y_{sn} \end{pmatrix}$$

Moreover, assume that amount of inputs x_{ij} are always positive (i.e. $x_{ij} > 0$) and outputs y_{rj} are always positive (i.e. $y_{rj} > 0$). Focusing on any one DMU, the relative efficiency can be calculated by formulating the ratio of weighted sum of outputs to a weighted sum of inputs, subject to the constraint that no DMU can have a relative efficiency score greater than one. The efficiency of each DMU is measured once and therefore, $"n"$ optimizations are needed. When input quantities are less flexible as primary decision (performance) variables and output is to be maximized in given situation, the input orientation is appropriate. To calculate the relative efficiency of the DMUj, the linear program based on the Input Oriented (Output Maximization) CCR-DEA Model can be as follows:

$$\text{Max}\, h_j(u,v) = \frac{\sum_{r=1}^{r=s} u_r y_{rj}}{\sum_{i=1}^{i=m} v_i x_{ij}} \quad \text{--------------- (1)}$$

$$\text{Subject to} \quad \frac{\sum_{r=1}^{r=s} u_r y_{rj}}{\sum_{i=1}^{i=m} v_i x_{ij}} \leq 1 \quad \text{--------- (2)}$$

$$u_r \geq 0 \ \text{ for } r = 1,\ldots,s$$

$$v_i \geq 0 \ \text{ for } i = 1,\ldots,m$$

If the DMU obtains an efficiency score of less than one, the unit is termed as relatively inefficient with respect to the other units in analysis and no other combination of weights can possibly make it efficient. If the unit obtains a score of one, the unit is relatively efficient (scope of improvement may still well exist), but the combination of weights makes it efficient. Likewise for each DMU, the ratio should be formulated. This means that each unit is allowed freedom in

assigning the set of weights to its factor inputs, which will render the unit as efficient as possible within the constrained limit.

Efficiency analysis of Secondary and Higher Secondary School Education in India

School Education System in India

Education in India is provided by public schools as well as private schools which are funded and controlled by three levels: central, state and local. Primary and Middle education is compulsory and free in India. It includes Lower Primary (Standards 1 to 5) and Upper Primary (Standards 6 to 8). Primary education usually begins at the age of 6 years with Middle/Upper Primary school education ending at the age of 14 years. Secondary education (Standards 9 and 10) usually begins at the age of 15 years and lasts usually until Higher Secondary education (Standards 11 and 12) ending at the age of about 18 years. "Sarva Siksha Abhiyan" (SSA) with the objective of "Education for All Movement" is initiated by the Government of India for universalisation of elementary education in the country since 2000-01. The programme is mandated in the constitution making education free to children of ages 6-14 and a fundamental right. "Rashtriya Madhyamik Shiksha Abhiyan" (RMSA) is a centrally sponsored scheme of Government of India launched in 2009-10 for the development of secondary education in public schools throughout India to provide conditions for an efficient growth, development and equity for all. As per the National Institute of Educational Planning and Administration (NIEPA) database of 2017, there have been 2,60,525 secondary and higher secondary schools having 14,34,128 class rooms, with 36,00,472 teachers for 6,13,98,312 students across all the 29 states and 7 union territories in India. Secondary and higher secondary education in India acts as a torch bearer for higher education to acquire skills for employment in India.

The Input and Output Variables

As the output of a school education depends on the use of available input resources, the main objective of school education is assumed to be the maximization of the output, given the inputs. The number of students enrolled by the secondary and higher secondary schools in states/union territories has been considered as one of the measure of output. Also the students attainment/performances at secondary school certificate exam (Standard 10th) level and higher secondary school certificate exam (Standard 12th) levels has been considered as the measures of output. Therefore there have been 3 output variables viz: Students Enrolment, Standard 10th Result and Standard 12th Result.

Total 11 input variables (resources) viz: Number of Schools, Number of Class Rooms, Number of Teachers, % Schools with Buildings, % Schools with Girls Toilet, % Schools with Boys Toilet, % Schools with Water Facility, % Schools with Electricity, % Schools with Library, % Schools with Internet, Total ICT Laboratories in Schools have been considered for analysis. The data pertaining to input and output variables of secondary and higher secondary schools of states/union territories of India has been sourced from the State Report Cards 2016-17 of National Institute of Educational Planning and Administration (NIEPA). Table 1 exhibits the output and input variables incorporated in the analysis.

Table 1: Output and Input Variables of Secondary and Higher Secondary School Education in India

State/UT	Inputs											Outputs		
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Y1	Y2	Y3
Jammu & Kashmir	4241	18738	67148	99.98	97.15	94.29	98.18	87.29	92.17	21.53	16875	534864	75.08	58.63
Himachal Pradesh	3970	17834	55448	99.9	99.37	98.64	100	99.57	98.79	53.15	15469	466236	74.72	85.89
Punjab	9474	50228	176532	99.88	98.42	94.56	100	99.98	98.7	86.27	52987	1599386	87.44	88.83
Uttarakhand	3593	18648	45052	96.02	94.88	89.12	96.35	92.57	91.51	36.13	14239	696348	78.69	80.54
Haryana	7833	47669	141731	99.44	96.77	90.81	100	99.86	98.84	72.07	46176	1509060	65.66	72.90
Delhi	2087	31347	101722	100	78.92	61.81	100	100	99.66	90.42	16144	1232736	93.34	91.33
Rajasthan	28534	117561	353825	99.73	99.86	98.84	98.83	92.76	90.46	40.06	103849	4033879	79.47	88.27
Uttar Pradesh	27218	237043	235129	98.73	97.02	94.33	99.27	79.18	76.27	17.26	140138	11820631	85.05	87.59
Bihar	8116	51390	108650	98.11	96.24	89.79	99.38	77.44	88.79	10.42	21603	4349521	49.91	62.71
Arunachal Pradesh	451	1931	7685	99.56	98.67	95.57	98	86.7	69.4	34.37	2227	80289	97.16	65.79
Nagaland	743	2589	14836	98.25	99.46	99.19	89.91	88.43	65.55	31.36	2863	81401	96.39	78.13
Manipur	1118	4336	21124	99.82	98.93	96.78	97.5	88.01	82.11	27.1	6229	136661	99.17	72.81
Tripura	1043	3889	23785	99.52	99.42	98.27	98.27	84.85	63.37	9.59	3217	188477	68.83	82.13
Meghalaya	1629	4517	13890	95.03	74.46	72.25	78.94	74.95	35.54	16.64	3981	150659	99.17	72.91
Assam	9233	33806	124888	95.83	75.67	68.83	94.42	79.09	71.82	12.6	21272	1416837	64.15	80.71
West Bengal	10359	69776	220906	99.63	92.3	90.11	99.38	97.53	94.19	42.33	33827	4210247	93.15	82.59
Jharkhand	4905	24000	47712	98.04	95.86	85.67	98.1	70.54	90.95	27.32	19543	1309399	98.85	70.81
Odisha	11056	35669	104229	98.82	92.47	85.95	99.61	74.77	95.06	21.23	29335	1801260	85.22	75.21
Chhattisgarh	6538	37612	75720	95.55	96.73	93.9	98.96	93.51	94.19	19.78	30189	1498569	58.90	77.66
Madhya Pradesh	16272	89422	172869	85.2	92.35	89.66	98.18	78.44	89.61	34.37	64163	3901995	66.75	78.92
Gujarat	11478	65122	115455	99.24	96.99	93.34	100	100	89.01	63.84	66377	2692617	68.65	72.25
Daman & Diu	43	264	810	100	95.35	90.7	100	100	100	93.02	246	9663	62.42	67.24
Dadra Nagar Haveli	45	426	1167	97.78	100	100	100	100	95.56	86.67	255	20314	49.42	63.93
Maharashtra	25737	128888	361285	99.34	98.68	96.32	99.85	97.47	97.51	62.89	146888	6614604	90.11	87.21
Karnataka	18769	71005	179054	97.63	95.66	93.69	97.69	96.68	95.6	29.94	74089	1796076	86.61	74.06
Goa	514	2421	9528	98.64	98.05	96.3	100	100	99.22	92.02	2867	85388	98.10	89.46
Lakshadweep	15	151	658	93.33	100	100	100	100	100	93.33	95	4875	85.40	75.97
Kerala	4770	49612	168230	98.91	98.18	94.3	99.87	99.45	98.7	92.96	27521	1889067	96.84	84.31
Tamil Nadu	12911	113558	344000	99.64	95.79	88.6	99.94	99.95	99.54	79.21	61492	4076634	93.87	91.09
Puducherry	376	2451	10538	99.73	94.41	89.1	100	100	100	90.69	2158	78202	96.81	86.76
A & N Islands	113	787	3641	100	100	99.12	100	100	100	60.18	610	22926	96.86	74.69
Telangana	14077	56338	142623	99.81	95.98	93.62	99.63	97.19	91.1	30.96	42933	1621305	89.56	72.20

Source: Compiled from State Report Cards 2016-17, National Institute of Educational Planning and Administration (2018).

Note: X1: Number of Schools, X2: Number of Class Rooms, X3: Number of Teachers, X4: % Schools with Buildings, X5: % Schools with Girls Toilet, X6: % Schools with Boys Toilet, X7: % Schools with Water Facility, X8: % Schools with Electricity, X9: % Schools with Library, X10: % Schools with Internet, X11: Total ICT Laboratories, Y1: Students Enrolment, Y2: % Result of Standard 10th, Y3: % Result of Standard 12th. Chandigarh, Sikkim, Mizoram and Andhra Pradesh are not included in Analysis due to unavailability of adequate data regarding concerned variables for the year.

Empirical Analysis

Efficiency Measurement System (EMS) Software, Version 1.3 is employed to derive the efficiency estimates of Secondary and Higher Secondary School Education in total 32 states/ union territories of India. DEA-CCR Model is applied to derive the relative efficiency of Secondary and Higher Secondary School Education in states/union territories under analysis. On the basis of derived efficiency estimates, the relatively efficient and relatively inefficient states/ union territories in terms of Secondary and Higher Secondary School Education are identified. The estimated efficiency scores also reveal the extent to which all inputs can to be reduced in equal proportions to reach the optimal output level. The efficiency estimates and the efficiency status of Secondary and Higher Secondary School Education in states/union territories are presented in Table 2.

Table 2: Efficiency Summary of Secondary and Higher Secondary School Education in India*

State/UT	Efficiency Estimate	Efficiency Status
Jammu & Kashmir	0.742	Relatively Inefficient
Himachal Pradesh	0.984	Relatively Inefficient
Punjab	0.974	Relatively Inefficient
Uttarakhand	0.984	Relatively Inefficient
Haryana	0.812	Relatively Inefficient
Delhi	1.000	Relatively Efficient
Rajasthan	1.000	Relatively Efficient
Uttar Pradesh	1.000	Relatively Efficient
Bihar	1.000	Relatively Efficient
Arunachal Pradesh	1.000	Relatively Efficient
Nagaland	1.000	Relatively Efficient
Manipur	0.986	Relatively Inefficient
Tripura	1.000	Relatively Efficient
Meghalaya	1.000	Relatively Efficient
Assam	1.000	Relatively Efficient
West Bengal	1.000	Relatively Efficient
Jharkhand	1.000	Relatively Efficient
Odisha	0.998	Relatively Inefficient
Chhattisgarh	0.949	Relatively Inefficient
Madhya Pradesh	1.000	Relatively Efficient
Gujarat	0.822	Relatively Inefficient
Daman & Diu	0.972	Relatively Inefficient
Dadra & Nagar Haveli	0.942	Relatively Inefficient
Maharashtra	1.000	Relatively Efficient
Karnataka	0.913	Relatively Inefficient
Goa	1.000	Relatively Efficient
Lakshadweep	1.000	Relatively Efficient
Kerala	0.997	Relatively Inefficient
Tamil Nadu	1.000	Relatively Efficient
Puducherry	1.000	Relatively Efficient
Andaman & Nikobar Islands	1.000	Relatively Efficient
Telangana	0.891	Relatively Inefficient

Note: * Derived using Efficiency Measurement System (EMS) Software, Version 1.3.
Efficiency Estimate of 1 indicates Relatively Efficient, Efficiency Estimate of <1 indicates Relatively Inefficient.

Result and Discussion

On the basis of the efficiency scores obtained for Secondary and Higher Secondary School Education in India, it is revealed that Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Manipur, Odisha, Chhattisgarh, Gujarat, Karnataka, Kerala and Telangana states and Daman & Diu, Dadra & Nagar Haveli union territories turned out to be relatively inefficient with the efficiency scores less than 1.000 (less than 100%), while Delhi, Rajasthan, Uttar Pradesh, Bihar, Arunachal Pradesh, Nagaland, Tripura, Meghalaya, Assam, West Bengal, Jharkhand, Madhya Pradesh, Maharashtra, Goa and Tamil Nadu states and Lakshadweep, Puducherry and Andaman & Nikobar Islands union territories turned out to be relatively efficient with the efficiency scores of 1.0 (100%, although the scope of improvement may still exist).

Moreover, it is evident that states/union territories with less output (than actually should have been given the inputs) in Secondary and Higher Secondary School Education turn out to be relatively inefficient. However, optimum allocation of resources by raising the output against the given input places the relatively inefficient states'/union territories' Secondary and Higher Secondary School Education in a better position towards increasing the efficiency. The analysis allows the decision makers to develop a better understanding of the competence of Secondary and Higher Secondary School Education in states/union territories to provide useful insights for improvement of resource allocation.

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Pre-vocational Education a Panacea for Indian Education System? Policy Concerns and Discussion

Shivani Mishra

Abstract

Prevocational Education is an instrument to facilitate school-to-work transition during elementary education. Sadly, it has been observed that it is an unexplored domain in several countries including India. In this paper, it is emphasized, that pre vocational program must be introduced in the schools, especially the rural area under the banner of a policy of life skill education. It is also helpful for children to prepare them for entry into vocational or technical program. By introducing pre vocational education in school children become more self reliant. The problems of child labor and school dropout can be addressed. Further, through pre vocational program the preparedness of children for vocational program leads to success of the vocational scheme. Consequently, the problem of unemployment could be addressed in strenuous manner. Evidently, several researches support that prevocational education facilitates the overall development of children, particularly their physical, cognitive, emotional and social development. Developing pre vocational skills immensely help children for their sustainable livelihood.

Author also mentions that the ancient crafts elope day by day and if we introduced the pre vocational program in schools, then our ancient crafts and culture can also be saved. Lastly, the author discusses about few concerns for life skill education policy, especially with reference to prevocational program.

Keywords : **Life Skills, Prevocational, Elementary Education, Child Development**

Preamble

I would like to begin with a few questions, which I always asked to myself whenever I deal with the rural children?

• What is the educational status of primary school children especially in rural area?

• Is there is any nexus between education and learning?

• How prevocational education is integrated into compulsory education?

• Is there pre-vocational education curriculum that enables skill building of rural children?

• How does policy support a prevocational education to school going children?

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Education plays a catalytic role in human lives and acculturating role in the society. Education is the right of the children and enables them to prepare them for their life, for present as well as for future. It is the best way to pull them out of economic misery, so education must focus on overhauling schools and commits itself to educating every child (World Development Report, 2018).

Status of Children Education in Rural Area

India, with more than 1.4 million schools and more than 230 million enrollments, is home to one of the largest and complex school education systems in the world.

Recently released ASER Report 2018 clearly mentions some disturbing facts about the status of children in rural areas. Nearly one-fourth of rural India's youngsters aged 14-18 cannot read their own language fluently. The report suggests that 43 percent children are not in a position to do a simple division correctly in the age group of 14 to 18 years. As per World Population Review 2019, India is a country where English has been designated as the de jure office language. However, in ASER report it is astonishingly observed that 47 percent of 14-year-olds could not read a simple sentence in English. Only 40 percent youth who is in the age group of 17 to 18 years are in positions to read English sentence

Further, it was found that 36 percent didn't know the name of capital, 14 percent were not in a position to identify the Indian map and 21 percent were unable to locate in which states they live in.

Highlights International Labour Organisation

- Rural areas host 75 percent of the world's poor, with 2.1 billion living on less than USD 2 a day, and 880 million living on less than USD 1 a day.
- Out of 215 million child labourers worldwide, 129 millions are in agriculture alone.
- About 60 percent of child labourers aged between 5-17 years work in agriculture, in contrast to 7 percent in industry and 26 percent in services.
- Rural children, particularly girls, tend to begin work at a very young age, sometimes when they are 5-7 years old. Without considering household services, on average, boys make up 63 percent and girls 37 percent of child labour in agriculture in the age group 5-17 years
- 92 percent of girl child labourers in the age group 5-14 also perform household chores, as compared with 67 percent of boys.

The gloomy picture mentioned in the above discussion, precisely pointed that the issues of learning, needs urgent attention. World Development Report 2019 stated that "we should prioritize learning not just schooling, without learning students will be locked into poverty and exclusion". The net enrollment in education has greatly influenced education levels, but the slow improvement in learning level of students. In rural area, it was found from several researches that there was a lack of resources, lack of quality of education, and opportunities are unavailable for the children. The student centric, market driven and region specific syllabus is missing in the Indian Education System. One out of every three people who are not attending school said that they considered education unnecessary (Rawal, 2017). According to the Ministry of Human Resource Development (MHRD), 62.1 million children were out of school in India.

ASER 2017 report suggested that 70.7percent out-of-school youth have mothers who have never been to school. 42 percent of 14 to 18 years group of students were working regardless of their schooling. The dropout rate among female is rising with the age. ILO report clearly stated that only 1 in 5 child labourers are in paid employment - the large majority are unpaid family workers. There is massive impact on child development and education.

ILO report clearly stated that only 1 in 5 child laborers are in paid employment - the large majority are unpaid family workers. There is the massive impact on child development and education.

The prevention of child labor and to control the drop out ratio, the creative approach to learning will make an enormous difference in status of education of children. Against this backdrop, the prevocational education components delivered as part of general education have acquired particular significance (Commission of the European Communities, 2009).

Before going for in-depth discussion on pre vocational education let us first understand the concept and status of vocational education in India.

Status of Vocational Education in India

Vocational education is a purposive activity and is targeted on explicit outcomes Sharma (2018). The aim of vocationalisation of education is to improve vocational efficiency. It was accorded a high priority in the National Policy on Education, 1986. Earlier, the Secondary Education Commission (1952-53) and India Education Commission also recommended to have a diversified course in multipurpose schools so as to increase the productivity and vocational efficiency of students. In 1964 the Kothari Commission came to the conclusion that many jobs don't require university degrees, and can be performed by well-trained higher secondary students (Soden, 1992). The World Bank stated that the vocational education stream in India is quite small, enrolling less than 3 percent of students at the upper secondary level. The analysis also shows that the Vocational Education and Training (VET) system is not responding to the needs of the labor market. Less than 40 percent of its graduates find employment. Quality vocational education has become more important to industry because employers see a skilled workforce

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as fundamental to getting and maintaining a competitive advantage (Soden, 1992). The Government of India puts conscious efforts to increase the quality of vocational education, hence the notable reform took place in the year 2015 by introducing the National Skill Development Mission.

Vocational education in India is divided and acquired through: formal training centers and the informal trainings. This informal training is also referred as the hereditary mode of passing talents since through hereditary mode cascading skill sets from one generation to other generations takes place. A formal training is presently offered at Grade 11th and, 12th - however, students reaching this grade aspire to higher education. Since the present system does not allow vertical mobility, skills obtained are lost. Enrollment in 11th & 12th Grade of vocational education is only 3% of students at upper secondary level. About 6800 schools enrolled 400,000 students in vocational education schemes utilizing only 40% of the available student capacity. A skilled youth is a challenge faced by educational institutes, corporate, governmental and non-governmental organization. It is clearly projected in the NSSO report for the year 17-18 that overall unemployment was at a 45-year high, with youth between the ages of 15 and 29 facing higher rates of joblessness than others (Raghavan & Jebaraj 2019).

The Census for the year 2011 projected that in the year 2025, India will have 25percent of the world's total workforce. The working-age ratio in India's population is projected to increase from 64percent in 2013 to 69 percent in 2014. Therefore the demographic dividend needed to channelize accurately, effectively and equip them for the job market. India Skill Report 2019, stated that at school level, there must focus on learning. Consequently, it helps to bridge the employability gaps. Every educational institute should focus on identifying skill gaps. This exercise helps youth to develop their skills. If the identification and development of skills will be focused during school days, then young citizen will take responsibility of his or her career.

Prevocational Education: Why and What for?

In order to make educational edifice strong, Gandhiji had put forward the scheme "Basic Education" He viewed that, the object of such education is the physical, intellectual and moral development of the children through the medium of handicraft viz "Learning by Doing". The sensory and motor coordination can be best acquired by child through craft. When craft, art, health, and education are integrated in one scheme. i.e. Nai Talim, then this scheme enables children to solve their problems of livelihood. Gandhiji rightly pointed that education must prepare a child to be self reliant by enabling him to use his acquired knowledge and skills in the practical affairs of life (Chandsethi & Shah 2013).

The education and learning in primary and elementary schools is significant because when the children reach adulthood, they are equipped with knowledge, skills and resources. The signs of learning are there and its rightly mentions in the ASER report that 5% schools, students, are receiving some kind of vocational education. The percentage of participation in vocational education would increase, and drop out ratio can be managed, if we introduce a

prevocational education in primary schools. This will create an encouraging learning environment for children. Pre-vocational education can be defined in a number of different ways, ranging from preparing young people to enter the labor market to developing a sense of initiative and entrepreneurship and, more generally, providing an induction into a specific occupational grouping (Pilz, Berger, & Canning,2014). It is mainly designed to introduce participants to the world of work and to prepare them for entry into further vocational or technical programs.

It is noted that pre-vocational education is an unexplored domain in primary schools of India. World Education report (2013) stated that "the prevocational program has simulated and enhanced classroom participation and knowledge about the related subjects. Students reported that they have the ability to connect aspects of Physics, Mathematics, English and Nepali". In Indian government schools the absence of prevocational subjects does generate a learning deficit among children. This can be understood clearly from the ASER 2018 which stated that in rural area one in two students in 50.3 percentage of Indian schools lack basic reading ability not just of their own grade but also of those of three levels below. 56 percent of students in Class VII can't divide a 3 digit number with a single digit, 72 percent students in Class V can't do division at all and 70 percent of Class III students aren't able to do any subtraction. Nationally, one out of four children was leaving Class VIII without basic reading skills (Times of India, 2019). Taking into account the last 2 years ASER survey report the proportion of all Class VIII students in rural India who can divide a three-digit number by a single-digit has reduced to 43.2% in 2016 from 44.2% in 2014. While 32% of children in Class III could read simple English words, up by 3.5 percentage points over 2009, in Class V, only one out of every four students could read an English sentence. This learning deficit could be converted into a learning surplus by introducing pre-vocational programsin schools. In a nutshell, pre-vocational programs can promote learners' horizontal and vertical progression, prevent dropouts and develop employability skills that facilitate the transition to employment.

Policy: Concerns & Discussion

Aforementioned discussion clearly suggests that prevocational education program enables children's physical, intellectual and cognitive development. It is an unexplored domain in the primary schools not only in India but at international level too. The primary level students should be exposed to a range of vocation so as to acquire excellence in the different professions (Rawal,2019) . This exercise prevents students to dwell into problem of child labor, school drop-out and unemployment at a later stage. A considerable number of young people across the globe have difficulties in their transition from school to the world of work and many countries in the world suffer from a high level of youth unemployment

A prevocational educational program in schools can be enacted under the banner of life skill education policy. There are several urban schools in India who accorded academic learning with life skill education by introducing pre vocational program. The saddest part is that in rural area, we are missing on these fronts. In rural and remote area there are many artisans and

in the era of globalization, several skills are diminished day by day. Approximately there are 2500 arts and crafts of India that will be lost if the children of India are not taught these skills in schools (Rawal, 2019) .

Life-skill education

The eight skills of life skill education are understanding self, managing communication, understanding emotions, empathy, critical thinking, decision-making, problem-solving and creative thinking. These skills, prepare children for social competence and develop an attitude for their present and future. These skills were given due importance in World Economic Forum in Davos 2016. In this forum the experts from the diverse fields stated that top 10 skills that will be vital to succeed in workplaces of 2020 are problem-solving, critical thinking, creativity, people management, emotional intelligence, judgement and decision-making, service orientation, negotiation skills and cognitive flexibility. Regrettably, we are least provides these skills either at school or at the college level. Life skill education is should be implemented in schools and universities. Once the policy of life skill education is introduced the effective curriculum can be prepared as per Indian circumstances. The following aspects need to take care of, for smooth functioning of prevocational education through life skills.

1. Policy should be framed keeping in mind both rural and urban children

2. Pre vocational curriculum must be a part of the National Vocational Curriculum Framework

3. The curriculum or framework must be prepared with inputs from life skill educators, teachers, educationist, artisans and business leaders to define the knowledge and skill of students that are needed to shape the future of their work and life.

4. The system/model must be prepared considering the economic viability of the pre vocational program

5. There must be a strong correlation between pre vocational skills to be imparted and pre vocational curriculum

6. Like math and science the pre vocational subjects must be introduced at lower secondary level . This effort will raise the clamor for education and will infuse the responsible citizen of tomorrow.

Thus, through life skills the children will develop the top rated skills such as problem solving, critical thinking, creative thinking, cognitive flexibility, decision making and emotional intelligence.

Concluding Remarks

The World Development Report 2018 clearly mentioned that education itself is not enough for the development of children, learning plays a crucial role in it. Without it there is no

education. The burgeoning research proves that prevocational education does impact on physical, cognitive, social and emotional development of children. By introducing such subjects in the school the craft heritage can be saved which is getting eloped year by year. There is a dire need of life skill education policy at the school level. An introduction of such policy will immensely help in child labor, school dropout and in due course of time the problem of unemployment would be managed. Another point mentioned in this paper is that several vocational programs is not reaching the maxim since they are not prepared for the same from an early stage. If children are trained in pre vocational program, there will be a good amount of success in a vocational program.

Last but not least, Gandhiji's Principle of Self Reliance can be well materialized through the prevocational program under the banner of a policy of life skill education.

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Social Expenditure and Economic Growth in Gujarat- Econometric Exploration

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Abstract

Increase in health and educational expenditure has an immense impact on the socio-economic conditions in any country at large and state at regional level. There is no definite agreement as to whether the rising health and educational expenditure are causally affecting to economic growth. This study endeavors Gujarat State as a case to examine empirically a causal relationship among health expenditure, educational expenditure and economic growth using time series data from 1980-81 to 2016-17 for State gross domestic product (SGDP), health expenditure and educational expenditure. The findings from the Vector Error Correction Model (VECM) indicated that there exist a short-run relationship among State health expenditure (HEX), educational expenditure (EXP) and GDP. We also confirmed the Granger unidirectional causality from log State level GDP to log Educational Expenditure and log of Health Expenditure. These results were further confirmed by findings from the impulse response function. This indicates that Gujarat represent an example of a developed state where the size of health and educational expenditure expands in the process of economic transformation.

Introduction

The expansion of social services can be considered as a special gift of economic development. As development proceeds, the demand for services arises and expansion of existing services is needed. To cope with the rising demand for social services, state government attempts to make large allocation of investment for this purpose. This way the expansion of social services became a corollary of development. These services help in removing illiteracy, deprivation of poverty, diseases etc. Expansion of social services ushers an era of plenty and self-reliance (Myer, 2017).

According to the United Nations Development Program (UNDP), with limited education and limited access to health services, the poor are not adequately prepared to engage productively in society. Empowering the poor is a necessary ingredient of development, and gives them equal

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chances in participating in the economic development process. Human capital assets are considered as an important factor in the pursuit of sustained economic growth.

Economists have long recognized that human capital is important for economic growth (Schultz, 1961; Becker, 1964; Uzawa, 1965; Rosen, 1976). Schultz asserts that investments in human capital such as expenditures on education and health account for most of the rise in the real earnings per worker. According to Becker (1964), investments in human capital raise an individual's productivity and earnings. The basic idea is that a highly educated and healthier workforce is expected to be relatively more productive. Subsequent work has also emphasized the importance of human capital in explaining growth or growth differences among countries (Lucas, 1988; Mulligan and Sala-i-Martin, 1993; Barro and Sala-i-Martin, 1995).

Both the health and education sectors play fundamental roles in contributing to the development of human capital. The importance of these factors contributing towards the improvement of human capital and economic growth has been advocated by Noraina and NurAzura (2013). According to Rahmah and Selvaratnam (1999), health and education are important determinants that enhance economic growth and development. In the past, there had been many researches that were conducted to examine the role of education and health care sectors in a country's production level. However, empirical results from the past studies were found to be distinct and contradictory from one another. Although most researches such as Baldacci et al. (2003), Uche et al. (2013), Nasiru and Usman (2012) had tested positive relationship for the variables. While, Djafar (2009), Gouden (1967), and Asghar et al. (2012) concluded that there is insignificant relationship found between the educational expenditure, health care expenditure on economic growth.

The aim of the present study is to examine the relationship among the educational expenditure, health expenditure and economic growth in Gujarat state by using the Granger Causality approach. Increases in health and educational expenditure have massive impact on the socio-economic condition in any states or country. Though, there is no consensus as to whether the rising health expenditure and educational expenditure are beneficial or detrimental to economic growth. The present study chooses Gujarat as a case study to empirically examine a complex relationship among health expenditure, educational expenditure and economic growth. The paper has been structured after this introduction, literature review, data and methodology, empirical results and conclusions are followed in sequence.

Literature Review

Aka, B. F. and Dumond, J. (2008) have examined the causal relationships between human capital and economic growth where human capital has included with education and health components for the United States of America using time series approach for the period 1929-1997. There has been a long run association found for these variables while testing with cointegration test. They found a bi-directional causality running from Education to Health using Error Correction-Vector auto-regression technique. Unidirectional Granger Causality has also

been found from Education to Economic growth and from Health to Economic Growth. On the other hand, causality was found between Health and Economic growth and not the reverse. They confirmed these causalities by performing impulse response function and variance decomposition methods. The further results depicted a long run dynamics which were explained by last year health expenditure and education level while the health level accounted for 10% variation in education in the long run.

Rahman, M. and et al. (2011) have examined the causal relationship among health expenditure, educational expenditure and GDP for Bangladesh. They analysed expenditure on education and health as human capital using Solow Growth Model for yearly time series data from 1990 to 2009. They found that the coefficients of human and physical capital have been significantly improved as investment in health and education been increased for Bangladesh using ECM methodology. Moreover, they found causality running from educational expenditure to GDP while a unidirectional causality been found from health expenditure to GDP.

Ayuba A. J. (2014) has used Vector Error Correction (VECM) model and Granger causality to examine the causal relationship between economic growth and social expenditure on education and health in Nigeria for the period of 1990 to 2009. He found a unidirectional causality from economic growth to health expenditure, which supports the Wagner's Law. The study concluded that public social expenditure strengthen economic growth at aggregated level and recommended to increase in budgetary allocations for both education and health sectors.

Hassan M. S., Kalim, R.(2012) have analysed the existence of long run association and triangular causality among real GDP per capita, per capita educational expenditure and per capita health expenditure in Pakistan for year 1972 to 2009 time period. They applied Ng - Perron test to investigate stationarity, Autoregressive Distributed Lag (ARDL) bounds testing approach to examine the existence of long run relationship and Granger Causality test for estimating short run, long run and combined short run and long run triangular causality among the variables. They found long run relationship among real GDP per capita, per capita educational expenditure and per capita health expenditure. They also found bidirectional relationship between per capita real GDP and per capita educational expenditure in the short-run, whereas per capita health expenditure and real GDP per capita did not Granger cause each other in short run. Moreover, they found bidirectional Granger causality among real GDP per capita, per capita educational expenditure and per capita health expenditure in long run and confirmed that the existence of joint causalities in short run and long run in Pakistan.

Yun, W. S. and Yusoff, R., (2015) empirically investigated the impact of the educational expenditure and health care expenditure towards economic growth in Malaysia for the time period of 1980 to 2012 by employing Pair Wise Granger causality test. The empirical findings of the Granger causality test revealed that there is a unidirectional causality that runs from GDP to the public educational expenditure. Similarly, a one-way causality was found running from GDP to the public health care spending. The findings of this study may be helpful for the policy-

makers to amend the existing policies and budgetary allocation for the health care sector and education sector respectively.

Thus, literature provides a brief history of causation among health and educational expenditure with economic growth. It further suggests the contradictory results obtained for various studies. The cause and effect relationship of these variables have to be explored to check the allocations of budgetary resources for the country like India and further to the disaggregate level at the States.

Data and Methodology

This research endeavors to study the causal relationship among health expenditure, educational expenditure and economic growth. The annual time series data of Gujarat state from 1980-81 to 2016-17, a data set of 36 years has been considered for this analysis and are taken from various reports of Gujarat Government, Ministry of Human Resource Development, Ministry of Health and Family Welfare and many other secondary sources. The public health expenditure includes all sort of health related expenditure incurred by the state Government, while public educational expenditure includes all sort of education related expenditure incurred by the state Government.

The proposed model with Y = f (Health Expenditure, Educational Expenditure) has been tested. Where, Y is taken as the log value of SGDP (LNSGDP), Health expenditure with log value as LNHEX and Educational expenditure with log value as LNEXP. The formal linear model can be developed as below.

$$\text{LNSGDP} = \beta 1 + \beta 2 \ \text{LNHEX} + \beta 3 \ \text{LNEXP} + \epsilon t \qquad\qquad (1)$$

In the present study, the model one is a relationship among log of SGDP in current value, log of HEX in current value and log of EXP in current value. There are two reasons for this selection. Firstly, due to flaws that may exist in the statistical data, GDP or HEX or EXP in current values could ensure a more precise measurement compared to their real values. Besides, the Indian government does not provide an official version of the GDP price deflator (Keidel 2001: 355). Secondly, the previous analyses of health spending-development relationship used the ratio variables, such as the growth of GDP or the HEX's and EXP's share in GDP. This can pose methodological problems because these variables have same denominator.

In order to check causality, the definition given by Granger has been used. xi causes yi if the prediction of yi based on knowledge of the past values of xi and yi. The choice of the estimation method is dictated by the nature of the variables. If they are stationary, then the Vector Autoregression (VAR) has been employed. In considering the two variables x_i and y_i, the VAR process takes the following form:

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$$x_t = c_1 + \sum_{i=1}^{p} \delta_i x_{t-i} + \sum_{i=1}^{p} \varphi_i y_{t-i} + e_{1t} \qquad (2)$$

$$y_t = c_2 + \sum_{i=1}^{p} \alpha_i y_{t-i} + \sum_{i=1}^{p} \beta_i x_{t-i} + e_{2t} \qquad (3)$$

Where e_{1t} and e_{2t} are white noise and p refers to the lag length. The null hypothesis of the Granger test is that the variable y_t does not affect x_t:

$$H_0: \varphi_1 = \varphi_2 = \ldots\ldots = \varphi_p = 0 \qquad (4)$$

It is also possible to test the absence of causality of x_t on y_t:

$$H_0: \beta_1 = \beta_2 = \ldots\ldots = \beta_p = 0 \qquad (5)$$

Through the hypothesis (3) and (4), four possible outcomes are considered:

- If the hypothesis (4) is rejected and if the hypothesis (5) is accepted, then yt causes xt, it is a unidirectional causality.

- If (4) is accepted and if (5) rejected, then xt causes yt, causality is again unidirectional.

- If (4) and (5) are accepted, then there is no causality between xt and yt.

- If (4) and (5) are rejected, then the causality is bidirectional, also called feedback.

This method requires stationarity of series. Moreover, numerous macroeconomic variables have unit root and so are not stationary at level. To implement the Granger causality test with non-stationary series, the co-integration framework needs to be used. There is a co-integration relationship between two non-stationary variables xt and yt if a linear combination of xt and yt is stationary. The existence of a co-integration relationship does not yet detect the direction of causality.

Empirical Results

Descriptive statistics of level data of Expenditure on education, Health expenditure and Gross State Domestic Product of Gujarat during 1980-81 to 2016-17 has been worked out. The Jarque-Bera statistics indicate rejection of normality of the data. Thus, all the data are transformed into the natural logarithmic form and below table-2 provides the descriptive statistics of log values of all the data used in the study which satisfied the normality of data as per Jarque-Bera test. Therefore, further statistical operations can be performed.

Table 1: Description of variables

Variables	Measurement Indicator of variable
Educational Expenditure (EXP)	Total Gujarat government's expenditure on education (Rs. in Lakhs)
Health Expenditure (HEX)	Total Gujarat government's expenditure on health (Rs. in Lakhs)
Economic growth (SGDP)	State Gross domestic product at market price in Gujarat (Rs. in Lakhs)
LNEXP	Logarithm of Education Expenditure
LNHEX	Logarithm of Health Expenditure
LNSGDP	Logarithm of SGDP

Table- 2 Descriptive Statistics

Statistic	LNEXP	LNHEX	LNSGDP
Mean	12.41355	11.13180	15.90701
Median	12.59595	11.19653	16.01345
Maximum	14.76308	13.61047	18.30356
Minimum	9.884712	9.078522	13.47450
Std. Dev.	1.370640	1.288681	1.449544
Skewness	-0.149810	0.318418	-0.010893
Kurtosis	2.095558	2.127952	1.811373
Jarque-Bera	1.399505	1.797626	2.178853
Probability	0.496708	0.407052	0.336409
Sum	459.3015	411.8765	588.5594
Sum Sq. Dev.	67.63152	59.78518	75.64244
Observations	37	37	37

Source: Authors' own calculation

The below Graph-1 indicates the Log of SGDP (LNSGDP), Log of Health Expenditure (LNHEX) and Log of Educational Expenditure (LNEXP). The three lines describe exponential increase. But educational expenditure increases rapidly than Health expenditure. It is evident from the theoretical ground that there has always been an increasing relationship among these variables in a developing state. There has been a case of causal relationship. Thus, to check the direction of causality among the concerned variables, it is imperative to check stationarity of these series and cointegration test.

As explained in earlier section, the first step is to check the properties of each series. Two widely employed test, Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) test with the null hypothesis of presence of unit root has been tested. The ADF test requires choosing the optimal lags of the variable, to avoid autocorrelation problems. This is done with the help of AIC (Akaike Information Criteria) and with the partial autocorrelation. For the PP test, the bandwidth given by the Newey-West method has been used.

Graph - 1 Time Series plot of SGDP, Health Expenditure and Educational expenditure of Gujarat
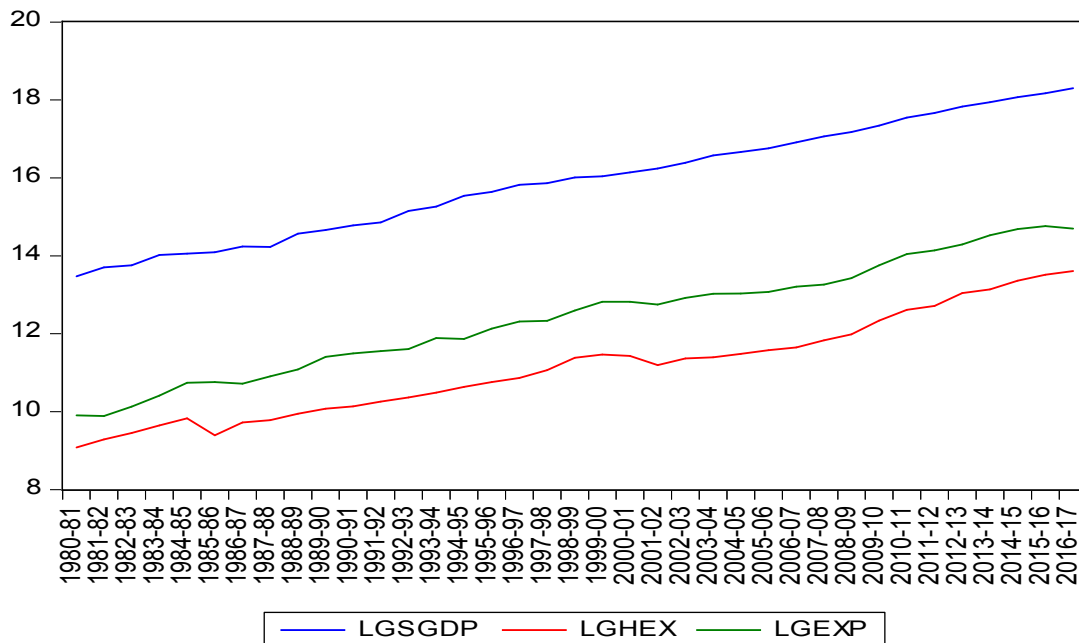
The results of ADF and PP tests are given in the Table-3. If there is a conflict between the ADF and PP test, the latter is chosen since it had a better correction of autocorrelation. LNEXP, LNHEX and LNSGP are stationary, so a VAR could be applied to check causality.

To compute the VAR, first it is necessary to determine the optimum lag length. This is done by checking information criteria: Akaike criteria (AIC), Hannan Quinn criteria (HQ) and Schwarz criteria (SC). As per Table -4, for all the criteria, the appropriate choice of one lag has been made. VAR has been checked with one lag and stability condition checked by examining the roots of characteristic polynomial. They are less than 1, so the VAR satisfies the stability condition. The Granger causality test could then be checked and presented in Table 5.

Table- 3 Unit Root Tests

Variable	ADF		Phillp-Perron	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
At Level				
LNSGDP	-0.296290 (0.9157)	-2.901450 (0.1761)	-0.318163 (0.9123)	-3.002543 (0.1455)
LNHEX	0.582290 (0.9872)	-1.503927 (0.8097)	0.660686 (0.9895)	-1.468363 (0.8220)
LNEXP	-0.824047 (0.8001)	-2.583177 (0.2897)	-1.416885 (0.5632)	-2.263117 (0.4423)
1st Difference				
LNSGDP	-3.773669 (0.0071)*	-3.524140 (0.0531)**	-8.866935 (0.0000)*	-8.741295 (0.0000)*
LNHEX	-6.411750 (0.0000)*	-6.557226 (0.0000)*	-6.411750 (0.0000)*	-6.551714 (0.0000)*
LNEXP	-5.886345 (0.0000)*	-5.880440 (0.0001)*	-5.928958 (0.0000)*	-6.066754 (0.0001)*

(*Denotes significant at 1 %, ** Denotes significant at 5 %, **** Denotes significant at 10 %)

Table- 4 Number of lags in VAR

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-33.92796	NA	0.001762	2.172233	2.306912	2.218162
1	94.12359	225.9733*	1.61e-06*	-4.830799*	-4.292084*	-4.647082*
2	99.83392	9.069344	1.98e-06	-4.637289	-3.694537	-4.315784
3	107.9877	11.51127	2.16e-06	-4.587514	-3.240725	-4.128220

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

From Table-5, Granger causality is confirmed from economic growth to health expenditure (SGDP ? Health), but not reverse. This meant that there has been a unidirectional relation between economic growth to Health. There has also unidirectional Granger causality been found from economic growth to educational expenditure (SGDP ? education), but not the reverse. Moreover, analysis further confirmed Granger causality from health expenditure to educational expenditure (Health ? Education), but not the reverse. These results are in confirmation

with the theory of economic growth as increase in growth further stimulates investment in social expenditure like educational and health. To confirmed causality results Impulse Response Function and Variance Decomposition techniques are used.

Table-5 Causality Analysis

Null Hypothesis	F-Statistic	Probability	Direction
LNHEX does not Granger Cause LNSGDP LNSGDP does not Granger Cause LNHEX	0.19143 3.28598	0.6646 0.0790***	SGDP → Health
LNEXP does not Granger Cause LNSGDP LNSGDP does not Granger Cause LNEXP	0.27973 11.8581	0.6004 0.0016*	SGDP → Education
LNEXP does not Granger Cause LNHEX LNHEX does not Granger Cause LNEXP	0.09469 3.98597	0.7602 0.0542 **	Health → Education

(*Denotes significant at 1 %, ** Denotes significant at 5 %, *** Denotes significant at 10 %)

In order to examine the impact of one shock, Impulse Response Functions (IRF) is used. It represents the impact of an innovation's shock to the variables of the system, in the present and in the future. A shock to one variable might affect itself but also other variables through the dynamics of the VAR. More specifically, IRF maps out the dynamic response path of a variable, due to a one-period standard deviation shock to another variable. The steady state value is 0, and this approach led to an examination of how one variable converges (or not) to this value, following a shock from another variable.

To compute IRF and so orthogonalize shocks in the VAR, the Cholesky decomposition has been widely used in empirical literature. It requires to know the order of the variables; they have to be listed from the most exogenous to the most endogenous. This might have been problematical since two different ordering choices lead to two different IRFs. To avoid this weakness, the method of generalized impulse is employed as provided by Pesaran and Shin. In this method, IRF are invariant to the ordering of the variables.

Looking to the Figure 1, GDP has minimal impact on health expenditure. It shows declining impact of LNSGDP to LNHEX. While analysing the Figure 2, GDP has positive impact on educational expenditure. The effect is gradually increasing. It reaches maximum in six years. Onwards, the impact tends to increase and remain positive for a long period.

Figure:1 Response of LNSGDP to LNHEX

Response to Nonfactorized One S.D. Innovations ± 2 S.E.

Response of LNSGDP to LNHEX
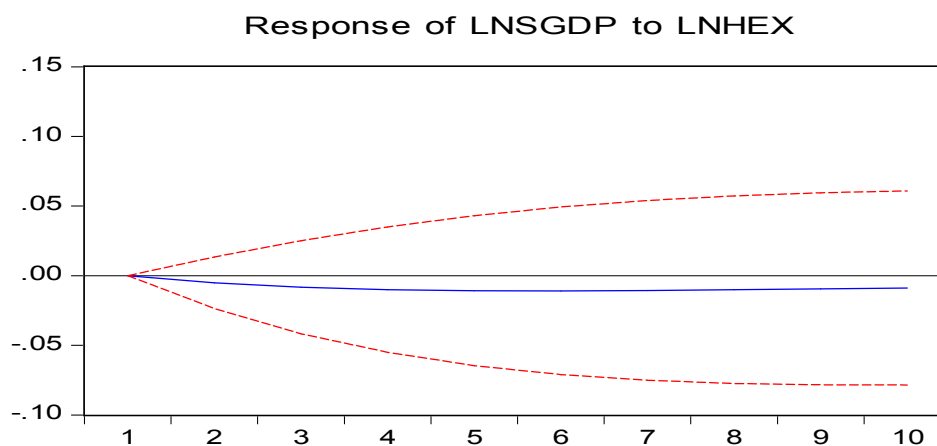
Figure: 2 Response of LNSGDP to LNEXP

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of LGSGDP to LGEXP
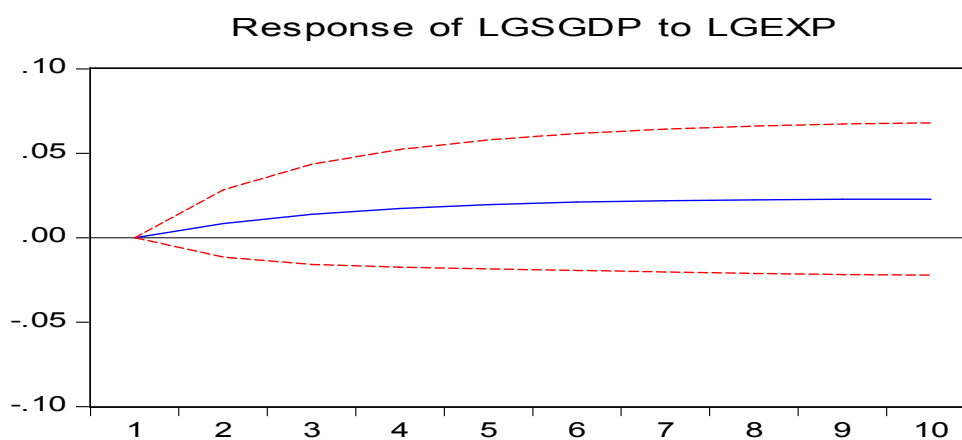
Examining the Figure 3 shows health expenditure has positive impact on GDP. The effect is gradually increasing. It reaches maximum in six years. Onwards, the impact tends to increase and remain positive for a long period. The positive impact increases with the passage of the time as can be seen from graph. Looking to the Figure 4, educational expenditure has positive impact on GDP. The effect is gradually increasing. The positive impact increases with the passage of the time as can be seen from figure. It reaches maximum in six years. Onwards, the impact tends to increase and remain positive for a long period

Figure: 3 Response of LNHEX to LNSGDP

Response to Nonfactorized One S.D. Innovations ± 2 S.E.

Response of LNHEX to LNSGDP
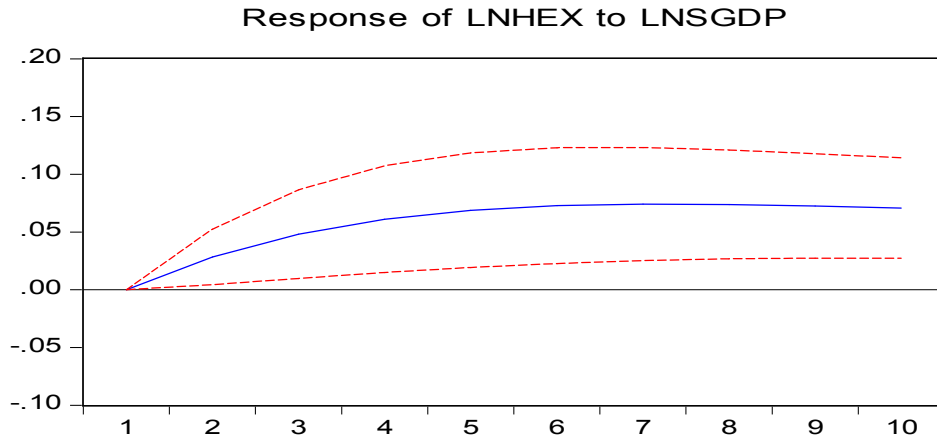
Figure: 4 Response of LNEXP01 to LNSGDP

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of LGEXP to LGSGDP
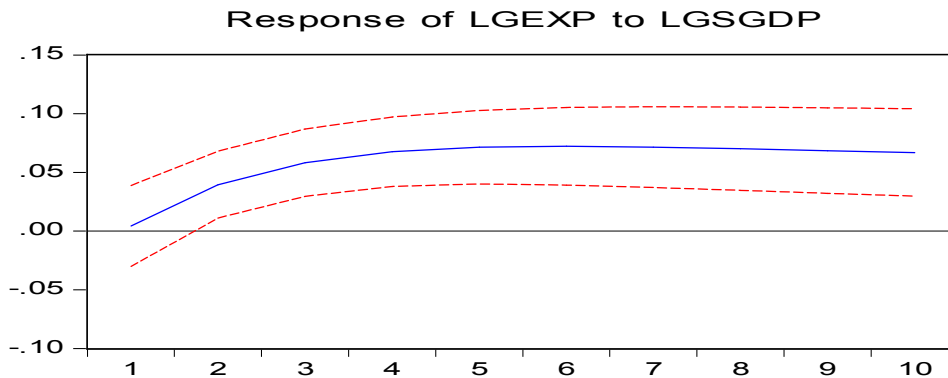
At last, the Variance Decomposition (VD) has been utilized to complete the results obtained with Granger causality test and IRF. Here, the goal is to compute each variable's contribution to the variance of the forecast error for a given horizon. Table 6 is divided into three parts, the first part of the table provides the percentage of variance of SGDP growth due to health expenditure & educational expenditure, the second part indicates the percentage of variance of health expenditure due to SGDP & educational expenditure and third part indicates the percentage of variance of educational expenditure due to health expenditure &GDP.

Table 6 provides information that nearly 96.59 % variance of forecast error for SGDP for four years mainly due to its own innovations. Onwards the variance of forecast error for SGDP declines marginally up to the 10 years and nearly 0.85 % variance is due to health expenditure while, 2.54% variance is due to educational expenditure in four year. This implies

that the relative weight of education is stronger than health expenditure. Moreover, the impact of variance in SGDP due to educational expenditure has been found more pronounce than the health expenditure. As from the table nearly 6.87 % variance in SGDP has been explained due to educational expenditure of Gujarat State during ten years of time period and onwards it stabilizes. While, health expenditure explained 2.25 % of variance in SGDP up to ten years of period and stabilizes. Thus, these results are in confirmation to the previous studied of country based analysis in India as well in the world.

Table: 6 Variance Decomposition from VAR

Variance Decomposition of LNSGDP				
Period	S.E.	LNSGDP	LNHEX	LNEXP
1	0.079591	100.0000	0.000000	0.000000
2	0.109109	99.21772	0.200626	0.581657
3	0.130692	97.96369	0.517938	1.518375
4	0.148432	96.59867	0.859121	2.542205
5	0.163829	95.29798	1.180585	3.521431
6	0.177603	94.13204	1.465806	4.402158
7	0.190159	93.11796	1.711592	5.170446
8	0.201751	92.24854	1.920590	5.830866
9	0.212552	91.50717	2.097524	6.395302
10	0.222687	90.87508	2.247437	6.877486

Conclusion

This article analyzed the new information about the relationship among the State Gross Domestic Product, State Level health expenditure and State Level educational expenditure for Gujarat first time. The results are in line with the previous literature. There is a unidirectional Granger causality between SGDP and health expenditure, even if health expenditure has a little favorable impact to GDP, the former cannot be considered as exogenous from the later. There has also been unidirectional Granger causality been found between SGDP to educational expenditure. Unidirectional causality has also been found from health expenditure to educational expenditure. Furthermore, with IRFs and VD, the effect of health expenditure into SGDP is more than the reverse. SGDP explained 6.87% variance in educational expenditure. Here, too the effect of educational expenditure into SGDP is more than the reverse. Nearly, 56% variance in SGDP is due to health expenditure while 69 % variance in SGDP due to education expenditure observed during 10 years. The impact of variance in SGDP, due to educational expenditure has been found more pronounce than the health expenditure.

By concluding, some indications in terms of policy recommendations are offered. Health expenditure and educational expenditure have been used as an instrument of counter-cyclical policy, because it is determined by economic factors (here SGDP). Gujarat has been considered

as the case where the increased in SGDP has substantial effects on social expenditure like education and health. It provides the fine case of applicability of Wagner's Law of increasing Income accompanied increase in Public expenditure. While analyzing the counter cyclical impact of social expenditure on SGDP, educational expenditure turned out to be a better variable compared to health. Such a tool of economic policy is very useful because its effects are strong with persistence. Efforts can be made on the effectiveness of health expenditure and educational expenditure at a disaggregated level. This may provide a good reason for future study.

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A Study of Enrollment Pattern in Higher Education - A case study of Sardar Patel University in Gujarat.

Rashmita B. Vishrama[*] and H. P. Trivedi[**]

Abstract

Internationally role of governments in financing higher education is found to declining over a period of time by a number of research scholars working in the field of economics of education. One of the major arguments for such a withdrawal is that a major share of total revenue generated by a government from tax payers come from indirect taxes which are usually paid by poor and backward category of people. Researchers in this field have found that the benefits of higher education are usually reaped by higher income groups of population and upper caste groups of the people in various counties of the world. So spending on higher education leads to greater inequality among the population precisely because the above stated groups of population is already rich and their easy access to higher education make them richer. Against this, poor and backward population of acountry do not take benefits of higher education which keep them below poverty line over a period of time. So financing of higher education prove to be non egalitarian. This particular aspect has been studied in this paper by taking enrollment to higher education in faculty of arts with regard to Sardar Patel University of Gujarat during a period from 2001 to 2015. The study concludes that the advanced argument does not hold true in the study area. According to this study, there is an increase in an average annual enrollment of poor and backward students in the faculty of arts over a period under study. If this holds true in remaining parts of the country then the education policy needs to be revised in respect of raising financing for higher education in India.

Financing of education has remained a matter of great concern and a challenge to all the countries in the world. The education sector of any country continuously competes for public resources with all its other sectors in an economy and also faces competition for resources within various sub-sectors of education. Once upon a time the educational development of a nation was exclusively based on the availability of public resources and the private participation was not considered that much necessary and a good practice. The governments were also having sound budgets and were providing sufficient resources to the education sector, at least,

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up to the elementary and secondary levels. This situation has changed considerably with the advent of international economic reforms. Consequently many countries have opened education sector for the private sector on a massive scale. This has brought up the issues of rising costs, cost recovery and financing of education on the forefront of any discussion related to the education sector.

At an international plane, governments are found to be financing higher education. In this context,Psacharopoulous (1985), reviewed the financing pattern of a number of developing countries, and found that costs of education are financed largely from the taxpayers' money rather than the individual student.Jimenez (1984) Observed that the primary source of financing was the state support to the higher educational institutions and tuition fees remained a very small part of the total educational financing. It was found that nearly one third of the countries in the world provide higher education at no-fee, and the users fees as percentage to unit cost were eight per cent only at the higher education level in nearly 30 countries.Mwikisa and Lungwangwa (1998) studied the financing behavior of two important universities of Zambia and found out that the main source of financing these two universities of Zambia namely Lusaku and Copper Belt were the grants of government even though both of the universities were autonomous institutions.Mingat and Tan (1986)Made a careful examination of the Source of Financing of higher education and opined that an increase in tuition fees as a non-government source of financing under certain circumstances could prove as an important source of financing higher education because it might contribute to both efficiency and equity. Woodhall (1991) came out with a suggestion of reduction in the subsidies to the higher education sector and recommended that the student loans, graduate tax and enhancing fees and funds should be promotedto finance the rising cost of higher education.

Statement of The Problem

According to Tilak (2006), for the past many years, public expenditure on higher education has been declining at least in real prices as in relation to state income and budgets across many countries of the world including India. The decline in public expenditure on higher education is found to have emerged as a global crisis of higher education sectors and is the most noticeable trend. It is perhaps because of compelled economic reform policies which conceived of the reduced role of the state in funding higher education. The most countries are found to have inflicted serious cuts in public budgets for higher education. This trend is found to exist in many countries, in some or all the areas related to education that refer to total public expenditure on higher education, per student public expenditure, public higher education expenditure's shares in relation to a particular country's national income or total government expenditure, and allocation in absolute and relative terms to the important programs that include research, scholarship and so on. The decline is more prevalent in the developing than that in the developed countries. There has been a significant fall of public expenditure on higher education such as the united kingdom, Australia and New Zealand.

The financing of higher education has proved to be a matter of great theoretical and empirical debate. The nature, extent and mode of participation of public funds in the education sector involve a long list of arguments which have been raised by individual scholars and institutions. These arguments are observed to revolve around the 'public good' nature of higher education, dynamic externalities produced by itsrole in achieving equality of opportunities, and economies of scale (Blaug and Woodhal, 1979, Tilak 1997). There are also, several arguments against the public subsidization of higher education. These arguments are (a) inefficiency, (b) incautious and (c) pragmatic nature of these grants/subsidies.

A number of research studies show that the benefits of higher education are largely received by the students belonging to the upper and middle income groups, and those who belonged to the forward communities. This means that, the benefits of liberal government grants/subsidies are largely enriching the already rich sections of the society, whereas the tax receipts come particularly from the indirect taxes of states which finance higher education expenses are mainly paid by the lower income groups. It is, therefore, reasonably stated that the higher education of privileged sections of society is liberally financed out of the revenue extracted from the poor and such a policy shall perpetuate educational and income inequalities in the society (Psacharopoulos, 1994, World Bank, 1994, Psacharopoulos, 1997, Mingat and Tan, 1986, Jimenez, 1984).Here, the debate of increasing grants/subsidies on one hand and no grants/subsidies to higher education on the other hand observed to be intensified over time (Hinchliffe, 1993). In the absence of public grants/subsidies, it is suggested that the cost of higher education should be extracted from the beneficiaries (students) or financed from the alternate sources like the endowments, industry, charity,etc.

Justification Of The study

One of the major arguement for reducing grants to higher education is that it encourages inequity in the sense that a larger indirect tax amount is generally collected from middle or low income group of people.But benefits of higher education is reaped only byhigher upper income group ofpeopleas well as upper caste groups of people and backward or reserve category of people do not have access to higher education. In this context,it is pertinent to examine as to what extent this argument holds true it micro level. The major objective of this is to examine enrollment pattern in faculty of arts in case of S.P.University in Gujarat during 2001 to 2015.

Data Base and Scope of Study

The data were available about category wise enrollment of students in faculty of arts in the period from 2001 to 2015 for Sardar Patel University. The data were also available by gender wise enrollmentof students during the same period. The data are analyses for enrollment of students by humanities, social sciences and each department under humanities and social sciences. The data are also analyzed across various categories students such as open category, SC Category, OBC Category, PH Category as well as across male students and female students.It

is attempted to work out average enrollment for all different group and subgroupsfor three periods viz,(1) 2001 to 2005, (2) 2006 to 2010 and (iii) 2011 to 2015. The statistics so worked out are shown in table 1. The important observations emerging from the table are detailed here below.

Enrollment Pattern Analysis for Faculty of Arts

An average annual enrollment of all students of faculty of arts in 2001 to 2005, 2006 to 2010 and 2011-15 worked out to 1621,1526 and 1181 students respectively. This shows that average annual enrollment in case of faculty of arts is experiencing a decline over the study period in S.P. University. Similarly, an average annualenrollment of all male students in faculty of arts in 2001 to 2005, 2006 to 2010 and 2011-2015 worked out to 931, 841 and 531 studentsrespectively. The corresponding figures for all females for the same time periods worked out to 691,685 and 651 respectively.So anannualenrollment of both male and female students has declined over the periods under study. However, the decline is greater for male students in comparison with female students in Faculty of Arts during the period under analysis.

An average annual enrollment of all students belonging to open category for the whole faculty of arts in 2001 to 2005,2006 to 2010 and 2011 to 2015 worked out to 788, 565 and 513 students respectively. The corresponding figures for male students for the same periods worked out to 394, 288 and 198 students respectively whereas for female students these worked out to 394,277 and 315 students respectively. Thus, male students have decline over the three period whereas female students decline in 2006 to 2010 over a period of 2001-05 but then showed an increase in an annual enrollment in 2011-15 when compared with the period 2006 to 2010. So an average annual number of enrollment of female students in the faculty of arts are found to have increased in S.P. University in the recent period of time in comparison with male students.

An average annual enrollment number of total students (male plus female) belonging to SC, ST, OBC and PH Category put togetherher during 2001-05, 2006-2010 and 2011-15 worked out to 830, 951 and 659 students respectively. The corresponding figures for male students during the same time periods worked out to 533, 547 and 331 students respectively where asfor female students these were found to be 295,403 and 327 students respectively. Thus, absolute average annual number of total students' enrollment belonging reserve category has declined in case of both male and female students. However,average number of male students of all reserve category put together is found to have increased in 2006-10 when compared with the period 2001-05 but then experienced a decline in 2011-15 which is also found to be the same for female students for the same periods. But average annual number of femalestudentsenrollments for all reserve category put together is found to have increased in 2011-15 over the period 2006-10-- meaning thereby an increasing preference of higher education among female students belonging to various reserve categories in S.P. University of Gujarat especially in faculty of arts.

Enrollment pattern Analysis for Humanities

An average annual enrollment of all humanities students in faculty of arts in 2001 to 2005, 2006 to 2010 and 2011-15 worked out to 977.6, 915.6 and 584.5 students respectively. This shows that an average annual enrollment in case of all students of humanities is experiencing a decline over the study period in S.P. University. Similarly, an average annual enrollment of male students in 2001 to 2005, 2006 to 2010 and 2011-15 worked out to 575,523 and 229 students respectively. The corresponding figures for female students for the same time periods worked out to 403,393 and 355 respectively. So enrollment numbers of both male and female students have declined over the periods under study. However, the decline is greater for male students in comparison with female students for various languages put to gather during the periods under analysis. This shows that the preference for languages study has increased in case of female students when compared with male students during the study period.

An average annual enrollment number of Humanities students in case of open category for the whole humanities in 2001 to 2005, 2006 to 2010 and 2011 to 2015 worked out to 407, 315 and 239 respectively. The corresponding figures for male students for the same periods worked out to 217,173 and 76 students respectively whereas for the female students these statistics worked out to 190,142 and 163 students respectively. So an average annual enrollment of female students in the humanities is found to have increased in S.P. University over a period of time in comparison with male students. This concludes that male students enrollment in humanities has substantially decline over the study period belonging to open category students.

An average enrollment number of humanities all students male plus female belonging to SC, ST, OBC and PH category put to gather during 2001-05, 2006-2010 and 2011-15 worked out to 571, 602 and 337 students respectively. The corresponding figures for male students during the same time periods worked out to 358, 349 and 160 students respectively whereas for female students these figures were found to be 212, 251 and 186 students respectively. Thus, absolute average number of in humanities total students enrollment in humanities belonging to reserve categoryhas declined in case of both male and female students. However a comparison of an average annual enrolment between open category and reserve category reveal quite noteworthy observation.

Table: 1 Category -wise, Gender-wise, Department wise Average Annual Enrollment of Students in Faculty of Arts Sardar Patel University Over Different Quinenium

Sr. No.	Department	Classification of Students	Total 2001-05						Total (2006-10)						Total (2011-14)					
			Total	Open	SC	ST	OBC	PH	Total	Open	SC	ST	OBC	PH	Total	Open	SC	ST	OBC	PH
1	Gujarati	All Students	221	80	38	60	41	3	215	74	26	57	57	2	151	59	28	27	36	0
		Male Students	129	42	19	38	27	3	109	37	11	24	36	1	59	20	11	11	18	0
		Female students	91	37	18	21	13	1	106	37	15	34	20	0	92	40	17	17	19	0
2	Hindi	All Students	275	109	38	68	56	4	255	73	35	75	71	2	136	49	26	35	26	1
		Male Students	168	60	23	45	39	2	166	45	21	47	52	1	58	18	14	14	12	1
		Female students	107	50	15	23	17	2	89	28	14	28	19	0	78	31	12	21	14	0
3	Sanskrit	All Students	230	82	33	66	46	2	202	56	23	64	59	0	121	42	19	31	29	0
		Male Students	138	45	19	41	31	2	129	37	14	37	42	0	63	19	11	16	17	0
		Female students	92	37	14	25	15	0	73	19	10	27	17	0	58	23	8	15	12	0
4	English	All Students	252	136	30	27	57	2	244	112	30	38	62	1	170	89	34	31	17	0
		Male Students	139	70	18	19	30	2	119	55	15	15	34	1	49	20	12	10	8	0
		Female students	113	66	12	8	27	0	125	58	15	23	28	0	121	69	22	21	10	0
5	Sociology	All Students	184	99	25	31	27	1	159	69	21	39	30	0	177	82	22	41	31	1
		Male Students	94	37	14	22	20	1	82	33	10	22	17	0	92	40	12	18	21	1
		Female students	90	62	11	10	7	0	77	35	11	17	13	0	85	42	10	23	10	0
6	Psychology	All Students	78	57	8	3	8	1	111	62	16	8	24	1	118	63	16	14	25	0
		Male Students	32	22	4	2	4	0	43	23	6	4	9	0	54	24	9	7	14	1
		Female students	46	35	4	2	4	1	68	39	10	4	15	1	64	39	7	7	12	0
7	Economics	All Students	188	124	20	19	23	2	167	68	19	43	36	1	164	83	31	26	24	0
		Male Students	114	68	12	13	18	2	81	29	11	23	18	0	78	33	13	18	14	1
		Female students	74	56	7	6	5	0	85	39	8	20	18	0	86	50	18	8	10	0
8	History	All Students	162	79	23	40	19	2	121	31	17	39	33	1	97	31	14	30	22	0
		Male Students	102	43	17	28	14	1	84	18	10	27	28	1	55	17	7	19	13	0
		Female students	60	36	6	12	4	0	37	13	7	12	4	0	42	14	7	12	10	0
9	Political Science	All Students	28	22	3	1	2	0	42	22	8	5	8	0	38	16	7	7	9	0
		Male Students	12	8	2	1	1	0	22	11	4	3	4	0	22	9	3	4	6	0
		Female students	16	14	1	0	1	0	20	10	4	2	4	0	16	7	4	2	4	0
10	Humanities (All langages 1 to 4)	All Students	978	407	138	220	201	12	916	315	114	234	249	5	577	239	106	123	109	1
		Male Students	575	217	79	143	128	8	523	173	60	122	164	3	228	76	48	50	54	1
		Female students	403	190	59	77	73	3	393	142	53	112	85	1	349	163	58	73	55	0
11	Social Sciences (5 to 9)	All Students	640	381	79	95	79	6	600	251	81	135	131	3	594	274	89	117	112	2
		Male Students	354	178	50	65	57	4	312	115	40	79	77	2	301	122	45	66	67	2
		Female students	286	203	29	30	22	3	288	136	41	56	54	0	293	152	44	52	45	0
12	Arts Faculty	All Students	1617	788	217	315	280	18	1516	565	194	369	380	8	1171	513	195	240	221	3
		Male Students	929	394	129	208	185	12	835	288	100	201	241	5	529	198	93	115	121	2
		Female students	689	394	88	107	94	6	681	277	94	168	139	2	642	315	102	125	100	0

Source: Trivedi H.P. (2015), Sardar Patel University Statistical Outline 2001 to 2015, Department of Economics, SPU, VVNagar.

Enrollment pattern Analysis for social sciences

An average annual enrollment of all social sciences students in faculty of arts in 2001 to 2005, 2006 to 2010 and 2011-15 worked out to 643, 610 and 596 respectively. This shows that an average annual enrollment in case of all students of social sciences is experiencing a decline over the study period in S.P. University. Similarly, an average annual enrollment of all social sciences male students in 2001 to 2005, 2006 to 2010 and 2011-15 worked out to 356, 318 and 301 respectively. The correspondingfigures for all female students for the same time periods worked out to 288, 292 and 295 respectively. So enrollment of both male and female students have declined over the periods under study. However the decline is greater for male students in comparison with female students for all social science departments in faculty of arts put to gather during the period under analysis. It is important to note over here that against a decliningtrend, an average annual enrollment of female students is found to have increased over the threetime periods selected for analysis.

An average annual enrollment of all social sciences students in case of open category for the social sciences in 2001 to 2005, 2006 to 2010 and 2011 to 2015 worked out to 381, 251 and 274 students respectively. The corresponding figures for male students for the same periods worked out to 178,115 and 122 students respectively whereas for the female students these statistics worked out to 203,136 and 152 students respectively. Soan average annual enrollment of female students in the Social Sciences subject are found to be greater in comparison with male students during all the three period selected for the analysis.

An average annual enrollment number of social science students (male plus female) belonging to SC, ST, OBC and PH category put to gather during 2001-05, 2006-2010, and 2011-15, worked out to 258, 350 and 318 students respectively. The corresponding figures for male students during the same time periods worked out to 176, 198 and 177 students respectively whereas for females these were found to be 82, 152 and 141 students respectively. Thusabsolute average number of total social sciences students' enrollments belonging reserve category has declined in case of both males and female students. However an average number of male students of all reserve category putt gather is found to have increased in 2006-10 when compared with the period 2001-05 but experienced a decline in 2011-15 which is also found to be the same for female students 2001-05 to 2006-10.

A comparative analysis between students of open category and students of reserve category joining studies in faculty of arts during the study period reveal quite noteworthy observations. An average annual enrollment of all students of open category in 2001-05, 2006-10 and 2011-15 worked out to 788, 565 and 513 respectively. The corresponding figures for all the students put together constituting SC, ST, OBC and PH category for the same time periods worked out to 830, 951 and 659 respectively. This observation is also found to be the same in case of average annual enrollment of male and female students over a study period. This clearly shows that an average annual enrollment of students belonging to reserve category has

remained greater than open category of students during different periods under analysis as well as over a period of time. This means that poor and backward category of students are receiving an increasing benefits from higher education over a period of time under study.

Department-wise Enrollment Pattern

It is attempted to analyses enrollment pattern of different category of students taking admissions among various post-graduate departments in faculty of arts over a period of time. The important observations so obtained are briefly described here below.

In case of Gujarati subject, an average annual enrollment of all students put together in 2001-05, 2006-10 and 2011-15 worked out to 221,215 and 151 respectively. The corresponding figures for male students during the same time periods worked out to 129, 109 and 59 respectively whereas for female students these figures were 91,106 and 92 students respectively. So an average annual number of total students are found to have declined over a period of time under analysis but an average annual number of students enrolled as female students are found to have increased when compared with an average annual enrollment of male students joining to study Guajarati subject during the period under analysis

An average annual enrollment pattern in respect of the remaining eight subjects was found to be varying substantially across gender category as well as caste category over a period of time and at a point of time. However, the variations observed so far very clearly indicate a fact that on an average poor and backward students as well as female students are taking increasing benefits of higher education in case of higher education provided in faculty of arts in Sardar Patel University Of Gujarat. Central government of India and its various state governments have launched a number of women empowerment programmers. In this context, financing of higher education also leads to an achievement of women empowerment objective- a half of Indian population. Thus, financing of higher education in light of present research finding proves to be an important policy measure to promote equality among population in India.

Conclusion:

In summing up, although an average annual enrollment of all students in faculty of arts have decreased over study period , it is quite pertinent to note that during all the different three periods under analysis, total students of reserve category have remained greater than the open category of students. Further, an average annual enrollment of female students has also remained grater when compared with male students. This means that poor backward students and female students requiring support for empowerment and development have successfully received the same. So an expenditure on higher education has extended due benefits to poor people who are payinglarge amount of indirect tax to governments. In this context, it can be concluded that a gradual withdrawal of grants of various state governments to higher education on the ground of uity argument is required to be corrected in light of this research study.

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Performance of Pradhan Mantri FasalBima Yojana in Odisha: Some Micro-evidence from Bolangir District

Mamata Swain* and Basanti Renu Hembram**

Abstract

This paper assesses the operational efficiency of PMFBY as a risk management tool in Odisha on the basis of primary data collected from 80 loanee and 80 non-loanee insurance users and 40 non-users from drought prone Bolangir district. The paper finds that the farmers who are more dependent on cultivation to earn their livelihood are more exposed to risk and hence go for crop insurance. Farm size and household income significantly and positively influence the adoption behaviour of the farmers.PMFBY has not gained wide acceptance among the insurance users. Most of the insurance users remained neutral or were dissatisfied with the scheme. Delay in compensation payment, large loss assessment unit and non-coverage of individual and independent risk lead to dissatisfaction among the users. However, the non-users had not adopted the insurance as they were lacking in premium paying capacity and considered documentation of PMFBY to be complex.

Keywords: Crop Insurance, Agricultural Risk, Performance, Odisha

Introduction

In India, agriculture is a highly risky venture primarily due to uncertainty in crop production.Contrary to industrial production, crop production takes place in the open field and depends on various climatic parameters such as rainfall, temperature, sunshine, humidity etc. Any deviation from the requisite quantity at various growth stages of plant affects crop production adversely. Extreme weather events such as drought, flood, cyclone and storm surge inflict huge crop loss and destabilise rural livelihoods. Moreover, infestation of pest attack and plant diseases causes crop failure. Sometimes, erratic input supply and technology failure also reduce the crop yield. Thus, the small holder farmers operate in a very risky environment and these risks are unpredictable and thereby non-preventive in nature. Therefore, the government takes many measures to reduce risk and provide resilience to agriculture. Various risk mitigation measures taken by the Government include promoting cultivation of drought and flood resistant crop varieties, intercropping, extending irrigation facility, drought proofing, flood control, watershed management and launching crop insurance schemes.

Farmers often adopt various strategies to manage agricultural risk (Singh, 2010). Risk can be managed by avoiding, preventing, sharing, transferring and spreading it. Risk can be avoided by opting for alternative livelihood opportunities in non-farm sector. Some risks can be prevented by taking advance action like preventive pest control. Risks can be shared by giving lease of land to tenants. Risk can be transferred by insuring the crop yield and through forward contract. Risk may be spread through diversified farming and mixed cropping.

In spite of taking all precautionary measures when there is crop loss crop insurance comes to the rescue of the farmer. Crop insurance is a risk transfer mechanism and a risk adaptation measure that transfers the risk from the insured farmer to the insurer company. Farmers pay a small nominal amount as premium for insuring their output against an uncertain larger amount of loss, which will be compensated by the insurance

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company in the event of crop damage due to non-preventable risks. Insurance has great potential to provide income support to farmers, both by protecting them when shocks occur and by encouraging greater investment in crops that increases their yield and farm income. Therefore, there is a great need for crop insurance to provide economic support to farmers, stabilize their farm income, induce them to invest in agriculture, reduce their indebtedness and decrease the need for relief measures in the event of crop failure(Hazell, 1992).

In India, during the last two decades climate change has emerged as a major threat to agricultural development and rural livelihood (Swain, 2014). Climate change has manifested itself in terms of gradual increase in temperature, variability in rainfall and more importantly increase in frequency, intensity and duration of extreme weather events such as flood, drought, cyclone and storm surge. As a result, production risks have increased substantially. Odisha, located on the east coast of India is considered as the climate change hot spot of the country because of its long coastline, high dependence on agriculture, low irrigation coverage and high incidence of mass and chronic poverty.

Various crop insurance schemes have been implemented by Government of Odisha since 1981: Pilot Crop Insurance Scheme, Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS), pilot Weather Based Crop Insurance Scheme (WBCIS), pilot Modified National Agricultural Insurance Scheme (MNAIS), and the latest Pradhan Mantri FasalBima Yojana (PMFBY). In the increased risky environment of climate change, globalisation and commercialisation of agriculture, there is a need to analyse the effectiveness of the latest crop insurance scheme i.e. PMFBY, currently under implementation in Odisha to suggest innovative insurance products to cater to the changed needs of the farmers.

Operational Mechanism of PMFBY

PMFBY was launched by Prime Minister Narendra Modi on 13[th]February 2016. This scheme replaced National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS) from Kharif 2016. Following the guidelines of the Government of India, Odisha has implemented PMFBY in all the thirty districts since 2016. PMFBY provides comprehensive insurance coverage against crop loss on account of non-preventable natural risks such as (i) Natural Fire and Lightning, (ii) Storm, Hailstorm, Cyclone, Typhoon, Tempest, Hurricane, Tornado etc. (iii) Flood, Inundation and Landslide (iv) Drought, Dry spells (v) Pests/ Diseases etc. This scheme is compulsory for loanee farmers who have availed crop loans from institutional sources of finance and non-loanees farmers can also insure their crops voluntarily. The objectives of the scheme are to provide financial support to the farmers in the event of failure, to stabilise their income, to encourage them to adopt innovative and modern agricultural practices and to ensure flow of credit to the agriculture sector.

The risk coverage of crop cycle has increased which include not only crop loss during plant growth stage but also prevented-sowing and post-harvest losses. Inundation has been incorporated as a localized calamity in addition to hailstorm and landslide for individual farm level assessment. An area approach has been adopted for settlement of claims for widespread damage. Notified Insurance unit has been reduced to Panchayat for major crops. Uniform maximum premium of only 2%, 1.5% and 5% is to be paid by farmers for all Kharif crops, Rabi Crops and Commercial/ horticultural crops respectively. There is provision of individual farm level assessment for Post-harvest losses against the cyclonic and unseasonal rains for the crops kept in the field for drying up to a period of 14 days.

The scale of finance in each district for each crop forms the basis for calculation of sum assured. This roughly corresponds to costs incurred in cultivation of crops and gives farmers adequate financial protection without any capping as followed in earlier schemes. The sum assured has doubled in the case of PMFBY in comparison to earlier schemes.

Private participation in crop insurance has been encouraged. A cluster approach has been adopted under which a group of districts with variable risk profile are allotted to an insurance company through bidding for a longer duration up to 3 years.

PMFBY is an actuarial model-based scheme where token premium is charged from the client farmers, and government pays the balance premium quoted by insurance companies selected by states through transparent bidding. However, the full liability of payment of claims lies with the insurance companies.

The claim amount is credited electronically to the individual farmer's bank account. Remote Sensing Technology, Smart phones and Drones are used for quick estimation of crop losses to ensure early settlement of claims. A Crop Insurance Portal has been launched. This is used extensively for ensuring better administration, co-ordination, transparency and dissemination of information. Focused attention and adequate publicity are given on increasing awareness about the schemes among all stakeholders and appropriate provisioning of resources for the same. Government is keen to improve the implementation of scheme by focusing on timely settlement of claims. There are penal provisions on agencies which cause delays in release of claims to farmers.

Objectives

In the above backdrop, the objectives of the study are

(i)   To assess the operational efficiency of PMFBY in the state of Odisha;

(ii)   To assess the satisfaction level of farmers with PMFBY and identify the causes of dissatisfaction if any;

(iii)   To make suggestions for improving the efficacy and effectiveness of the scheme for managing agricultural risk.

Methodology and Study Area

In order to understand the effectiveness of PMFBY as a risk management tool at the ground level, a field survey was conducted in drought prone Bolangir District in Western Odisha, which is a part of the most backward KBK districts as designated by the Planning Commission. Bolangir is known for its high incidence of mass and chronic poverty and dominance of tribal population. Persistent crop failure, lack of access to the basic services and entitlements, starvation, malnutrition and migration are the leading manifestations in Bolangir. Severe droughts very often visit this region in quick succession.

Agriculture is very much vulnerable to agricultural risks because of low rainfall and variability in rainfall pattern. The annual normal rainfall in the district is 1289.8 mm which is lower that the state average rainfall of 1451.2 mm. Only 20.6 per cent of gross cropped area was irrigated during 2013-14, which was lower than the State average (38.9%). Thus, agriculture is still considered as a gamble in the monsoon. Farmers mostly follow mono-cropping and grow paddy in the Kharif season. During 2013-14, the cropping intensity of the district was 168 per cent and the yield rate of paddy was 4837 quintals per hectare. The consumption of fertiliser was also low at 45.83 kg / ha.

In order to assess the performance of PMFBY, a multi stage stratified random sampling technique was followed to select the households for field survey. In the first stage, Bolangir district has been chosen as the study area because of its high vulnerability to drought as compared to other districts in Odisha. In the second stage, Bongomunda block was selected from the district. In the third stage, from this block, a cluster of six villages namely, Bhalumunda, Jurabandha, Sangamada, Turekela, Tentelpada, Kutrabeda were selected because of high coverage of PMFBY. Finally, 80 loanee PMFBY users, who were compulsorily covered under PMFBY and 80 non-loanee PMFBY users, who voluntarily purchased PMFBY were randomly chosen from the selected villages. To explore the reasons for non-adoption of crop insurance, 40 non-users of PMFBY were also randomly selected. Thus, a total of 200 households were included in the study. Primary data was collected from these households by direct interview method with the help of structured questionnaires.

Survey Findings

Socio-economic Profile of Insurance Users and Non-users

The functional efficiency of any agricultural insurance scheme depends on its adoption rate. The adoption of insurance in turn depends on various socio-economic characteristics of farmers which include their social composition, educational attainment, occupation and sources of income, land holding pattern, asset position and net farm income. Therefore, the socio-economic profile of insurance users and non-users in the study area has been examined and presented in Table 1.

A comparison of the socio-economic characteristics of users and non-users of crop insurance reveals that the majority of the loanee (80 per cent) and non-loanee (60 per cent) PMFBY users and non-users (77.5 per cent) belong to SEBCs. However, the percentage of SCs and STs insurance users is greater in the case of non-loanee (37.5 per cent) than that of loanee (18.5 per cent) insurance users. Thus, the lower castes are more risk averse, and voluntarily adopting crop insurance as a risk management strategy. The proportion of farmers having education of primary level (class 5) and above is 51.2 per cent in case of loanees, 36.3 per cent in case of non-loanees and 57.5 per cent in case of non-users. Thus, it cannot be concluded that farmers with higher literacy rate have opted for insurance. As regards size of land ownership, a higher percentage of non-users are marginal and small farmers (62.5 per cent), owning land less than two hectares in comparison to loanee (42.5 per cent) and non-loanee (32.5 per cent) insurance users. With regard to sources of income, cultivation is the major source of income for all the sample households. Nevertheless, the percentage of income from cultivation to total income is significantly greater for loanee (56.5 per cent) and non-loanee (49.9 per cent) insurance users than for non-users (32.5 per cent). Thus, the farmers, who are more dependent on agriculture to earn their livelihood, are buying insurance.

Table 1: Socio-Economic Profile of Insurance Users and Non-Users

Characteristics	PMFBY Users		PMFBY Non-Users
	Loanee	Non-loanee	
I. Caste in %			
a) General	1.2	2.5	7.5
b) SEBC	80.0	60.0	77.5
c) Scheduled Castes	10.0	27.5	7.5
d) Scheduled Tribes	8.8	10.0	7.5
II. Education in %			
a) Below Primary	48.8	63.7	42.5
b) Primary and above	51.2	36.3	57.5
III. Farmer Class in %			
a) MF/SF	42.5	32.5	62.5
b) Others	57.5	67.5	37.5
IV. Sources of Income			
a) % of Income from Cultivation	56.5	49.9	32.5
b) % of Income from Non-agricultural Wages	11.4	17.2	25.3
c) % of Income from Other Sources	32.1	32.9	42.2
d) Yield rate of Paddy (Qtls/Ha)	11.54	16.16	14.88
V. Farm Income and Cost of Cultivation Rs./Ha)			
a) Gross Income	13229	13758	15955
b) Total Cost of Cultivation	27824	36581	36091
c) Imputed Value of Family Labour	12788	16318	13019
d) Paid-out Cost of Cultivation	15036	20263	23071
e) Net Income	-1808	-6506	-7117

Source: Field Survey

Crop Yield and Farm Income

Paddy is the staple cereal crop grown in the study area. Paddy is cultivated during the Kharif season. Also, some farmers cultivate other crops like cotton, maize, arhar, ground nut, ginger, turmeric and sunflower. But most of the farmers depend upon paddy cultivation for their sustenance. They mainly practise rain-fed farming as irrigation facility (both surface and ground water) is not available in the study area.

During Kharif 2017, the per hectare yield rate of paddy for loanee and non-loanee insurance users and non-users was11.54 quintals, 16.16 quintals and 14.88 quintals respectively (Table 1). The non-loanee insurance users thus have a higher yield rate, demonstrating that progressive farmers come forward to insure their crops voluntarily.As the survey year was a drought year, almost all the households had a below normal yield. According to the farmers, the normal yield of Kharif paddy in their villages is 29 qtls/ha. Thus, in rainfed agriculture, farming is not profitable and subject to risks associated withrainfall variation.

Moreover, because of low yield owing to drought condition, the net income per hectare of Kharif paddy arrived at by deducting the cost of cultivation from gross income is found to be negative for all sample households. Among the users of crop insurance, the amount of loss met by the non-loanees (Rs.6506) is higher in comparison to loanees (Rs.1808), which has prompted them to adopt crop insurance voluntarily. However, it is observed that the highest amount of loss is borne by the non-users (Rs 7117/ha).

Who are Buying Insurance?

The survey attempted to find out the factors that positively influence the purchase of insurance. The loanees are compulsorily covered under PMFBY, therefore the option of buying insurance does not arise for them. But the non-loanees have adopted crop insurance voluntarily, whereas the non-users have not gone for insurance. Therefore, to identify the factors that influence the adoption of crop insurance, the t-test was applied to find out the level of significance between mean difference of various socio-economic variables of the non-loanee users and non-users of PMFBY. The results are shown in Table 2.

The t-test results show that there is significant difference in variables such as farm size, family size, age, livestock, household income and income from cultivation between non-loanee users and non-users of crop insurance. Thus, aged farmers with larger farm size, family size, livestock, household income and income from cultivation are more inclined to purchase insurance.However, there is no significant difference in education level, yield and income from other sources between non-loanee users and non-users of crop insurance. Contrary to usual expectation the non-users were having higher level of education than that of the non-loanee users. This may be due to occupational diversification adopted by the educated non-users to manage risks, as the share of non-farm income in total household income is greater for them than non-loanee insurance users.

Table 2: Socio-Economic Characteristics of Non-Loanee Users and Non-Users of PMFBY

Parameters	Non-Loanee Users		Non-Users		Mean Difference	T	Significance
	Mean	S.D.	Mean	S.D.			
Farm size (Acres)	1.06	0.68	0.61	0.34	0.45	4.82	**
Age (Numbers)	47.69	10.63	44.58	8.47	3.11	1.74	*
Family size (Numbers)	5.35	2.14	4.83	1.43	0.52	1.60	*
Education (Years)	3.49	4.40	3.98	3.78	-0.49	-0.63	NS
Livestock (Rs.)	34651	27029	21345	16415	13306	3.43	**
Yield (per hectare)	16.16	7.72	14.88	3.56	4.16	1.24	NS
HH Asset	253015	131710	178406	162210	74609	2.52	**
Household income (Rs.)	110266	28754	79300	26438	30966	5.82	**
Income from Cultivation (Rs.)	55081	19493	25850	18749	29231	7.94	**
Income from Others (Rs.)	55185	23892	53450	19089	1735	0.36	NS

Source: Based on data collected through Field Survey

Note: ** Significant at 1 per cent; * Significant at 10 percent level; NS Not Significant

Risk Management Tools

Farmers face different types of production risks in agriculture. As reported by the respondent's drought is the major risk factor in the study area. In the study villages, drought conditions are not created by just deficits in rainfall but also variability in rainfall. Drought is a chronic phenomenon in the area and occurs almost every alternate year. Other important risk factors in the study area are pest attacks, plant diseases and variability in rainfall.

The farmers adopt various strategies to manage risks in case of crop loss due to occurrence of natural calamities, pest attacks or plant diseases. Crop insurance is considered as one of the important tools to manage risk by loanee insurance users. Off farm employment is considered most effective tool by non-loanee insurance users, but non-users regard maintaining financial/credit reserves and employment as more effective in managing risk.

Reasons for Adopting Crop Insurance

The sample farmers have given various reasons for adopting crop insurance. The non-loanees users of PMFBY were found to be more inclined to avoid risk because of which they had voluntarily opted for crop insurance. Both the loanee and non-loanee insurance users considered the premium amount charged was low which induced them to go for crop insurance. Some users also indicated that they were influenced by the advice by the progressive farmers. Moreover, they also considered crop insurance as an instrument for reduction of risk and providing financial security and viewed this as the main reason for insuring their crop.

The farmers expect that crop insurance should cushion the shock of crop loss by assuring them protection against natural hazards beyond their control. Even if there is a need for crop insurance in the risky environment of the study area, farmers are not coming forward in large numbers to insure their crops. Hence, the efficacy of the existing insurance scheme is assessed by eliciting the satisfaction and dissatisfaction level of insurance users. Also, an attempt has been made to explore the reasons for dissatisfaction and how to improve the functional efficiency of the scheme.

Satisfaction with Crop Insurance Scheme

The farmers were asked to rate their level of satisfaction with the insurance schemes, the results of which appear in Table 3. The results show that only 6.2 per cent of the total loanee PMFBY users and 3.8 per cent of the non-loanee PMFBY users expressed satisfaction with the scheme. Thus, most of the insured farmers were either neutral having no strong opinion on the scheme or were dissatisfied with the scheme.

Table 3 : Satisfaction of Insurance Users with PMFBY: Frequency of Responses of Insurance Users

Number of Households

Level of Satisfaction (1)	Loanee (2)	Non-Loanee (3)
Strongly Dissatisfied	0 (0.0)	1 (1.2)
Dissatisfied	19 (23.8)	9 (11.2)
Neither Satisfied nor Dissatisfied	56 (70.0)	67 (83.8)
Satisfied	5 (6.2)	3 (3.8)
Strongly Satisfied	0 (0.0)	0 (0.0)
Total	80 (100.0)	80 (100.0)

Source : Field Survey

Note : Figures within parentheses indicate percentages of total.

In order to find out the reasons for their dissatisfaction, the insurance users were asked to rank the three most important reasons as 1ˢᵗ, 2ⁿᵈ and 3ʳᵈ. The percentage weighted score is calculated by assigning the value of 3, 2 and 1 to first important, second important and third important rank, respectively. Table 4 gives the data on the frequency of responses and the percentage weighted score on various causes of dissatisfaction.

Both loanee and non-loanee insurance users were not satisfied with crop insurance mainly because of delay in compensation payment with weighted score of 48 per cent and 27.9 per cent respectively. Moreover, users of PMFBY also complain about individual, independent risk not being coveredunder the scheme and express their dissatisfaction relating to the unit area being very large for loss assessment. The non-loanees (27.1 per cent) were also dissatisfied because of non-availability of proper facilities at financial institutions (Table 4).

Table 4 : Reasons for Dissatisfaction with Crop Insurance Scheme: Frequency of Response of Insurance Users

Number of Households

Sl. No.	Reasons	Loanee-Rank				Non-Loanee-Rank			
		1ˢᵗ Reason	2ⁿᵈ Reason	3ʳᵈ Reason	Weighted Score in%	1ˢᵗ Reason	2ⁿᵈ Reason	3ʳᵈ Reason	Weighted Score in%
1.	High Premium	69	4	1	4.2	39	3	2	5.8
2.	Delay in Compensation Payment	4	41	31	48.0	32	15	3	27.9
3.	Loss assessment unit is very large	2	27	29	27.8	5	26	15	17.7
4.	Individual, independent risk is not covered	0	3	13	19.8	1	29	9	15.2
5.	Proper facilities are not available at financial institutions	0	0	1	0.2	0	2	23	27.1
6.	Payout is very low	0	0	0	0.0	0	2	25	6.3
7.	Total	75	75	75	100.0	77	77	77	100.0

Source : Field Survey

Note : The total number of dissatisfied loanee users is 75 and dissatisfied non-loanee users is 77 asshown in Table 3.

During personal interaction with insurance users, it was observed that many loanee farmers compulsorily covered under PMFBY indicated ignorance about the coverage of their crops under crop insurance. Moreover, there was undue delay (more than six months) in payment of compensation as the assessment of yield on the basis of crop cutting experiments was a time-consuming process. Overall the PMFBY failed to stabilise income of the insurance usersand provide them economic support during adverse circumstances.

Reasons for Non-adoption of Crop Insurance

The sample non-users of crop insurance were interviewed to explore the reasons for non-adoption of PMFBY. Table 5 gives the data on the frequency of responses and the percentage weighted score on various causes of non-adoption by the non-users. The farmers cited two most important reasons for not taking up insurance: lack of premium paying capacity (37.9 per cent) and complex documentation (34.2per cent). Moreover, they also affirmed that the time duration within which they must go for insurance was too short. Few non-users also reported other reasons such as delay in payment of the claims, dissatisfaction with indemnity level and difficulty in opening bank accounts for non-adoption of crop insurance. None of respondents suggest unawareness as a cause of non-adoption of PMFBY. However, the farmers have not understood the operational mechanism of the scheme.

Table 5 : Reasons for Not Availing Crop Insurance Scheme:Frequency of Responses of Insurance Non-Users

Number of Households

Sl. No.	Reasons	Non-User-Rank			Weighted Score in%
		1st Reason	2nd Reason	3rd Reason	
1.	Not aware of crop insurance	0	0	0	0.0
2.	Too complicated to understand and use	0	0	0	0.0
3.	Govt. will provide disaster relief/aid	0	0	0	0.0
4.	Lack of premium paying capacity	22	8	9	37.9
5.	Not aware of the facilities available	0	0	0	0.0
6.	Not satisfied with crops covered	0	1	0	0.8
7.	Not satisfied with area approach	0	0	0	0.0
8.	Inadequate publicity of the scheme	0	2	0	1.7
9.	Complex documentation	8	26	6	34.2
10.	Lack of service/co-operation from the bank	0	1	0	0.8
11.	No faith in scheme	0	0	0	0.0
12.	No faith in agency	0	0	0	0.0
13.	Delay in claim payment	0	1	10	5.0
14.	Not satisfied with indemnity level	1	0	6	3.8
15.	Difficulties in opening bank accounts	1	0	5	3.3
16	I am tenant	0	0	0	0.0
17.	Others, specify	8	1	4	12.5
18.	Total	40	40	40	100.0

Source : Field Survey

Improving Scheme Performance

The sample farmers were interviewed to suggest measures to improve the operational efficiency of the scheme. Table 6 throws light on various suggestions given by the respondents with their weighted scores. The majority of the loanees with weighted score of 40.8 per cent suggested that covering more crops will improve the operational efficiency of the scheme. Many loanees (with weighted score of 23.5 per cent) also expressed that the premium rate charged for insuring crop must be reduced and individual assessment of crop loss (19.6 per cent) should be considered. Similarly, the non-loanees suggested a number of measures, which include reduction of premium (29.4 per cent), individual assessment of crop loss (26.9 per cent) and covering more crops (17.9 per cent) for improvement in the scheme.

Table 6 : Suggestions for Improving PMFBY by Insurance Users and Non-Users: Frequency of Responses

Number of Households

Sl. No.	Suggestions	Loanee Suggestion				Non-Loanee Suggestion				Non-User Suggestion			
		1st	2nd	3rd	W. Score in%	1st	2nd	3rd	W. Score in%	1st	2nd	3rd	W. Score in%
1.	Cover more crops	65	-	1	40.8	23	8	1	17.9	2	-	2	3.3
2.	Individual assessment	10	32	-	19.6	38	7	1	26.9	12	12	6	27.5
3.	Reduce premium	4	39	23	23.5	18	41	5	29.4	1	-	1	1.7
4.	Quick settlement of claims	1	7	29	9.6	1	12	30	11.9	16	1	1	21.3
5.	Making scheme voluntary	-	1	21	4.8	-	11	19	8.5	5	10	6	17.1
6.	Gram panchayat as unit of loss assessment	-	1	5	1.5	-	-	12	2.5	2	15	9	18.8
7.	Insurance service at your doorstep/at village level	-	-	1	0.2	-	1	7	1.9	-	-	7	2.8
8.	CCEs to be conducted in the presence of villagers/ insurance company's representatives	-	-	-	0.0	-	-	4	0.8	-	-	4	1.7
9.	Raisethe indemnity level from 60 % to 80-90%	-	-	-	0.0	-	-	1	0.2	2	2	4	5.8
10.	Others (specify)	-	-	-	0.0	-	-	-	0.0	-	-	-	0.0
11.	Total	80	80	80	100.0	80	80	80	100.0	40	40	40	100.0

Source : Field Survey

Note : W. Score denotes Weighted Score.

The non-users mainly proposed that along with individual assessment (27.5 per cent), settlement of claims should be quick (21.3 per cent). Many non-loaneesand non-users wanted the scheme to be voluntary with percentageweighted score of 11.9 and 21.3 respectively.Comparing the responses of both the users and non-users, more proportion of non-users desired that insurance service should be provided at the door step of farmers.

Many economists also attribute the low coverage of insurance to the insufficient attention paid by insurance agencies to awareness generation activities. The state government does not allot any funds to the Agriculture Insurance Company of India (AICI) to undertake awareness creationcampaign for popularisation of the scheme. According to the insurance users, the major sources of information on insurance schemes were bank representatives, progressive farmers, and friends and neighbours. They expressed their preference in fact for different types of media for the dissemination of information on the schemes, such as farmers' meeting (*kisansabha)*, the village fair, television and newspaper. The survey also asked questions about their preference for service providers for information dissemination on insurance schemes, in response to which they identified rural agents at their doorstep, rural agent at the village level, and the cooperative bank.

Conclusions and Policy Implications

Drought is the major risk factor in the study region of Bolangir district. Farmers recognise crop insurance as a basic instrument for maintaining stability in farm income. An analysis of the factors that influence the adoption behaviour of crop insurance reveals that farmers who are more dependent upon cultivation are more exposed to risk and hence are insuring their crops. Also, other factors such as farm size and household income significantly and positively influence the adoption of insurance.

The survey findings on performance of PMFBY reveal that a significant proportion of insurance users were not satisfied with the scheme. As low as 6.2 per cent of loanees and 3.8 per cent of non-loanees expressed their satisfaction with the scheme.The important reasons for dissatisfaction with the scheme as reported by

insurance users are delay in compensation payment, very large loss assessment unit. The users also complain about individual and independent risk not being covered under PMFBY. The non-users had not adopted insurance due to lack of premium paying capacity and its complex documentation. In the study area, insurance facility was available only for cultivation of paddy, however the farmers expectedthat insurance coverage should be extended to cash crops such as cotton and sunflower grown in the area.

As PMFBY is an area-based agricultural insurance scheme, it does not cover independent, idiosyncratic and individual risk. To make this possible, the private sector needs to be encouraged to provide insurance products for less severe events and for individual, independent, idiosyncratic and localized risk at actuarial premium. However, the public sector may continue to address catastrophic systemic risk and provide multi-peril insurance where the subsidy requirement is high.

To increase the coverage of the schemes, steps need to be taken to explain the operational mechanisms of different insurance schemes to farmers in simple terms in their local language. Rural agents who can come to individual household and the village can act as better service providers of insurance.There is a requirement for awareness creation by not only implementing agencies, but also PRIs, NGOs, CBOs and SHGs functioning in rural areas need to be encouraged to play an important role. Government has to promote adoption of crop insurance through advertisement via print and electronic media for sustainable livelihood of farmers and stabilising their income.

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A unique nexus between Human Development and ICT:
An empirical evidence from selected South Asian Nations

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Abstract

In the era of the industrial revolution of the late 18th and 19th centuries, one seminal force has impacted everything. Today, the world is witnessing an even more histrionic turnaround due to the consolidation of many pervasive disruptive forces, especially in the domain of technology. Where human development has witnessed a propagation of innovation in technology-driven space in most of the eastern and westernized nations. Despite our awareness of all these alterations, most of the current studies have failed to comprehend its 2nd and 3rd order effects that might result. The indubitable realism is that technology strategy has to be made the business strategy in the era of IoT (Internet of Things) revolution. Taking this perspective, we contemplate the emergent prerequisite of the network society for human capital development in Asia due to its pervasive reach in a global society. Human intangible capital resources (being referred as an epitome of measuring 'New Wealth of Nations' by neo and contemporary economists) play a vital role to ensure the holistic economic development where per capita GDP may be a narrow indicator to map the economic well-being of any nation. Therefore, the current study focuses on how advanced information and communication technologies (ICTs) could promote human capital development with special reference to South Asian Region (SAR). The research methodology chosen is principally empirical along with descriptive analysis using fixed effects panel modeling. Where, social human capital is proxied by the Human Development Index (HDI) and the emergence of the network society is by key ICT parameters like technological readiness, mobile cellular subscriptions, and internet penetration. The same is supplemented by other key macroeconomic control variables like population growth, urbanization sprawl, etc. in order to obtain an umbrella view. The panel testing results hint towards the strong associations of (square transformations of) internet penetration, technological readiness, and (square root transformations of) mobile usage to the human development index. Furthermore, per capita GDP, birth life expectancy and school enrollment rate (components of HDI) are also tested separately in order to have an in-depth understanding of individual component level linkages of HDI with ICT and other macroeconomic demographic indicators. The overall results are found to be in sync with the key findings. Therefore, the study recommends a cohesive ecosystem that could amalgamate digital space with HDI. Additional steps shall be to nurture through skilled-human driven innovation that has the potential to generate economic value through a number of channels - internal as well as external towards the economic business of any nation. Since information without accountability could prove to be disastrous, so the best way forward is to place personnel first and then empower them. Consequently, the creation of social intangible capital could only be realized fully with the skill development and skill premiums upliftment to flag the sustainable global presence.

Keywords: ICT, Human Social Capital Development, Innovation, Mobile, Internet, India, South Asia

Introduction

In the 21st century, the existing literature supports the growing eminence of 'network society' as a key to human capital development (Tchamyou, 2017; Kuada, 2015). This new society is comprised of networks

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which often reflects the global society since networks don't have confined boundaries. In the saga of humanity, this era is expressed as 'the Information Age' - a distinguished phase of rising digital knowledge to facilitate access to, and administration of information (Mason 1986; Castells 2010). In fact, IT and ITeS are considered to be the most powerful tools as per the World Bank's 'knowledge economy index' to exercise impact on human capital development due to its ability of penetration. Rather, ICT is viewed to exert desired effects due to its possible ripple effects across innovative capacity and income levels. In this area, one of the remarkable feats includes the digital opportunity initiative (DOI) as was announced at the G-8 Okinawa Summit in the year 2000 that aims to ascertain the ICT roles in enhancing social equity and cultivating sustainable economic development.

Earlier in the 1990s, technological advancement used to account for a mere fifty percent of the mortality decline. However, today's landscape of such revolution is far more precipitous in comparison to the past, notably in the technology domain like memory storage, telecom costs, processor power (Moore's law), and bandwidth (Gilder's law). Still, there are vast North-South gaps that separate within South and North too. The same is generally termed as "digital divide". The incidences of 'Digital Divide' with a special reference to South Asian Region (SAR) already exist in the form of disparities within the cultures that need careful examination in terms of differing modes of distribution of resources and also technological ownership patterns of developing nations' societies.

In general, the concepts of 'societies'/ 'cultures'/ 'human development' are highly debated and largely remains misperceived. Still, GDP is considered to be the most popular proxy to depict and measure the magnitude of economic advancement by most of the nations. It is often said that the challenge lies in not only to manage the asset volume portfolio but also the constitution of the portfolio to require different types of capital like institutions, governance; in short the Social intangible capital. Human Development Index (HDI) is a composite qualitative indicator that depicts the level of social and economic development (well-being) of a country, coined by UNDP in 1990.

India is considered to be the Asian powerhouse on most of the key macro fundamentals (GDP growth, urbanization, job creation, etc.), still, human capital development issues prove to be the paradox of plenty. There are a few studies that correlate information technology investments with economic growth via shifting jobs from intermediary skill to high skill jobs (by building the human capital). While technology has essentially witnessed to a subsequent proliferation in the capital intensity, yet overall it has not squeezed aggregate employment in Indian manufacturing industries. Rather network society could contribute to economic growth through different mediums like production and investment mediums. Production medium shall definitely be benefiting the factor productivity growth (labor) through rapid technological change. Several quantitative research reports on westernized nations' dataset have proved the existence of correlation (if not causation) between technology usage and worker's skill-set .

From Fig-1, it can be observed that HDI of all selected South Asian Nations is indicating an upward sloping trend between the year 2000 and 2016. Sri Lanka and India top the region with higher HDI values.

Theoretical Framework

Today, the pace and presence of ICT are indispensable in all the fields of human activities. ICT development has generated a major change in the world map (Castells, 2000). Parallely, the involvement of

Figure 1 : Human Development Index Time Trends for South Asian Region
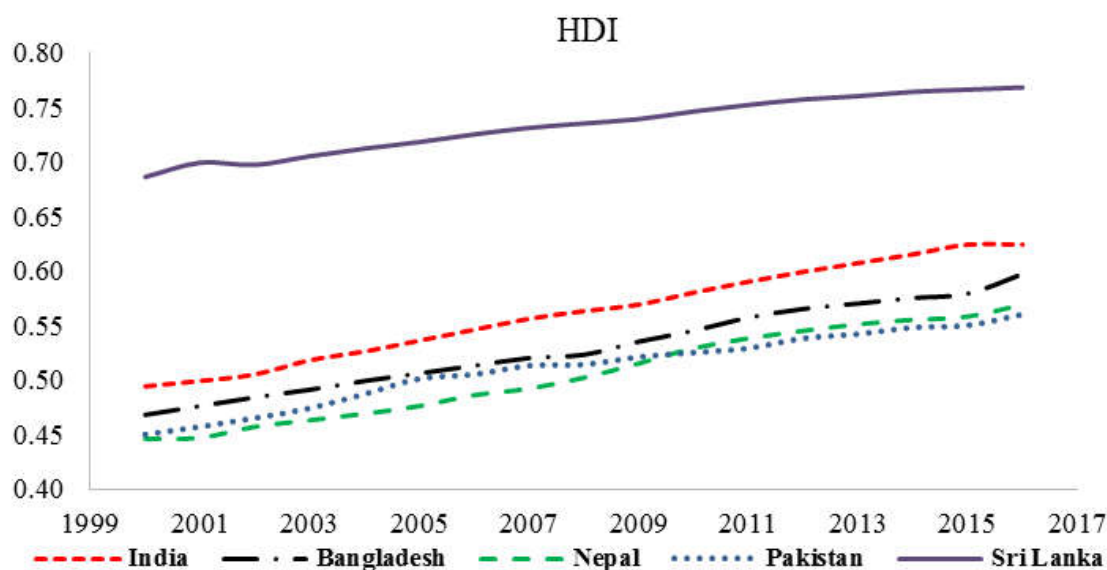
Source: Authors' representation using UNDP Human Development reports[1] and reviews on qualitative indicators

of technology to improve not just growth and efficiency but human wellbeing too; is discussed on the broader platforms of both developing and developed nations. Even the World Economic Forum (WEF) recognizes the ICT role as a crucial enabler in order to ensure sustainable and balanced socio-economic development. ICT is also taken as an imperative component for desirable regional harmonization in the formation of larger competitive markets. ICT is proved to be instrumental in impacting various realms including the intangible (human) capital creation. The internet usage is suitably detailed to encourage and protect human rights in democratic control.

Areas like education, human development, and health have adopted the urge of emancipation and shall continue to discover the new advanced usage of digital knowledge as a key catalyst of behavioral transformations e.g., telemedicine investments (Rosser et al. 2009). By means of ICT both domestically and globally, human capital is progressively producing a sense of experience that is beyond the constraints of geographical space. It is only via ICT that people have multi-fold revelation to outward influences that have profound effects on identity and culture (Appadurai, 1996; Greig, 2002). In the words of Castells (2000), people are enjoying *timeless time* (the ability to operate real-time across nations) without interruption with convenience and without absolute difference between digital and physical proficiencies.

From above, it is apparent that the digital technology used for human capital creation still remains debatable and challenging. Such inadequacies could be addressed by appropriate digital tools in a cordial involvement of community and MNCs both throughout the transformation process.

ICT, Human Development, and the Digital Divide

All said and done, the digital sub-divide of South-North actually hampers the perceived potential dividends associated with IT and ITeS. The same still remains unavailable for people in the world (Shields, 2003). Though, the same cannot outweigh the ones that are truly impacted by the IT and ITeS advancement via virtual networks (Lim, 2003). Today, the digital divide is extremely appropriate to those who understand and hence value the elemental role of ICT (Guillen and Suarez, 2005).

One has to be exceptionally conscious to deal with the distributional inequalities to use and access among groups and nations while taking into account the effect of ICT on human capital as these could exert grave consequences on human capital creation. IT and ITeS could harness and nurture human capital development via information access and greater possibilities of communication. The very objective of growth is to broaden

people's alternatives by the expansion of existing knowledge of ICT (Haq, 1995; Sen, 1989; Hill, 2007). It is in this context, the current study explores the possible prime interlinkage between human development and internet of things (IoT), proxied by mobile usage, internet penetration, and technological readiness along with co-existing simultaneous sub-linkages with other macroeconomic factors like population growth and density and urbanization & its growth.

From Fig-2, it can be noticed that the human development index and ICT indicators (mobile usage and internet penetration) have the pertinent rising trend, more pronounced after the year 2008 for India over the period 2000-2016. The same hints towards the probable association amongst them. Notably, the mobile usage time trend indicates a much early and substantial increase all throughout as compared to the internet penetration rate.

Figure-2 : HDI and ICT Time Trends
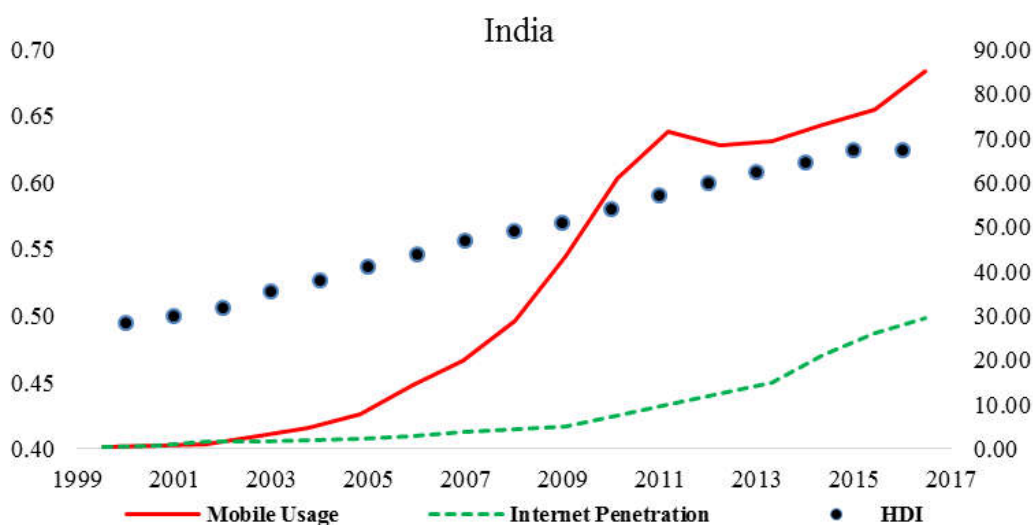
Source: Authors' depiction using data sourced from ITU World Telecommunication/ICT Indicators and UNDP databases. HDI is plotted on the primary axis whereas mobile usage and internet penetration on the secondary axis.

In light of the above, this article identifies the roles of the network society (ICT enabled) in human capital development, especially in South Asia. The rest of the paper is structured as follows. Section 2 presents the existing literature review on correlates of HDI like ICT, technological readiness, urbanization, population density, etc. Section 3 mentions the prime rationale and underlying objective of the paper. Section 4 includes the descriptive qualitative analysis and details of the data sources and selection. Section 5 entails the empirical research methodology adopted in the paper in order to establish the possible linkages between HDI and ICT tools. Section 6 encloses the key results of the empirical analysis, followed by conclusion and key policy implications in Section 7.

Literature Review

In light of the above background, the current paper digs deeper to investigate the existing strand of literature that associate ICT with Human Development. There is scarcity of studies that assess empirically the impact of ICT investments on human development. Majority of the studies have explored the effect of ICT on economic development so far. And whatever nominal that has been conducted, is mostly confined to developed nations with a lot more such untapped areas to be directed in the context of developing nations.

Many global institutions like World Bank, International Telecommunication Union (ITU), and International Monetary Fund (IMF) have pinpointed ICT as a powerful catalyst in the development process of emerging

economies. As per a recent report by UNDP, the increasing role of ICT infrastructure in empowering human capital growth is at the priority agenda list of many ICT practitioners, policy think-tanks, and government bodies.

Theoretical Framework

It is worth discussing the theoretical background before the exisiting literature to link HDI and ICT. The contemporary theories of growth apprehends the role of IT and ITeS within the ambit of excluded goods, private goods. Infact, as per Solow (1994), creation of intellectual property rights (patents) and also different forms of compensation for technology could also be counted a private good. While the secluded kinds of IT (like monopolistic power and patents) are expressed in certain versions of economic growth and expansion, yet most of the versions especially enunciating from monopoly are found to be temporary (Uzawa, 1965). As per Romer (1990), technological advancement could be both concurrently endogenous and exogenous. In the process, some of the IT and ITeS features may prompt technology to turn out to be a public good (or service) over a period of time. The author also confirms that the technological paybacks by different nations are heterogeneous due to the presence of intercountry technological spillovers. Obviously, the same would cause disequilibrium in the processes of human and economic development to produce intercountry alterations in economic development (Verspagen, 1997).

Outcomes emanating from ICT depict the importance to determine inclusive and sustainable growth from commercial and national outlooks. It is due to the fact that these are influenced by further progress in ICT. Therefore, the vital factor that emerges from here to make relevance for ICT improvement is human capital development (depicted by individual's knowledge, expertise and skills) as per Coleman (1998). It is also proposed that ICT should not be recognized as a silver bullet of holistic growth in the absence of substantial empirical studies (Mpogole et al., 2008).

A part of existing literature entails the potential outcomes of ICT specifically in the area of inclusive growth, remarkably, in terms of: enhancing financial inclusion levels (Singh, 2012; Kirui et al., 2013); social change and developmental effects (Islama & Meadeb, 2012; Mira & Dangersfield, 2012); extenuation of urban-rural sub-divide (Chan & Jia, 2011; Qiang et al., 2011); women empowerment (Ojo et al., 2012; Maurer, 2008); better reach to health care amenities by the low economic strata of the society (Kliner et al., 2013); and opening up of potential business avenues, especially for SMEs (Asongu, 2015b; Ondiege, 2010; Mishra & Bisht, 2013).

Mostly, all the studies in this field have probed the influence of ICT investments on economic growth (Jalava and Pohjola, 2002; Daveri, 2002 and Stiroh, 2000). In general, the findings reflect the positive stimulus of ICT penetration on economic expansion in different settings across developed countries (Kuppusamy and Santhapparaj, 2005; Kim, 2008; Oulton, 2001; Wang, 1999; and Colecchia and Schreyer, 2002). Unfortunately, there are a fewer studies that explore such an association in the context of developing nations (Mbarika et al., 2005; Bolou, 2006; and Ngwenyama et al., 2006).

Bankole (et. al. 2011) study the relationship between four components of ICT infrastructure (hardware, software, telecommunication and internal spending) and three facets of human development (education, health, per capita GDP and school enrollment rates) in 51 nations classified into high-income, middle-income and low-income countries based upon their respective presence in the area of ICT across the globe over the period 1994 to 2003, deploying 3SLS regression technique. The study confirms the substantial impact of ICT investments on the standard of living, level of education and health in the sample of considered country-set, however, the impact is found to be varying across different classification of the nations.

Asongu & Roux (2016) explores the linkage between ICT and human development using a sample of 49 nations by employing instrumental variable Tobit regression in Sub-Saharan Africa (SSA) over the period 2000-2012. The study confers it by incorporating different aspects of human development such as income levels, resource-wealth, religious dominations, legal origins, etc. The key finding of the study suggests that increasing

ICT penetration will enhance inclusive human development and hence will push SSA in its quest to attain sustainable development goals, (SDGs).

Objective and Rationale of the Paper

The study aims to provide a comprehensive overview of the role of ICT to raise human development, in the backdrop of the impact of technological disruptions on reaching individuals. Trend analysis exhibits a much rapid growth in mobile telecommunication services, hence proffering the opportunities this strand of ICT development has for speeding up human capital growth through mobile financial services. The study is an attempt to present *novel evidence* regarding the role of ICT (considered as the *digital financial services*), mobile rollout and internet usage in advancing human / intangible capital of South Asian Region. It also investigates numerous factors influencing the pace of human development like urbanization, technological readiness, etc. in the economy. Through this paper, the authors principally attempt to ascertain the role of advanced IT and ITeS (ICT tools) to promote human capital development in the context of South Asia in specific. This shall further enable to look into conceivable choices to such IT tools to foster human development in the region. The two prime notions that are examined in this paper are human development and the role of ICT.

Qualitative Analysis and Data sources & Selection

Descriptive (Qualitative) Analysis

The current section conducts the preliminary analysis to understand the basic features of data behavior and validity of the sample considered with respect to the existing inter-linkages and causality relationships.

Some of the pertinent interpretations from above tabulated values (from table-1) are listed below for the variables that we intend to study empirically in the next section:

- Table-1 results indicate that dependent variable, HDI varies from 0.45 to 0.77 with an average value of 0.57.

- The distribution of the sample around mean values seems to vary widely. The same is supported by their average and measure of dispersion values in Table 1.

- Among the explanatory variables, mobile usage, internet penetration, urbanization growth, technological readiness index indicators depict the wide range of variations for the seclected South Asian nations over the period 2000 to 2016.

Table-1 : Summary Statistics of selected variables

Variables	Obs	Mean	Std. Dev.	Min	Max
HDI	85	0.57	0.09	0.45	0.77
Mobile_sqrt	85	5.35	3.40	0.21	11.14
Internet_square	84	119.44	212.68	0.01	1027.27
FixedBroad	65	0.79	0.95	0.00	4.29
Pop_Growth	85	1.39	0.48	0.54	2.28
UrbanPop_G	85	2.76	1.19	0.47	5.99
TRI	50	2.87	0.35	2.21	3.46
Life_Expectancy	85	68.04	3.79	62.39	75.28
School_Enrollment	70	105.23	16.63	73.83	145.13

Source Author's own computation on Stata 13 for selected variables for South Asian nations from the year 2000 to 2016, conducted on database extracted from UNDP, ITU indicators, WDI (the World Bank) and WEF (World Bank)

Cross-Correlation

This section precisely helps in understanding the degree of endogeneity existing among the selected variables. Additionally, this section helps in identifying the level of criticality of the factors for the tested variable dependence.

Table-2 displays the correlation testing outcomes on the variables taken into account for the purpose of the study. Pertinent observations that emerge out of Table-2 results are:

1.   Human Development Index (HDI) is found to have a positive strong and significant relationship with mobile user subscriptions (ICT indicator), internet penetration (ITU indicator), fixed broadband subscriptions (teleinfrastructure indicator) and technological readiness index (IT & ITeS indicator).

2.   Due to a mixed country set in the South Asian region, urban population growth and population growth (macroeconomic demographic indicators) are found to negatively impact the human capital development in the selected South Asian nations.

3.   Other components of dependent variable (HDI) tested in Model (1) to (3) such as school enrollment (primary), per capita GDP and birth life expectancy are not presented in the tabulated results in Table-2 since these variables are found to have weak association as compared to HDI directly for the selected group of nations over the period from the year 2000 to 2016.

Data Sources and Sample Selection

The data for macroeconomic demographic indicators is obtained from World Development Indicators, World Bank. International Telecommunication Union's ICT statistics have been utilized to gather data on mobile cellular subscriptions and internet usage.

Table-2 : Correlation Matrix

Variables	HDI	Mobile_sqrt	Internet_sq	UrbanPop_G	Pop_G	FixedBroad	TRI
HDI	1						
Mobile_sqrt	**0.5642*****	1					
	0.0000						
Internet_sq	**0.5035*****	0.6461	1				
	0.0000	0.0000					
UrbanPop_G	**-0.8791*****	-0.3166	-0.2938	1			
	0.0000	0.0016	0.0067				
Pop_Growth	**-0.7513*****	-0.36	-0.1697	0.6292	1		
	0.0000	0.0007	0.0220	0.0000			
FixedBroad	**0.4606*****	0.7209	0.7813	-0.1712	-0.2176	1	
	0.0001	0.0000	0.0000	0.1728	0.0817		
TRI	**0.6757*****	0.4867	0.3056	-0.7096	-0.1116	0.3808	1
	0.0000	0.0003	0.0309	0.0000	0.4404	0.0064	

Source Authors' testing results using Stata 13 on correlation exercise on studied variables where '***' is 1% significance, '**' is 5% significance and '*' is 10% significance.

HDI data is collected from UNDP Human Development reports and reviews on qualitative indicators. Technological Readiness Development Index (TRI) database is taken from the World Economic Forum (WEF), the World Bank Global Competitiveness database (TCdata360).

The sample is purposively considered to be of selected South Asian (developing) nations in order to examine any pertinent distinction on the association among the studied variables due to differences in the stage of development that is unique for this region only. The period considered for the study is from *2000 to 2016* so as to investigate the recent reversals (if any) for developing nations for human development with positive impact due to ICT wider usage.

Research Methodology

In order to conduct an empirical examination of the linkage among the variables, the study has applied *fixed effects panel modeling (FE-Model)* technique on the selected country set. Fixed effects model eliminates the probable impact of time-invariant attributes so as to evaluate the net impact of the explanatory variables on the key (left-hand side) outcome variable. Each firm is distinct, therefore the firm's error term and the constant (that captures discrete properties) must not be associated with the remaining. In case; the error terms are linked, fixed effects model may not give the true, correct and realistic inferences and the only option left is to probably use random-effects modeling. This is the key reasoning behind the Hausman[10] specification test (current empirical estimation results mentioned in the explanation section below). Additionally, cross-sectional dependence problem is automatically taken care with usage of micro (short) panel (a large number of entities with fewer years).

Econometric Model Specification

$Y_{it} = \beta_1 X_{it} + \alpha_i + \mu_{it}$ (Common FE Model Regression Equation)……..

Where, α_i (I = 1……n) captures the individual firm level traits via unknown intercepts of each firm, Y_{it} represents the dependent variable (DV) over time (t) and entity/ firm (i); X_{it} is the list of independent variables (IVs) used in the model; β_1 is the regression coefficient of the respective IV and μ_{it} is the error term. Thus, it is often suggested to use panel fixed effects modeling wherever firms' individual characteristics are to be kept intact.

In order to capture the holistic view, the authors have extended the model specifications with different dependent variables. Therefore, the current paper tests the impact of ICT indicators on HDI and other components of HDI like per capita GDP, school enrollment, life expectancy in the empirical analysis results; tabulated in Table-3.

Variables used in the Econometric Model:

Dependent Variable(s): Human Development Index (HDI) represents the social cum economic growth indicator to estimate the magnitude of influence due to improvement in the standard of living and per capita income level of the people staying in the selected developing nations group. Alternatively, HDI includes a decent standard of living (given by GNI per capita), knowledge (given by expected years of schooling) and long & healthy life (with a holistic mix of qualitative and quantitative growth parameters).

The net school enrollment rate is the ratio of children of official school age who are enrolled in school to the population of the corresponding official school age.

Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Independent Variable(s): The key IVs are Information & Communication Technology (ICT) indicators, i.e. mobile phone penetration, fixed broadband usage and internet usage per 100 inhabitants denoted by $X_{it.}$

The technological readiness index pillar of GCI encapsulates this competence via components on the latest techniques availability, technology absorption at firm-level, tech transfer and FDI, etc. The index takes into account the innovation capacity as well.

The annual population growth rate for year t is the exponential rate of growth of midyear population from year 't-1' to 't', expressed as a percentage. The population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects.

Empirical Analysis and Results

Table-3 includes the panel regression results of empirical testing on selected South Asian nations dataset over the period from the year 2000 to 2016 as per trailing regression equation:

$$HDI_{it} = \alpha + \beta_1 (Mobile\_sqrt_{it}) + \beta_2 (Internet\_sq_{it}) + \beta_3 (Pop\_growth_{it}) + \beta_4 (UrbanPop\_G_{it}) + \beta_5 (FixedBroad_{it}) + \beta_6 (TRI_{it}) + \varepsilon_{it}$$

$$Per\_Cap\_GDP_{it} = \alpha + \beta_1 (Mobile\_sqrt_{it}) + \beta_2 (Internet\_sq_{it}) + \beta_3 (Pop\_growth_{it}) + \beta_4 (UrbanPop\_G_{it}) + \beta_5 (FixedBroad_{it}) + \beta_6 (TRI_{it}) + \varepsilon_{it}$$

$$School\_Enrol_{it} = \alpha + \beta_1 (Mobile - sqrt_{it}) + \beta_2 (Internet\_sq_{it}) + \beta_3 (Pop\_growth_{it}) + \beta_4 (UrbanPop\_G_{it}) + \beta_5 (FixedBroad_{it}) + \beta_6 (TRI_{it}) + \varepsilon_{it}$$

$$Life\_Expect_{it} = \alpha + \beta_1 (Mobile\_sqrt_{it}) + \beta_2 (Internet\_sq_{it}) + \beta_3 (Pop\_growth_{it}) + \beta_4 (UrbanPop\_G_{it}) + \beta_5 (FixedBroad_{it}) + \beta_6 (TRI_{it}) + \varepsilon_{it}$$

We have run several different specifications of the regression equations, however, the significant key results are listed here in Table-3. To correct the panel's heteroscedasticity drawback, the robust standard errors estimates are considered. Although FE panel modeling takes care of the multicollinearity problem, it is advisable to check the multicollinearity (VIF <10) for the variables of key interest. Table-3 encapsulates the key findings of the empirical regression analysis. To conduct the regression on the selected panel dataset, we have utilized STATA 13.0 MP for regression coefficients computation.

Table 3 FE Regression Results

Selected South Asian Nations Panel Results						
Dependent Variable	Per Cap GDP	Life_Expec	Sch_Enro_Rate	HDI	HDI	HDI
Control Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Mobile_Sqrt	2.4323** (1.7906)	0.5921*** (0.0580)	0.5416* (0.3474)	0.0111*** (0.0011)	0.0089*** (0.0011)	0.0089*** (0.0012)
Internet_Sq	1.1962*** (0.1021)	0.0001* (0.0004)	0.0047** (0.0023)	0.0001** (0.0008)	0.0005* (0.0007)	0.0001* (0.0008)
Population Growth	-1.7751 (1.9968)	-1.0119** (0.5419)	-0.1348 (0.8130)	-0.0319*** (0.0119)	-0.0343*** (0.0096)	
Urban Population Growth						-0.0216*** (0.0068)
Fixed Broad Band_sq					0.0168*** (0.0044)	0.0133*** (0.0045)
TRI	4.6442*** (1.0738)	1.0008* (0.4163)	6.8692** (1.1218)	0.0139** (0.0181)	0.0171** (0.0077)	0.0181** (0.0079)
Constant	5.9697** (2.9147)	8.7967** (0.9813)	7.6914** (1.2570)	0.5822*** (0.0405)	0.6007*** (0.0189)	0.6183 (0.0221)
R-square	0.7011	0.5775	0.6214	0.5741	53.4211	0.8333
F-Stats	74.14	76.46	72.98	87.85	96.43	91.21
Probability	0	0	0	0	0	0
rho	0.9843	0.9846	0.9692	0.9949	0.9926	0.9886
No of Obs.	50	50	44	50	50	50
No of Groups	5	5	5	5	5	5

Source Author's regression results based on FE modeling using STATA 13 testing.
1. *** signifies 1%, ** 5% and * 10% level of significance (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).
2. Standard errors in parentheses.

Although R-square is found to be as low as nine percent in some of the initial basic regression models listed in Table-3, the same is reasonable with the large heterogeneous panel of firms considered in the sample. The F statistics and the DW test statistics have turned out to be highly significant. The specification tests under regression diagnostics (post-estimation testing), especially testing for heteroscedasticity (hettest & szroeter) and serial correlation (xtserial) are found to confirm the presence of strong homoscedasticity for DV (dependent variable) series and no auto serial correlation among IV (independent variable) series.

From Table-3, the following pertinent observations could be noted:

✓ All ICT infrastructure indicators, fixed broadband, and mobile subscriptions, and internet penetration are found to impact positively and significantly all the key dependent variable, HDI and its components like net school enrollment rate, birth life expectancy and per capita GDP (Model 1 to 6). The same corroborates with existing studies that have propagated that IT and ITeS have a crucial role to determine the prospective human capital development, especially in the context of developing nations (Hettiarachchi, 2006; Bankole et al. 2011).

✓ Population growth, annual (in %) and urban population growth (in %) are found to impact HDI significantly and negatively (Model 4 to 6). Instead, these demographic macroeconomic variables for selected developing South Asian nations are adversely influencing rather hampering the path of creation of skilled manpower (resources) in these nations (Hettiarachchi, 2006).

✓ Another global competitiveness indicator, technological readiness is found to impact the coefficient of HDI (and other dependent variables tested) positively and significantly (Model 1 to 6). This indicates that the adaptation and availability of basic infrastructure in the selected group of developing nations are mandatory pre-conditions for having a positive contribution of technological advancement in the human capital creation of these countries.

Conclusion and Policy Implications

Undoubtedly so far, ICT tools have proved crucial and advantageous for the regions like South Asia. Historical pieces of evidence have vested in high hopes of the relevance of such technologies. Despite prevailing usage of the same are not essentially determined towards human capital development. Formulating different notions to explore the influence of ICT investments on human capital creation, delivers a contemporary outline to comprehend how nations could best invest in IT and ITeS for advancement. The empirical analysis has exhibited the distinguishing effect of IT investments on human capital development in developing economies. By selecting only the highly significant results ($p < 0.01, 0.05$), key inferences relevant to the selected South Asian countries of this paper; are revealed. The prime detection from the current paper indicates that the ICT investments are of substantial relevance to impact the (increased level) standard of living and also the education level across the globe.

There is an urgent need to change the entire paradoxical thinking about ICT in order to ensure effective use of ICT in human capital creation in SAR. The same shall include the complete transformation from rethinking of fruitful government policies, integration of ICT policies with broader economic and social goals, and of course, active participation of residents.

In developing nations (as per empirical analysis results in Section 6), the importance of ICT investment can't be denied on the level of education and standard of living. For developing nations like South Asia, the outcome of IT and ITeS investments on human capital creation are more obvious. Measures like health and education in the HDI are possibly more suitable for these nations. Most of the current shreds of evidence indicate that these nations are still attempting to enrich elementary education (primary school enrolments and literacy rates), and health (birth life expectancy). These nations shall consequently undertake conscientious investments in manpower and skill enhancement in their IT financing policies so as to fully exploit the effect of investments in the domain of human capital creation.

End Notes:

[1] Information Technology (IT) and Information Technology enabled Services (ITeS).

[2] Information and Communication Technology.

[3] a public-private partnership of Accenture, the Markle Foundation and the United Nations Development Programme (UNDP).

[4] It primarily comprises three broad indices – education index, income index, and life expectancy index.

[5] United Nations Development Programme.

[6] From *Destruction or Polarization: Estimating the Impact of Technology on Jobs in Indian Manufacturing* by P Vashisht, 2017.

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Gram Vaani: A Healthy Initiative for Rural Healthcare in India

D. Amin*

Abstract

Healthcare is the right of every individual but lack of quality infrastructure, dearth of qualified medical functionaries, and non- access to basic medicines and medical facilities blocks its reach to 60% of population in India. A majority of 700 million people lives in rural areas where the condition of medical facilities is miserable. Considering the picture of alarming facts there is a dire need of new practices and procedures to ensure that quality and timely health-care reaches the deprived corners of the Indian villages. This paper is based on the case study of Gram Vaani which provides cutting- edge mobile and IVR solutions to automate processes and applies best practices in the field for health care services. Its services cater to health care sector using simple technologies and social context to design tools to impacting communities- more than 2.5 million users in over 15 Indian States, Afghanistan, Pakistan, Namibia and South Africa. This study analyses the heath campaign of Gram Vaani to review health services for accountability in Jharkhand state.

Keywords: *Rural healthcare, Gram Vaani, Tribal areas*

Background of the problem

Healthcare is a right of every individual but lack of quality infrastructure, dearth of qualified medical functionaries, and non-access to basic medicines and medical facilities thwarts its reach to 60% of population in India. Around 700 million people live in rural areas where the condition of medical facilities is deplorable. Though a lot of policies and programs are being run by the Government, the success and effectiveness of these programs is questionable due to gaps in implementation. In rural India, where the number of Primary Health Care centers (PHCs) is limited, 8% of the centers do not have doctors or medical staff, 39% do not have lab technicians and 18% PHCs do not even have a pharmacist. India also accounts for the largest number of maternity deaths. 31% of the population travels more than 30 kms to seek healthcare in rural India. About 30% of people in rural India did not opt for treatment because of financial constraints. Around 39 million Indians are pushed to poverty because of ill-health every year (National Rural Health Mission Report 2011).

The Rural Health-Care System in India

The rural healthcare infrastructure in India is a three tier system as shown in Figure 1. As on March, 2011, there are 148124 Sub Centers, 23887 Primary Health Centers (PHCs) and 4809 Community Health Centers (CHCs) functioning in the country (National Rural Health Mission Report 2011).According to the National Rural Health Mission (NRHM) report, 700 million people live in 636000 Indian Villages. Majority of people die due to preventable and curable diseases like diarrhea, measles and typhoid.

The key factors that are inhibiting rural healthcare delivery in India include:

- Not attractive enough for private sector considering the distributed population and lack of purchasing power of the customers.

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- Less efficient public sector initiatives.

- Inefficient distribution networks and lack of skilled staff.

Figure-1
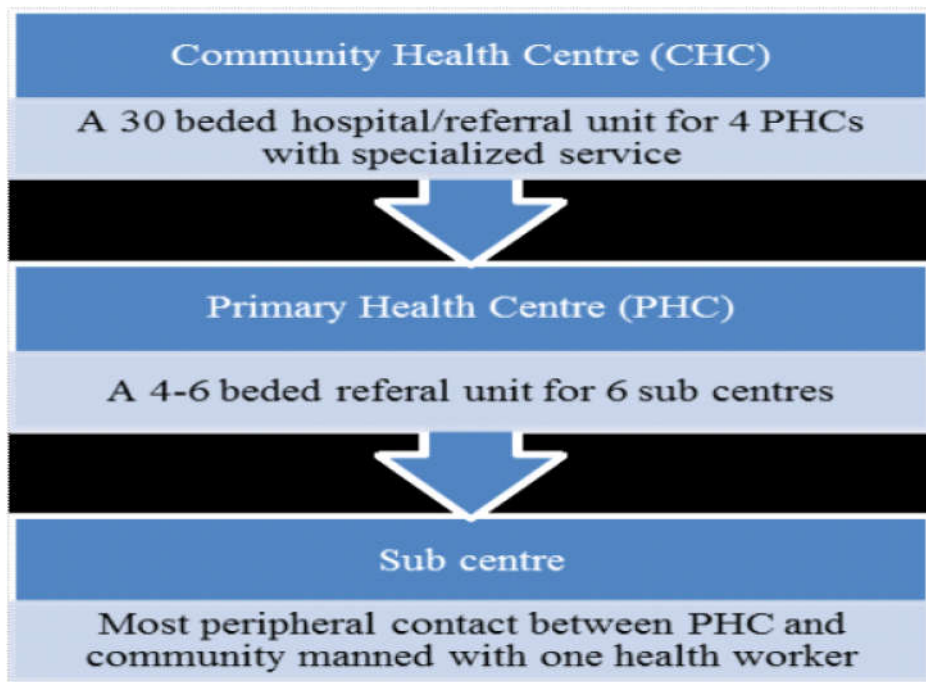
Source: National Rural Health Mission Report -2011

About 31% of the population travels more than 30 kms to seek healthcare in rural India. Due to this inaccessibility to public health care and low quality of health care services, a majority of people in India turn to the local private health sector. Around 92 percent of healthcare visits are to private providers of which 70 percent is urban population. The rural population is however not in a position to afford this expensive health service. Around 39 million Indians are pushed to poverty because of ill-health every year. Gram Vaani is established with an aim of making a difference to this alarming reality.

The Idea of Gram Vaani and Growth of the Social Enterprise

Gram Vaani Community Media is based out of IIT Delhi and presently, is located inside the campus as one of the units of Technology Business Incubation Unit. It was founded in January 2009 with a team of 3 people, which has now grown into a team of 9 people. Aaditeshwar Seth was a PhD student at the University of Waterloo when he came up with the idea of building voice based technologies to create a social media platform at the bottom of the pyramid. He reached out to his old-time classmate from school, Mayank Shivam, and to a serial entrepreneur, Parminder Singh, to build a business model behind the idea. Mayank had trained as an engineer followed by an MBA and several years of rich consultancy experience with McKinsey Inc. Parminder too had trained as an engineer and had opened several companies in the rural ICT space. Together, the three co-founded Gram Vaani in late 2008 and started operations in 2009, with an initial team of five, together with Balachandran C. and Zahir Koradia, old friends and associates of the co-founders.

The Gram Vaani team was motivated by the tremendous empowerment and accountability impact that Internet-based social media tools such as Facebook and YouTube had had in the developed world. It was really difficult to build similar tools for rural populations of developing countries like India, where there were significant

literacy challenges, social-cultural factors influencing the participation of citizens, poor Internet connectivity, and empowerment differences. Voice-based participatory technologies such as community radio and video seemed appropriate, and this motivated the team of Gram Vaani to work in this space.

Gram Vaani - a radio-over-phone platform in rural hinterland of Bihar and Jharkhand aims to set a perfect example of technology leading to social change, more specifically eliminate the social evil of child marriage. Working at the interface of technology, media and development, Gram Vaani is a social entrepreneurial organization that builds technological solutions for the development sector. In India, the internet penetration is 6%, while the penetration of radio, cable TV and telephony is 41%, 33% and 29% respectively. Therefore, Gram Vaani believes that their technology can help provide people living in remote areas with limited connectivity (and who are therefore excluded from the ongoing information revolution), access to critical information services.

Their work builds upon several years of research on the use of voice-based technologies and on the development of innovative processes to engage citizens and different stakeholders. Most of the technologies developed by Gram Vaani tend to be voice-based, so that they can be used by even poorly-literate populations in villages and slum areas. It works with existing infrastructure in rural areas (so does not require large capital investments in new infra) and is participatory in nature, thereby closely involving the community it is being deployed in. Some of their products include,

- GRINS (Gramin Radio Inter Networking System): Automation system for community radio stations;

- mNews: Grassroots mobile-based news; and

- vAct: Urban citizen engagement platform.

They combine and customize their platforms to suit community needs. Their open-source solutions have won international awards. Gram Vaani's technologies are provided to organisations that would use them to maximize social benefits. This being their first consideration, price points are adjusted for the client's ability to pay when social benefits outweigh the client's financial strength. As a result, they have sold and deployed technologies with individuals who were interested in sponsoring technology for their home villages, with organisations having few full time employees but a large pool of unpaid volunteers, with emerging projects in conflict affected areas like Afghanistan, and many others, who would not be able to purchase comparably customized technology at market rates.

Market size

Gram Vaani has over 25 NGO clients for GRINS, including Development Alternatives, The Restoring Force, Barefoot College, Radio Active, Deccan Development Society, TERI, etc. Clients of their voice applications include Sesame Workshop, iMedia Associates, Satark Nagrik Sangathan, Delhi MCD, and several private players who have set up voice services in their rural communities. Their customers can be categorized to include

(1) Rural consumers, to whom they provide easy access to information that is customized to their needs, and vertical-specific applications like distance education, agriculture consulting;

(2) Corporates, with an aim of accessing the rural market, to whom they provide a platform for reaching out to the rural consumer in a targeted manner and, importantly, measure the impact of their initiatives; and

(3) Government and development agencies, to whom they provide a platform for a more coordinated and targeted information dissemination of their campaigns (e.g., national rural employment guarantee scheme, AIDS awareness programs) and get feedback on their effectiveness. Their activities are supported by the Knight Foundation, USA and FITT, IIT Delhi and their partners include Nomad Networks, PATH, and the University of Washington.

Strategy and Operations

Gram Vaani conducted a Health campaign to review health services for accountability in Jharkhand. In this campaign on **Mobile Vaani** they invited opinions, experiences, information and feedback from public on current Government health facilities in Jharkhand.

People from different districts of Jharkhand left messages on various issues in health care facilities, such as; health facilities available at PHCs, Laboratory testing and Delivery facilities at Government Health Centers, availability of clean toilet and drinking water at PHCs, and distance of the nearest health center from the Village. Within the first 4 weeks of the campaign, more than 1600 callers from 12 districts of Jharkhand called in and participated.

Lot of important facts were brought forward in the campaign. 50 percent of the people informed that there was no facility of Laboratory Investigation or Delivery available at their nearest Health Centers. While a total of 86 percent callers shared that the facility of drinking water and public toilet was not available in the Government Health centers.

The campaign enabled them to:

- Understand the present scenario of health facilities in Jharkhand

- Identify major issues that people are facing while seeking health services.

- Review the state of PHC infra-structure and its connectivity to nearby villages

- Build awareness about accountability in health care

To bring about a change in the existing healthcare system Gram Vaani took the voices of people to the Government authorities. Gram Vaani collated data from their campaign and communicated the real picture to the district collectors and state health department for action.

Various Activities Initiated by Gram Vaani

Gram Vaani has built innovative voice applications for organizations working in health care sector to automate and manage their processes efficiently. Our Automate suite of technologies provides host of services, including the following mobile technologies that can be used for better rural health care delivery in several ways:

vSurvey: Organizations can create a custom questionnaire containing multiple-choice-questions, quantitative input questions, and qualitative audio recordings, that can be broadcast to different con-tact groups. For example: a net-work of ASHA workers (community health workers) can be sent a survey to capture self-reported data on the number of visits they did; similarly, AWWs (Aanganwadi Workers) can be sent a survey to get data on the number of children that were fed, the menu that was served, and if they are running out of ration supply and need to alert the district authorities.

vInform: Organizations can build an audio pack with a series of tutorial messages, which can be played out over a phone call to a desired contact group. For example, ASHAs or AWWs, could be sent messages on best practices to follow during ante-natal care, danger signs to look out for, and ensure that they take expectant mothers for institutional delivery.

vAnswer: As an extension to vInform technology, the users can also ask questions, which can be answered by experts. Thus, if ASHAs or AWWs have any questions or concerns, they can record their message which can be answered by experts live or through recordings over the phone.

Gram Vaani customizes these services and solutions as per our client's needs and de-vise ways to reach 'under-served' com-munities and 'out of reach' markets.

Social Value Creation

Gram Vaani is employing mobile technology in several health-care projects for leading global organizations. In partnership with the White Rib-bon Alliance for Safe Motherhood, for a program of Merck for Mothers, they are working to upgrade the quality of maternity healthcare in India. There's growing evidence from developing countries confirming that patient's perception of quality of care and satisfaction with care are critical to utilization of health services. To this end, they are building a quality-of-care checklist for expectant mothers (and their families) to answer using mobile phones and rate on factors such as whether they were treated with respect during the delivery, whether they got entitlement for institutional delivery, whether the transportation provided was of good quality, etc. This tool is constructive for:

- Making women aware of their rights to demand good quality of care,

- Bringing accountability by highlighting lapses in the health delivery process, and

- Increasing uptake of appropriate health services at the right venues

As a part of another health-care program Ananya, with NGO's PATH and PCI, we are mobilizing communities using our voice technologies to demand greater accountability from the health delivery infrastructure. Through simple education and discussion programs on mobile we make the marginalized communities aware of best practices in healthcare and sanitation, and about their rights and entitlements from the health delivery system. The community members are encouraged to engage and share their stories with each other on our open mobile platform, and to demand grievance redressal and accountability from the health system.

Gram Vaani provides cutting- edge mobile and IVR solutions to automate processes and applies best practices in the field. Our services cater to health care sector, social sector, and corporate organizations for connecting with the difficult to reach markets at bottom of the pyramid.

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Role of 'Krishi Vigyan Kendra' as an Agent for Rural Agricultural Transformation: A Case Study of Krishi Vigyan Kendra, Valsad

Naresh M Chauhan*

Abstract

In this case study, paper discuses some success stories of Valsad district following by Way Ahead segment containing the policy implications to replicate such success stories by various KVK in the country. As the title indicate this paper is about the success stories of the krishivigyan Kendra Valsad. This paper mainly contains the stories which had been discussed by KVK valsad's annual reports (various reports). The writer did study various annual reports of the KVK Valsad while providing the guidance for his M.Phil student. He carried out some success stories and also mention them in the district human development report, prepared by department of economics, Gujarat Vidyapith, Ahmedabad and published by Gujarat Social Infrastructure Development Society, Government of Gujarat.

In this research paper the story of NICRA (National Initiative on Climate Resilient Agriculture) mainly focus. The other success stories also discuss in brief. The story of NICRA is about the transformation of farming community. How can KVK works successfully is driven out by these stories. The segment of policy implication also mentions the way ahead /layout plan for replicate the same stories in different KVK around the nation.

Introduction

NICRA project was implemented by Krishi vigyanKendra valsad which is administered by Gujarat Vidyapith, Ahmedabad. Map of Krishi vigyan Kendra, Ambhethi, Kaprada talukaKrishi Vigyan Kendra is an innovative science based institute committed to train farmers, farm women, rural youth and extension functionaries besides transfer of the latest relevant technologies in the district through conducting front line demonstration of newly released or pre released high yielding varieties, technologies and inputs and plan to carry out on farm research or on farm testing to verify, validate and refine location specific technologies generated by the national agricultural research system for its wider adoption among farmers.KVK, Valsad is administered by Gujarat Vidyapith founded by Mahatma Gandhi in 1920 at Ambhethi Village in Kaprada taluka.

Transformation of Farming Community: Success story of Krishi Vigyan Kendra (KVK) Valsad

Map of Krishi vigyan Kendra, Ambhethi, Kaprada taluka

Krishi Vigyan Kendra is an innovative science based institute committed to train farmers, farm women, rural youth and extension functionaries besides transfer of the latest relevant technologies in the district through conducting front line demonstration of newly released or pre released high yielding varieties, technologies and inputs and plan to carry out on farm research or on farm testing to verify, validate and refine location specific technologies generated by the national agricultural research system for its wider adoption among farmers.

KVK, Valsad is administered by Gujarat Vidyapith founded by Mahatma Gandhi in 1920 at Ambhethi Village in Kaprada taluka.

## *About NICRA Project: National Initiative on Climate Resilient Agriculture (NICRA)*

During last five decades, science and technology- one of the culprits to ruin and degrade natural resources base affecting agriculture in a negative manner have been helping the sector. Different technologies developed by the National Agricultural Research Education System were applied in situation challenged by climate variability in different agro-climate environments. A national-wide project National Initiative on Climate Resilient Agriculture (NICRA), has been launched in 100 selected district during the year 2011 through technology demonstration components.

Objectives of the Project

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate through development and application of improved production and risk management technologies.

- To demonstrates site specific technology packages on farmers' field for adapting to current climate risks.

- To enhance the capacity of scientists and other stakeholders in climate resilient agricultural research and its application.

KVK, Valsad had selected the Khutli as NICRA village, located in Kaprada with total population of 1922 and total cultivated area is 277.38 (ha). Khutli has 349 total farm families.

Map of National Initiative on Climate Resilient Agriculture (NICRA) village (Khuntli)
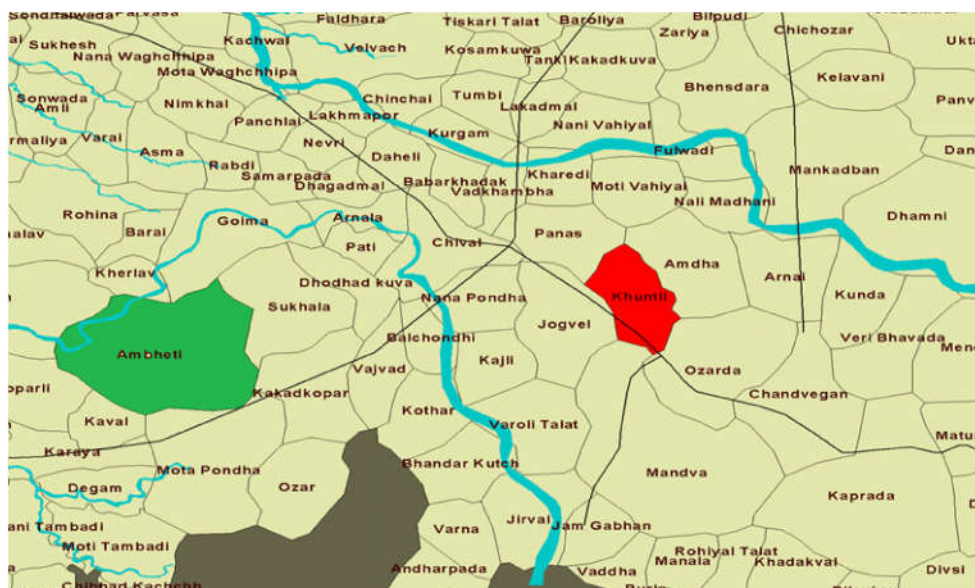
The application of NICRA Project

The Village Climate Risk Management Committee (VCRMC) composed of 13 members, representing small medium and large farmers created five subcommittees such as Custom hiring center committee, crop demonstration committee, natural resources management committee, livestock management committee to increase effectiveness of the project.

Under the NICRA project the major actions has been taken are as follows.

(A) Natural s Management

1. **Water harvesting through check dam and percolation tank.**

2. **Enhancing water use efficiency through micro irrigation system:** KVK popularized drip and sprinkler irrigation system following public private partnership approach.

3. **Trench cum Bunding:** The plantation of trees like mango, cashew and drum stick was carried out on the sloppy land treated with trench cum bunding.

4. **Burning of crop residue (Rabbing):** In place of traditional system of *Adar,* soil solarisation technology using 75 micron thick plastic sheet was utilized.

5. **Soil health management:** Due to natural slope or typical sub surface characteristics of hilly soil, NRM measures like trenching, bunding, vermicomposting, biogas plant and liquid bio-fertilizers were conducted to raise soil productivity.

(B) Crop Production

Enabling paddy farmers to cope with waterlogged conditions.

1. Economic Impact of Intervention

Table 1: Economic Impact of Intervention in Khuntli village

Variety	Avg. grain yield (kg/ha)	Avg. income from grain (Rs/ha)	Avg. straw yield (kg/ha)	Avg. income from straw (Rs/hs)	Avg. cost of harvesting-manually (Rs/ha)	Additional benefits Rs.
MTU 1010 (Demo plot)	4040	40400	4083	10208	60 labours@ Rs.120 =7200	43408
Other Susceptible varieties	3105	24840	3189	7973	83 labours@ Rs.120 =9960	2283
Difference	935	15560	894	2235	2760	20555

2. Planting technique in bottle gourd

Farmers were trained to raise bottle gourd seedling in polythene bags (3x5cm) in community net house at the village with new scientific technology.

Before intervention	After intervention
Poor Plant population in field condition	Optimum plant condition
Bamboo structure alone could not resist against high wind velocity at full productive stage	Boundary with RCC pole provided extra strength to the bamboo structure thus prevented collapse of structure and prevented crop losses.
Early production was not possible due to late planting in field	Seedlings grown in nursery in poly bags transferred to the field at appropriate stage
Surplus production would fetch lower rate	Early production could earn more profits
GI wire for netting of mandap suffers from corrosion shortening the life of structure.	Plastic rope with good stretching capacity provided longer life to the structure.

3. Polythene munching in vegetables along with drip

A 40-micron polythene sheet on raised beds prepared for plantation of tomato checked growth of weed and conserved moisture. It also enabled less infestation and less water application. The farmers were also encouraged to use paddy straw as a mulch.

4. Protection of harvested paddy for deterioration

Tarpaulin sheets of 25x25 ft size to protect the harvested paddy in field from rain were provided.

(C) Live stock

(1) Gobar-gas and vermin compost from farm waste

KVK installed 45 bio-gas plants where cow dung is used to feed the biogas plant and its slurry to prepare vermin compost.

(2) Balanced diet for improving milk production and health

The livestock owning farmers were motivated to take up perennial fodder grass along with food crops. CO-4 fodder variety increased the nutritive value and palatability. Diagnostic camps and vaccination camps were organized. A series of activities undertaken under NICRA project has resulted in the milk production by 13 per cent (300 lit/day).

(3) Empowering dairy farmers through green fodder production round the year

Farmers use paddy straw as fodder for their livestock which is a poor grade roughage. Perennial fodder varieties viz, CO-1, CO-2, CO-3 and CO-4 varieties have higher nutritive value and can provide green fodder throughout the year utilizing minimum available land and water. Planting material of perennial grass, training about the importance of balance feed increased milk yield.

(D) Institutional intervention

(1) Resource conservation and enhanced crop productivity through custom hiring center

The Custom Hiring Centre (CHC) equipped with modern farm machineries and implements like pump set, power tiller, reaper, brush cutter etc. was established by the villagers. The leader of the VCRMC donated a piece of his own land for shed to keep equipment. The equipment are hired by farmers when required by paying nominal hiring cost.

Table 2: Revenue generated by VCRMC in Khuntli village

S.N	Equipment	No. of	Hrs. used	Users	Total income
1	Power tiller	01	370	187	1,12,441
2	Diesel engine	01	559	18	12,343
3	Winnowing fan	27	--	322	27,000
4	Brush cutter	1	30	10	1,500
5	Reaper	1	12	12	3,462
6	Sprayer	03	10 days	10	200
7	Paddy thresher	02	27 days	22	6750
8	Total	36		528	1,63,696

(2) Community Vegetable Nursery

Brinjal, chilly, tomato, bottle gourd crops are grown round the year. During the project period as many as 160,000 seedlings of preferred variety were produced and made available that generated revenue of Rs. 55,000.

(3) Establishment of Vegetable Collection Centre

Village vegetable collection centre saved time, fuel cost and exploitation. As many as 39000 kg of different vegetables collected at the centre during October 2013 to March 2014.

(4) Paddy Seed Multiplication in NICRA Village

The high yielding, short duration, dwarf, resistant to water logging conditions, pests and diseases variety MTU 1010 gave higher return. It will be a first step towards village level seed self-sufficiency.

Under NICRA project many climate smart technologies on farmers' fields have provided better livelihood option. A multi-enterprise model based on integrated farming system and multiple water-use approach involving components of crops, dairying, horticulture, vegetables, gobar gas plant, soil health managements, natural resources management, custom hiring centre resulted into better livelihood to small and marginal tribal farmers. Survey indicated that the paddy gave a net income of rupees 27000 and vegetable earned rupees 21700 per hectare. For dairying, it was Rs 19000 per animal.

The another achievement of KVK Valsad: Some another achievements also reported by KVK Valsad these are mentioned as below:

(a) The village Climate Resilient Management Committee of the Khuntali village is awarded as "Best VCRMC".

(b) Achievements for Skill oriented long duration vocational training programmes

Rural youth: Nursery management, Tractor and Power tiller driving and maintenance, Oil engine and electric motor repairing and maintenance were successfully organized.

Rural women empowerment: Leaf cup/ Paper dish making, tailoring, fruit and vegetable preservation, bamboo articles, foot mat preparation, sewing, imitation jewelry preparation

Summery and Policy Implications

Krishi Vigyan Kendaras are funded by ICAR (Indian Council for Agricultural Research), New Delhi under the Ministry of Agriculre. The main objectives of this establishments are the same as title of this paper: to make the agent of agriculture transformation. Each district in the country should have its own KVK, But some

how our country does not provide the KVK to each district till the date. The working KVKs are also not working with their full capacity. Due to such reasons KVKs in India are not performing in expecting direction. There are some stagnations and depressions prevailing in most of the working areas. Government should provide environment working enthusiastic environment with such awards and incentives for better performance of KVKs. Government must identify the non-performance areas and must steps toward the proper performance. KVKs are the proper agent for transforming agriculture of the nation and they have to perform as per the expectations.

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A Study of Digital Economy in India

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Abstract

India will be the largest consumer of digital technologies in times to come the digital channel in most of the cases remains the only channel of access There is no country in the world today, which has as much at stake in digital technologies, as India has One reason for this is that we have the youngest demographics in the world and this young population prefers to transact and communicate digitally.

Keywords: Digital economy, digitization

Introduction

India is one of the largest and fastest growing markets for digital consumers, and the rapid growth has been propelled by public and private sector the growth of its digital economy now exceed those of most other countries. Government and the private sector are moving rapidly to spread high-speed connectivity across the country and provide the hardware and services to put Indian consumers and businesses online. India's lower-income states are bridging the digital divide, and the country has the potential to be a truly connected nation by 2025. Much more growth is possible. India's digital transformation unfolds, it could create significant economic value for consumers, businesses, microenterprises, farmers, government, workers, and other stakeholders. Digital adoption by India's businesses has so far been uneven, but new digital business models could proliferate across most sectors.

There is no country in the world today, which has as much at stake in digital technologies, as India has One reason for this is that we have the youngest demographics in the world and this young population prefers to transact and communicate digitally. India will be the largest consumer of digital technologies in times to come. the digital channel in most of the cases remains the only channel of access and nothing brings it out more powerfully than the Jan Dhan, Aadhaar, Mobile trinity. This, because mobile phone for an average Indian is not just merely a voice device, it is a gateway to many services including banking. Consider the fact that it took us 70 years to take banking to nearly 100 million people, which was the top tier. It took less than two years to bring 250 million people into the banking fold, thanks for Jan Dhan, Aadhaar, Mobile. So, once the digital channels started opening up, we could reach out to a much larger number of people at the bottom of the pyramid, which is why Digital India and digital technologies have assumed such a great importance for India.

Research Methodology

The present study is based on the Secondary data collected from various journal, books, and magazines, websites, newspapers, trade journals, and white papers, industry portals, government agencies, trade associations, monitoring industry news, etc.

Objective of study

1. To study the digitization in India

2. To find out the growth of digitization economy in India

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What is Digital Economy?

Digital economy refers to an economy that is based on digital computing technologies, although we increasingly perceive this as conducting business through markets based on the internet and WWW. The digital economy is also referred to as the Internet Economy, Web Economy. Increasingly, the digital economy is intertwined with the traditional economy, making a clear delineation harder

Digital economy is defined as an economy that focuses on digital technologies, i.e. it is based on digital and computing technologies. It essentially covers all Economy, Social, Cultural and business etc. activities that are supported by the web and other digital communication technologies.

The term was first coined in a book "The Digital Economy: Promise and Peril in the Age of Networked Intelligence" by author Don Tapscott in 1995.

Table 1 : Users of Digitization

Sr. No.	Various Users	2014	2018
1	Smart Phone	5.4 million	26.2 million
2	Internet Users	239 million	560 million
3	Cashless Transaction per Person	2.2	18
4	Monthly Data Consumption per unique connection	86 MB	8320MB
5	Monthly Data price (per 1GB as % of Monthly GDP)	6.1%	0.1%
6	Mobile Data User Consumer		8.3 GB/Month
7	Download new APP		12 Billion
8	Online Shoppers		207.2 Million

Source: McKinsey Global Institute analysis

India is one of the largest growing markets for digital consumers, In year 2014 Smart Phone users were 5.4 million is increased up to 26.2 million in the year 2018. In year 2014 internet subscriber were 239 million is increased up to 560 million in the year 2018. Cashless Transaction per Person in year 2014 were 2.2 is increased up to 18 in the year 2018. In year 2014 Monthly Data Consumption per unique connection were 86 MB is increased up to 8320MB in the year 2018.Indian mobile data users consume 8.3 gigabits (GB) of data each month on average Indians have 1.2 billion mobile phone subscriptions and downloaded more than 12 billion apps in 2018.Online Shoppers 207.2 million in 2018.

Merits of Digital Economy

Digital economy has given rise to many new trends and start-up ideas. Almost all of the biggest companies in the world (Google, Apple, Microsoft, Amazon) are from the digital world. Let us look at some important merits of the digital economy.

Browse more Topics under Emerging Trends in Business-Net Work Marketing, Franchising, Business Process Outsourcing, Aggregator, Knowledge process Outsourcing, E-Commerce.

1. Promotes Use of the Internet

If you think about it, most of your daily work can today be done on the internet. The massive growth of technology and the internet that began in the USA is now a worldwide network. So there is a dramatic rise in the investment on all things related – hardware, technological research, software, services, digital communication etc. And so this economy has ensured that the internet is here to stay and so are web-based businesses.

2. Rise in E-Commerce

The businesses that adapted and adopted the internet and embraced online business in the last decade have flourished. The digital economy has pushed the e-commerce sector into overdrive. Not just direct selling but buying, distribution, marketing, creating, selling have all become easier due to the digital economy.

3. Digital Goods and Services

Gone are the days of Movie DVD and Music CD's or records. Now, these goods are available to us digitally. There is no need for any tangible products anymore. Same is true for services like Banking, Insurance etc. There is no need to visit your bank if you can do every transaction online. So certain goods and services have been completely digitized in this digital economy.

4. Transparency

Most transactions and their payment in the digital economy happen online. Cash transactions are becoming rare. This helps reduce the black money and corruption in the market and make the economy more transparent. In fact, during the demonetization, the government made a push for online transactions to promote the web economy.

Demerits of Digital Economy

1] Loss in Employment

The more we depend on technology, the less we depend on human resources. The advancement of the digital economy may lead to the loss of many jobs. As the processes get more automated, the requirement for human resources reduces. Take the example of online banking itself.

2] Lack of Experts

Digital economy requires complex processes and technologies. To build the platforms and their upkeep require experts and trained professionals. These are not readily available, especially in rural and semi-rural areas.

3] Heavy Investment

Digital economy requires a strong infrastructure, high functioning Internet, strong mobile networks and telecommunication. All of this is a time consuming and investment heavy process. In a developing country like ours, development of the infrastructure and network is a very slow, tedious and costly process.

Digital economy is one collective term for all economic transactions that occur on the internet. It is also known as the Web Economy or the Internet Economy. With the advent of technology and the process of globalization, the digital and traditional economies are merging into one. Let us learn more about this concept of digital economy.

Conclusion and Recommendation

In year 2014 Smart Phone users were 5.4 million is increased up to 26.2 million in the year 2018.In year 2014 internet subscriber were 239 million is increased up to 560 million in the year 2018. Cashless Transaction per Person in year 2014 were 2.2 is increased up to 18 in the year 2018. In year 2014 Monthly Data Consumption per unique connection were 86 MB is increased up to 8320MB in the year 2018.Indian mobile data users consume 8.3 gigabits (GB) of data each month on average Indians have 1.2 billion mobile phone subscriptions and downloaded more than 12 billion apps in 2018.Online Shoppers 207.2 million in 2018

We need to be ready, as an economy and a community, to respond to change and to grasp the opportunities of the digital economy. New and emerging digital technologies are changing the way industries and business work. Digital revolution, also known as 'The Internet Economy' is expected to generate new market growth opportunities, jobs and become the biggest business opportunity of mankind in the next 30 to 40 years.

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