

CHAPTER -7

SUMMARY, CONCLUSIONS AND SUGGESTIONS

The present study has intended to examine technical efficiency and demand for higher education institutions along with their determinants for the affiliated general degree colleges of Barak Valley. The empirical findings of the study are discussed in three preceding chapters and the present chapter deals with broad conclusions and related suggestions from the study. This chapter was divided into the following three subsections namely summary of the study (Section 7.1), conclusions of study (Section 7.2), suggestions from the research findings (Section 7.3) and limitations of the study (Section 7.4).

7.1 Summary of the Study

Efficient management of resources in every sector is a central issue with respect to scarce resources from the perspective of management. Recently, different organisations and institutions use various methods to measure their efficiency and then search ways to improve them. This is not only applied to profit-making organizations, but also in non-profit making organizations and the public sectors, including educational institutions. Efficiency of Higher Educational Institutions (HEIs) is one of the subjects of growing attention in recent years. The issue of efficiency in higher education in this Barak Valley or elsewhere has remained vague and problematic due to huge heterogeneity within the system itself. As the resources are scarce so the optimal utilisation of resources are required in every sector. Therefore, it is important to analyse whether the educational institutions are working efficiently or not. However, despite the importance of efficiency measurement in education institutions, there are few studies in India that have addressed the matter for developing region like Barak Valley.

The present study deals with seven broad objectives. The first objective of the study is to examine status of HEIs in Barak Valley with the help of some infrastructural and performance related indicators. In order to analyse the objective a composite status index is constructed with equal weights to infrastructure index and performance index. The findings of this objective reveal that physical resources of the HEIs are better in NAAC accredited colleges, while availability of human resource in non-accredited colleges are better than accredited colleges. Teacher's quality measured in terms of higher qualifications and experience depict a favourable situation in accredited colleges; here it is found that approximately 41 per cent teachers in the HEIs of Barak Valley have only master degree, while 25 per cent teachers have M.Phil. degree and 26 per cent teachers have Ph.D. degree. The situation is quite adverse in non-accredited colleges where 72 per cent of the teachers are teaching in the HEIs with only master degree. The approximate share of young teachers in the HEIs of the region is 33 per cent, which is 27 per cent are in NAAC accredited and 43 per cent are in non-accredited colleges. Availability and quality of human resource place has a crucial role in determining performance and the quality of teachers in Barak Valley is better in accredited colleges while availability is more in non-accredited colleges. The composite index of infrastructure index reveals that HEIs of Barak Valley are not satisfactorily sufficient in terms of its resource. The mean value of the status index measured in terms of infrastructure and performance is approximately 0.32 for all HEIs, 0.47 for NAAC accredited HEIs and 0.21 for non-accredited HEIs. The status index value of the 50 per cent HEIs of Barak Valley are under the range of status index value 0.21-0.4 and approximately 23 per cent HEIs scored below 0.2 in terms of status index. This implies that approximately 73 per cent HEIs are below the average level of status index score, while approximately 27 per cent are above average range.

The second objective of the study is to measure technical efficiency of the HEIs. In order to examine the objective both parametric and non-parametric techniques are applied here. Application of SFA and DEA reveals that majority of the HEIs of the region are producing below the best practiced frontier. The mean efficiency score of the session 2005-2006 to 2011-2012 varies from 0.51 to 0.75 across different specifications. The composite variance parameter related to measurement of efficiency by SFA denotes presence of inefficiency for panel data, cross section data and students background model. The result of Malmquist DEA reveals that productivity gain in affiliated degree colleges of Barak Valley is mainly attributed by technological change resulted from change in scale efficiency due to change in enrollment of input ration in the HEIs. Over the study period there is loss of productivity during 2010-2011 and 2006-2007 sessions, while the other sessions have witnessed gain in productivity of the HEIs resulted from change in technology as well as efficiency change. The overall mean of total factor productivity index is greater than one for non-accredited colleges while it is less than one for accredited colleges. Here, NAAC accredited colleges have shown productivity loss due to change in efficiency resulted from pure efficiency change from change in quality of the students. Whereas in case of non-NAAC accredited colleges, productivity gain over the study period has been observed due to technological change from scale efficiency through increase in enrollment.

While examining the determinants of inefficiency, SFA effect model of production frontier (Battease and Coelli 1992) for panel data set of accredited, non accredited and all affiliated colleges are applied. Further the same model is used for cross section data set of 30 HEIs and students' background model is examined here. Further to analysed the determinants of technical efficiency Tobit regression for DEA-VRS and DEA-CRS technical efficient scores are analysed here with the same data set of panel SFA effect

model. The findings from panel data set of 27 HEIs over the session 2005-2006 to 2011-2012 reveals that in case of non accredited colleges the trend parameter and year of establishment are significant and positively relative with inefficiency, indicating deterioration in technical efficiency over the time. While in case of NAAC accredited and all colleges this coefficients are insignificant. Location of the college is negatively related in all the three panel models, while significant for non-NAAC accredited and over all models. This implies that colleges of Barak Valley situated in urban areas, especially non-NAAC accredited colleges are more efficient than that of situated in rural areas. This specifies importance of prosperous region for learning process of higher education. Type of affiliation is also found negatively related and significant in reducing inefficiency of the HEIs of Barak Valley which implies that permanently affiliated colleges are better in terms of efficient production of quality graduates. Courses offered by the HEIs is found insignificant for overall model, while positively influencing inefficiency in accredited colleges and negatively influencing non accredited colleges. This implies more specialisation in accredited colleges, while more diversification in non-accredited colleges. Cut-off marks at entry level for honours and pass course are negatively influencing inefficiency in non-accredited colleges indicating importance of screening in non-accredited colleges. In case of accredited colleges cut-off marks for pass course is negatively influencing with inefficiency, which implies that colleges opted for screening in admission of pass course has positive impact on production of quality graduates in the region. Tobit estimates of determinants of technical efficiency also support screening of students at the time of admission in pass course over the study period for both DEA-CRS and DEA-VRS efficiency scores. Type of affiliation dummy for CRS technical efficiency model shows a divergence outcome indicating negative association with technical efficiency scores, which is a contradiction of SFA effect models. This may be due to the

reason that both the models have their specific characteristics which are not similar in terms of specification and estimation. Like SFA models location of the college is also found positively related with efficiency for both CRS and VRS Tobit estimates. Time variable is found significant for overall DEA-CRS technical efficiency scores and the coefficient is found negative and significant at 10 per cent level of significance. This implies that technical efficiency of HEIs is decreasing over the study period. The determinants of technical efficiency for cross sectional variables indicate that quality of teachers play an important role in determining efficiency of the HEIs. Average teaching experience of the teachers is found positively influencing efficiency of the HEIs. Again share of teachers with NET/SLET and M.Phil. degree is negatively influencing inefficiency which implies that HEIs with greater proportion of teachers with additional qualifications of teachers rather than simple master degree have significant influence on efficiency. Location of the HEIs, courses offer and type of affiliations are also found significant and helpful in reducing inefficiency in cross section model also. Cut-off marks for both honours and pass course is also significant in cross section model. While in case of students background related model the study reveals that number of tutors for honours course is found negatively related with inefficiency. Academic background, i.e., entry grade or past performance of the students have a positive influence on further production of quality graduates. Natural science dummy is also found significant and negatively related with inefficiency this implies that HEIs having moiré share of students pursuing science graduation have positive influence of efficiency of the HEIs. Socio-economic background like annual family income (per capita) and number of siblings are also significant and negatively related with inefficiency; whereas average parental education is found insignificant in the study. The general caste dummy is also has significant impact on

determining efficiency of the HEIs. This implies that HEIs having greater share of general caste students are more efficient than that of others.

The study further deals with construction of an efficiency index for ranking of the HEIs of Barak Valley. In order to construct an efficiency index, an index using principle component of analysis and composite index of six set of average technical efficiency scores obtain over the study period for difference specifications are applied here. The findings of the study reveals that efficiency index scores varies from zero to one with standard deviation 0.2163 for mean value 0.589 and the mean average technical efficiency scores of the HEIs is 0.627 which ranging from 0.924 to 0.085 with standard deviation 0.182. Here, college C9 has occupied highest position in terms of efficiency index and average technical efficiency score, followed by C3 and C26, the lowest position is occupied by college C13 preceded by C28 and C11.

Further the study deals with assessment of technical efficiency score variation between NAAC accredited and non-accredited HEIs of the region. In order to examine the variation in efficiency scores independent t-test for equality of mean is applied here and it reveals that efficiency level of NAAC accredited HEIs are better both in terms of efficiency index and average technical efficiency scores.

Further efficiency ranking of NAAC accredited colleges are compared with NAAC ranking and the analysis is done by using simple tabular analysis. The findings related to this objective shows that there is variation in terms of efficiency ranking and NAAC ranking. This implies that efficiency score varies among the HEIs with same NAAC rank.

The last objective of the study deals with examination of demand for higher education institutions in Barak Valley with determinants and further check whether the technically efficient colleges have higher demand or not. In order to examine the demand for higher educational institutions growth in terms of gross enrollment over the study

period and applicant to enrollment relation of the HEIs are taken as proxy for demand for higher education. Further analysing the determinants of demand for higher education institutions, linear regression model for institution specific factors on applicant to enrollment ratio and simple percentage analysis of the opinion of the students from their point of view percentage tabular analysis is used in this study. Then the coefficient of correlation between technical efficiency estimates and demand related indicators are calculated in this study. The enrollment growth over the study period has shown significantly positive trend indicating higher demand for HEIs is found in this study. Further the study reveals that the mean value of applicant to enrollment ratio is significantly different from one, which means that more number of students is applying for getting admission in higher education in the HEIs of Barak Valley. Regarding the determinants of demand for HEIs the study reveals that location of the college; teachers' quality and past performance of the HEIs are positively significant determinant. In order to check the relationship between technical efficiency and demand for higher education institutions in Barak Valley, Pearson's correlation coefficients is used in this study and the estimated coefficients reveals correlation coefficients of technical efficiency estimates with applicant to enrollment ratio and average enrollment. Applicants to enrollment ratio is found positively related with all the technically estimates for this region, however significant for stochastic frontier estimates and composite efficiency indices. The coefficients of correlation with composite technical efficiency indices are positively significant and moderately related applicant to enrollment ratio, while moderately high and significant in case of SFA estimates. On the other hand correlation coefficient of average enrollment of the HEIs with most of the technical efficiency estimates is positively related and statistically significant here. This implies that technical efficiency and demand for education is positively related with moderate degree of association.

7.2 Conclusions of the Study

The affiliated general degree colleges of Barak Valley either public or private; NAAC accredited or non-NAAC accredited; temporarily affiliated, permitted or permanently affiliated are operating simultaneously to provide higher education for the people of the valley and its nearby areas. However, the status of these HEIs are not that much satisfactory in terms of their infrastructural and performance indicators. The value of the infrastructure index lies between zero to one, and the average value for the HEIs of the region is 0.534 and approximately 50 per cent of the HEIs of Barak Valley are functioning with a score below the average level (shown in Table 4A in Appendix). However the mean value of infrastructure index for NAAC accredited colleges is 0.742 and 54 per cent of the colleges have scored below the average level. While in case of non-NAAC Colleges the mean value of infrastructure index is 0.374, and 53 per cent of the HEIs from this group have scored below average level. Thus it can be concluded that infrastructural status of the majority of HEIs of Barak Valley are below average. Further the findings in of the study reveals that the status of the general degree colleges of Barak Valley the NAAC accredited colleges are better in terms of infrastructure and performance in terms of infrastructure. However, there are few exceptions where some non-accredited institutions with poor infrastructure are better in terms of performance and some accredited colleges even if with good infrastructure are not up to the mark in producing successful quality graduate. Among the several indicators of HEIs' infrastructure there remains some sort of heterogeneity within the group itself. Further the mean value of the status index which is a composite measure of infrastructure and performance is approximately 0.32 for the HEIs of Barak Valley, with range 0 to 1 and the HEIs status index value is highly skewed towards lower range. Thus the first hypothesis ie; status of most of the HEIs of Barak Valley is poor (below average) is accepted.

Affiliated general degree colleges of Barak Valley are providing higher education and help to develop local community however there is presence of inefficiency in the colleges of Barak Valley and majority of these are producing quite far from the best practice frontier. The SFA estimates of the variance related parameter viz; Sigma-squared and Gamma are significantly different from zero and statistically significant for all the groups which indicate that there is presence of inefficiency in production of quality graduates in affiliated general degree colleges of Barak Valley. The results obtained from Malmquist DEA reveals that the main responsible factor for change in technical efficiency has been both technological change and efficiency change. However, in case of non-NAAC accredited colleges technological change is the main responsible factor for majority of the non-accredited colleges resulted from change in scale and input combinations, while efficiency change is mainly influencing productivity change in NAAC accredited colleges contributed change in quality of students and other factors rather than input combinations. Over the study period the growth rate of total factor productivity of non-accredited colleges is almost three times higher than that accredited colleges. This is may be due to the region the NAAC accredited colleges are somewhat consistent in terms of efficiency and there is less change in factor combination unlike non-accredited colleges. From the theoretical point of view, any producing unit is said to be technically efficient if the technical efficiency score is one or approaches to one. But the average technical efficiency score of the HEIs of Barak valley over the study period for different specifications in both SFA and DEA estimates ranges from 0.45 to 0.75 approximately. This implies that the HEIs of the region are comparatively far from the efficient frontier; hence second hypothesis that most of the HEIs of Barak Valley are technically inefficient is accepted.

The results from both SFA effect model and Tobit regression regarding the determinants of technical efficiency reveal that type of affiliation of the college is

significant for different models. This implies that the colleges which have gone through some sort of monitoring for affiliation are better in production of quality graduates and under graduates than others. Location of the HEIs is also significant and positively related with technical efficiency implying the fact that colleges of urban region are more efficient than others. This may be due to the region that these colleges are situated in prosperous areas with better infrastructural facilities in terms of availability of resources related to studies and private tutors which contribute highly in production of quality output of any HEI and significant in reducing inefficiency. Years of establishment is negatively influencing the level of technical efficiency for non-accredited colleges indicate deterioration in technical efficiency over the years with significant trend parameter. Both teachers' qualification and experience are significantly influencing technical efficiency of the HEIs in the region. Students' academic and socio-economic factors are also influencing technical efficiency of the colleges. The quality checking parameters at entry level with cut-off marks is also helpful in reducing technical inefficiency of the HEIs of Barak Valley. Hence, it can be concluded that selected environmental (non-inputs) factors related to the HEIs, viz; institutional characteristics, teachers' qualifications and students' background have significant impact on determining efficiency or inefficiency of the HEIs. Therefore, the third hypothesis ie; environmental (non-inputs) factors are significantly influencing the technical efficiency of the HEIs in Barak Valley is accepted.

The study reveals that distribution of NAAC accredited colleges are at a greater proportion towards higher values for both efficiency index and average technical efficiency scores, while in case of non-NAAC accredited HEIs efficiency scores are more clustered towards average and below average levels. However, there are few exceptions where some non-accredited colleges performing better than others in terms of technical efficiency scores. The mean difference between technical efficiency scores of NAAC accredited and

non-NAAC accredited HEIs in terms of average technical efficiency score is 0.120 and 0.213 in terms of efficiency index. So it is concluded that NAAC accredited colleges of Barak Valley are more efficient than non-NAAC accredited colleges. Therefore, the fourth hypothesis ie; technical efficiency varies between NAAC accredited HEIs and non-NAAC accredited HEIs is accepted.

Further the study reveals that efficiency score ranks vary among the HEIs with same NAAC ranking for the HEIs of the region. In some cases it is also found that HEIs technical efficiency rank is better even with a comparatively lower NAAC ranks. Hence the fifth hypothesis ie; technical efficiency score and NAAC ranks are positively related is rejected.

While examining the demand for higher education institution, the study reveals a significant demand for higher education in the region and there are several institution specific and student specific factors influencing demand for HEIs here. Here, the past performance and teachers' quality of the HEIs are found positively influencing the demand for HEIs in the region and also supported by a large proportion of the students as reasons for selection of HEI from their perspectives. Hence, it is concluded that past performance and quality of teachers are crucial in determining demand for HEI in Barak Valley. Again location of the colleges is found positive and significant indicating the piece of evidence that colleges situated in prosperous region are not only efficient, but also attracting more number of students. This may be due to the reason that in urban areas people are more interested in higher education or even those of rural areas are putting a forward step for mobility into the HEIs of urban areas to have a better academic infrastructure. The correlation coefficient between technical efficiency estimates and demand for HEI are also found significant for the region. Thus it is concluded that there is a significant demand for HEIs in the region with considerable influence of various institution specific and students'

background related factors, and demand for HEIs and technical efficiency is positively related. Therefore, the final hypothesis ie; there is significant demand and especially it is more in case of technically efficient colleges, is accepted. This also implies that more demanded institutions are those which comparatively more technically efficient.

7.3 Suggestions

The study suggests some measures for the improvement of the HEIs on the basis of findings in the following:

- The study reveals noteworthy variation in terms of infrastructure, performance, enrollment and technical efficiency for NAAC accredited and non-NAAC accredited HEIs of the region. As NAAC accredited colleges are performing better in terms of efficiency and all other indicators, so it is suggested that regular NAAC accreditation is necessary for the better performance of the colleges. However, the NAAC has been set up to facilitate the volunteering institutions to assess their performance for a set of parameters through introspection and a process that provides space for participation of the institution as per their expediency. Colleges (i.e., colleges / institutions affiliated to, or constituent of, or recognized by universities, including autonomous colleges) are eligible for NAAC accreditation and assessment (A&A) if they have a record of at least two batches of students graduated or been in existence for six years, whichever is earlier. However, colleges/institutions offering programmes recognized by Statutory Professional Regulatory Councils concerned as equivalent to a degree programme of a university shall also be eligible for accreditation and assessment even if such colleges / institutions are not affiliated to a university. The validity of NAAC rank remains for five years but in this region only 13 provincialised general degree colleges have invited once and out of which only five colleges have taken stand for reassessment and some others are still in process. Although NAAC was established by the UGC in 1994 with the prime objective for

accreditation of universities and colleges in general education in India, but the trend of NAAC assessment in this region is not so much popular. So, NAAC assessment should be made compulsory or any new body should be formed in order to provide continuous and comprehensive assessment with proper guidance to these HEIs for efficient and smooth functioning.

- The colleges situated in rural areas are to some extent reformative in nature as these are providing higher education to those who either cannot move to other areas due to several socio-economic constraints or comparatively academic past. Thus by providing low cost study materials and remedial teaching to the students who are poor in terms of financial ability or knowledge with special care may improve their result. This may further boost performance of their institution which may further lead to more demand for these HEIs in near future. By doing so it would become possible to control the mobility of good quality nearby students in other HEIs and ultimately can raise the efficiency of these HEIs
- The overall average annual partial elasticity of teacher student ratio with respect to output, i.e., production of quality graduates for all the HEIs in this study is found positive, though for non-accredited institutions it is found negative and for NAAC accredited institutions the value is positive. However, within the same group average value of partial elasticity of teacher student ratio with respect to quality output for the HEIs over the study period is found positive for some HEIs and negative for others. Hence, it can be suggested that the more numbers of qualified teachers should be appointed in the institutions, so that teacher-student ratio will be increased and that would increase the efficient level of output.
- To improve technical efficiency active involvement of society and change of mindset of the people are crucial. This may ensure the supply of quality inputs to the HEIs irrespective of its location.

- The coefficients of correlation between technical efficiency estimates and demand for HEIs is found significant for the region which suggests that affiliated general degree colleges of Barak Valley may increase their demand by increasing efficiency and with higher demand they may raise their technical efficiency.

7.4 Limitations of the Study:

- i) The study limited to affiliated general degree colleges only. For a more conclusive result all the higher education institutions including technical and professional would have been studied. However, this would not possible due to the reason that the number of other higher education institutions in this region is very less compared to general degree colleges for which inclusion of these institutions in the study would have brought more heterogeneity in the data set. In addition to that the concept of measurement of technical efficiency itself is relative in nature as it compares the producing units with best practiced producing units within the group and incorporation of heterogeneous units in a single might have lead to misleading findings.
- ii) The study is based on panel data set for 27 HEIs over seven consecutive academic sessions 2005-06 to 2011-12. It wouldn't become possible to cover few more sessions before 2005-06 due to unavailability of records in these institutions and due to change in examination pattern from yearly system to semester system in these colleges which are under same university further information post to the session 2011-12 were not included in this study.
- iii) It would not possible to cover the opinions of parents and other stakeholders of the society in the study because tracing them would have required considerable time, resource and other logistics for completion of the research.
- iv) The study is restricted to analysis of quality related variables for cross section data only. Further inclusions of these variables over the years would have given a more clear structure. It was not possible to incorporate all these variables for long period of time due to unavailability of data.