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ENGINEERING GRADUATES IN KERALA: PROBLEMS AND PROSPECTS

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Abstract: **Kerala is one of the highest literate states in India. But growth of engineering degree holders was questionable one. This study focuses on supply of engineering graduates and problems of engineering graduates in Kerala. The issue of outturn of engineering graduates is very complex and it cut across numerous disciplines, it concerns individuals directly and indirectly to local and national economies. It needs to be enhancing the employability as an integral part of economic development. The present study focused on the trend and pattern of supply of engineering graduates in Kerala and the problems of engineering graduates in Kerala. Non-linear regression used for the study and found out that there is a non-linear trend in intakes and outturn of engineering graduates in Kerala.**

Keywords: **Engineering Graduates, Employment, Skills, Economic Development and Disciplines.**

1. INTRODUCTION

Kerala has evidenced by phenomenal growth and development in technical education during the past two decades. Effective engineering education depends on the quality of engineering institution, quality of programmes, branch of specialization offered by the institution, quality of faculty availability, quality of teaching learning process, quality of management, and quality of students. Kerala has the highest proportion of literate persons in the population among the Indian States. This state has followed a development path quite different from that of other states of India. The focus on education has resulted in a faster growth rate. Kerala still requires some serious interventions to enhance academic quality at school as well as higher education levels, and to make education even more inclusive at all levels (Economic Review, 2018). The year 2000 and the preceding years marked a remarkable growth in the number of engineering institutions and a massive jump in the IT sector. Therefore, the researcher has selected the period from the year 2000 to 2016 for the study. Since 2000 many private engineering colleges were sanctioned in Kerala, as a result technical education has undergone outstanding changes. Engineering education in the state was fundamentally public funded and provided, right through from the beginning until 2001.

In Kerala, only the number of unemployed engineers doubled as the unemployment among the diploma engineers increased from around 1100 to 2100 during the period from the year 2000 to 2004 and the number of unemployed graduates increased from around 6100 to 11,200 during the same period(Mathur,2008). The state of Kerala has 183 engineering institutions. Among these, self-financing colleges are the majority (171) (Economic Review, 2018). Self-financing colleges, offering B.Tech are more than the purely government and government aided engineering colleges in Kerala. Engineering education has a decisive role of moulding technically skilled human capital for the renovation of the nation. Engineering education in Kerala has become attractive to all categories of people in the society. The study mainly focused to the problems and trend of engineering graduates in Kerala.

2. REVIEW OF LITERATURE

Gowsalya et al., (2016) found out the there is a relationship between the employability of the arts and science graduates of Namakkal district in Tamil Nadu and their parents' education. The ten identified skill were considered in the study. The results revealed that the students were unaware of employable skills required for getting employed. Communication skills and problem-solving skills of the undergraduates were found to be pitiable. Structural Equation Modeling was using for the relationship between the graduates' skill level and the parents' education and the result of the analysis displayed no relationship between them.

Singh (2012) discusses on the need of e-skills to become employable in the European labor market. The role of ICT in organizations has become predominant that its use and importance are found in all branches of the economy. There is a decline in the number of graduates who study computer related courses. So, there is a comprehensive e-skills gap present in the country. In this article, the author highlights the European Union to take up the issue seriously and consider e-skill development as a long-term agenda to build competitiveness, employability, and workforce development. He explained that there should be combination between the ICT policy of the country and the education to increase the number of IT savvy people

Harvey (2001) evaluates the mode of assessing employability. He concluded that mere employment rates and good ranking among institution are not actual determiners of employability. Employability should carry in internal development among the graduates and its estimation should be based on internal longitudinal benchmarking done within a time frame rather than external comparisons.

Mason et al (2009) says in "Employability Skill Initiative In Higher Education : What Effect Do They Have On Graduate Labor Market Outcomes? found out that that organized work come upon a business inclusion in degree course plan and convey the clear productive outcomes on the capacity of graduates to secure work in graduates level occupation. There is no proof that the prominence given by college division to the teaching, learning and appraisal of employability expertise has critical impact on both of the work.

3. STATEMENT OF THE PROBLEM

Of all the severe problems in Kerala encounters the unemployment of the educated is the utmost critical. Though Kerala has achieved much progress with regard to the spread of education, health services, social welfare measures and infrastructural development, the State has not been able to solve the problem of unemployment to any significant extent during the last 30 years. Engineering education demands heavy investments on the part of the parents as well as the government. But miserably that, there has not been a balanced increase in the earnings structure of engineers except in the case of a few who are employed in multinational companies. This is because after graduation the engineering turnouts fail to find a job. Many of the graduate students are not working in their own graduation field. At this juncture, much of the engineering graduates in Kerala creeps into the scene. This leads the researcher to look deep into the various aspects of engineering graduates and their problems.

4. OBJECTIVES

1. To identify the trend and pattern of supply of engineering graduates in Kerala

2.To find out the problems faced by engineering degree holders in Kerala.

5. METHODOLOGY

The study was used regression equation for analysis the trend of engineering graduates'. The data collected from NTMIS (Nodal Centre), Unpublished data based on University of Calicut, Kannur, Mahatma Gandhi, Kerala, and Cochin University of Science and Technology.

6. TREND AND PATTERN OF SUPPLY OF ENGINEERING GRADUATES IN KERALA

The intakes and outturn of engineering graduates were fluctuating year by year. Students enrolling for undergraduate engineering courses in the Kerala displayed that outturn rates have actually come down significantly and a branch-wide analysis showed that there had been a significant reduction in the rate of outturn in the more popular branches (AICTE, Report, 2017). Table 1 narrates the growth profile of engineering institutions in Kerala.

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TABLE 1: GROWTH PROFILE OF ENGINEERING INSTITUTIONS (YEAR WISE)

Year	Engineering Colleges	Annual growth (%)
1940	1	
1947	1	0
1950	1	0
1955	1	0
1960	4	60
1965	6	10
1970	6	0
1975	6	0
1980	6	0
1985	7	3.33
1990	9	5.71
1995	16	15.55
2000	36	25
2001	45	30.2
2002	77	71.11
2005	91	6.06
2008	94	1.09
2011	142	17.02
2014	163	4.92
2015	164	0.613
2016	183	11.58
Average	**50.43**	**13.11**

Source: NTMIS Bulletin and Commissioner of Entrance Examination, Kerala

Table 1 shows that real growth started from 1990's and continued till the last decade. Another exciting fact was that engineering colleges were increasing every year.In the engineering sector, private engineering colleges were having a mushrooming growth in Kerala till 2016.Since then there were incidence of closing down of private engineering colleges or turning them into other productive activities, such as starting of unaided plus two courses, Para medical courses, new courses in arts and science of the aided colleges.

7. INTAKE AND OUTTURN OF ENGINEERING STUDENTS

After 1990's, the number of engineering colleges affiliated to the universities in Kerala started growing. From five colleges in the pre liberalization regime, the number of colleges increased to 16 by 2002. All the newly formed colleges have a self-financing model. The Year 2009 marked a sudden increase in engineering colleges affiliated to the universities in Kerala. The intake and outturn for three cohorts of students from 2004 to 2006, showed that while intake had grown fast, outturn rate had not increased at the same pace.

TABLE 2: TOTAL INTAKES AND OUTTURN OF ENGINEERING GRADUATES IN KERALA (2000-2016)

Year	**Intakes**	**Annual Growth Rate (%)**	**Outturn**	**Annual Growth Rate (%)**
2000	8820		4894	
2001	11045	25.22	5143	5.08
2002	18428	66.84	3572	-30.54

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2003	19341	4.95	8025	124.66
2004	21448	10.89	8361	4.18
2005	25124	17.14	9026	7.95
2006	28635	13.97	10206	13.07
2007	30774	7.46	11504	12.71
2008	32383	5.23	12392	7.71
2009	34473	6.45	13912	12.26
2010	36218	5.06	15213	9.35
2011	38691	6.83	15998	5.16
2012	40879	5.65	19717	23.24
2013	42111	3.01	20777	5.37
2014	42886	1.84	22233	7.01
2015	58237	35.79	20868	-6.13
2016	60376	3.67	24998	19.79

Source: NTMIS nodal center for Kerala (Various Issues), Unpublished data on various Universities

Table 2 shows the pathetic situation of outturn rates. The Outturn rate (hereafter OTR), was almost 5.08 per cent for the year 2001. In the same year the growth per cent was 25.22.This means that one out of every five students who join the four-year degree programme in engineering either drops out, or fails in the exams, resulting in low outturn rates. This has serious consequences in the actual supply of engineers. This can be given in figure 1.

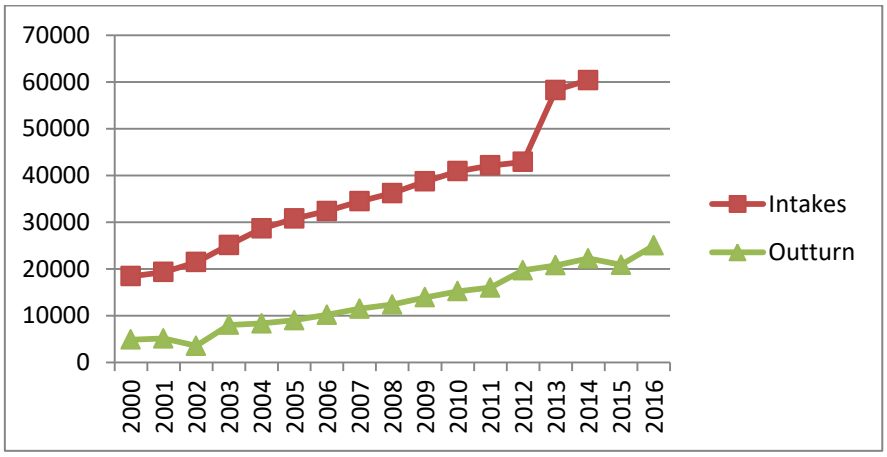

Fig.1- Trend and Pattern of Intake and Outturn of Engineering Graduates

Source: NTMIS nodal Centre for Kerala (2000-2016), unpublished data from Universities of Kerala, Kannur, Cochin University, MG University and Calicut University

Figure 4.1 illustrates that there is an increasing trend in intakes of engineering graduates over the years from 2000-2016. However, outturn rates of engineering graduates were changing every year. Outdated branches such as Electrical and Electronics, Civil and Mechanical have gone considerably down in learner preferences. Electronics and Communication, Computer Science and Engineering and Information Technology have taken up the share vacated by these three branches.

7.1. Regression Analysis in Total intakes

TABLE 3: MODEL SUMMARY AND PARAMETER ESTIMATES TOTAL INTAKES

Dependent Variable: Total Intake							
Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
S	.903	140.418	1	15	.000	209.413	-399876.213
The independent variable is Year.							

Source: Secondary Data Analysis

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The model summary and parameters of total intakes from engineering graduates in Kerala over the last seventeen years. The equation of non- linear regression is listed below:

Y= exp (209.4130344693029 + -399876.2129522731 / x)

Where Y=dependent Variable

X=Independent Variable.

Here, total intakes are taken as dependent variable and year as the independent variable. R square is .903, this model appeared to be best.

➢ The model summary table reports the strength of the relationship between the model and the dependent variable R, there is a non-linear correlation between the observed and model predicted values of the dependent variable. Its large value (.903) indicates a strong relationship between the variables.

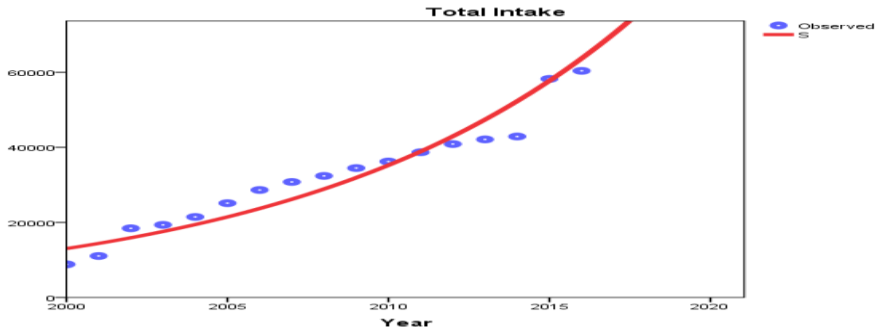

Fig.2-Total Intake of Engineering Graduates

Source: Secondary Data Analysis

7.2. Regression Analysis in Total Outturn

The next we analyzed the total outturn of engineering degree holders in Kerala. The result of the analysis given in table 4.

TABLE 4: MODEL SUMMARY AND PARAMETER ESTIMATES OF TOTAL OUTTURN

Dependent Variable: Total Outturn							
Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
S	.924	181.324	1	15	.000	229.489	-442016.689
The independent variable is Year.							

Source: Secondary Data Analysis

Table 4.10 displays that the R square value is .924, and the equation of non- linear regression is as follows:

Y= exp(229.4891946019607 + -442016.6893571553 / x)

Where Y=dependent Variable

X=Independent Variable

The total outturn was dependent variable and year was the independent variable.

◈ The model summary table reports the strength of the relationship between the model and the dependent variable R, there is an non-linear correlation between the observed and model predicted values of the dependent variable. Its large value (.924) indicates a strong non-linear relationship.

◈ R Square, the coefficient of determination, is the squared value of the multiple correlation coefficients. It was found that R square value and F ratio have 0.924 and 181.32 values respectively. As a whole, the regression does a good job of modeling the relationship between year and outturn of engineering students. This clearly points out that the outturn of engineering graduates have increased but at a decreasing rate taking into consideration, the intake of students.

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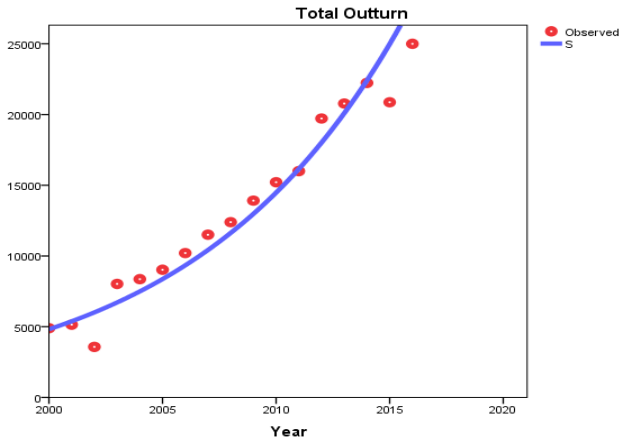

Fig.3: Total Outturn of Engineering Graduates

Source: Secondary Data Analysis

Figure 2 points out that the trend of the analysis is in non-linear form. It indicates that total outturn was fluctuating year by year. Every year there was a change in the outturn rates of engineering graduates. Cubic form is used to analysis of regression.

8. PROBLEMS FACED BY ENGINEERING DEGREE HOLDERS IN KERALA

One of the main problems faced by engineering graduates is that there are too many engineering graduates in Kerala. This leads to chronic unemployment in engineering sector. Graduates due to lack of job availability engage in different jobs like peon, school teacher, and BPO (Business Process Outsourcing). In each employment, the worker faces different hitches. The present study exposes the main problems faced by engineering graduates in Kerala. Low salary, more working hours, less chance of promotion, poor working environment, harassment, low motivation, performance issues, and discrimination are the problems of engineering graduates. The place of work should be a good location with pleasant experiences to nurture. The problems experienced in the work place decrease the performance and productivity and reduce the happiness of the person concerned. The present session analyses the problems faced by the engineering graduates in Kerala.

a) Low Salary

One of the main problems of engineering graduates was low salary. Skill level of an engineer was low. Most engineers are working in a field that has no connection to what they have studied .This leads to got a low salary.

b) More Working Hours

This is one of the problems of engineering graduates in Kerala. Employees who work overtime hours experience numerous mental, physical, and social effects. Significant effects include stress, lack of free time, poor work-life balance, and health risks.

c) Less Chance of Promotion

Many jobs not provided the promotion facilities. It creates stress and dislikes of job between employee and employer. If workforces create fewer open positions, it can be difficult employed person to findout a good work harder.

d) Poor Working Environment

Poor job environment creates problems in engineering graduates. Most of the working environment was unclean. Working with family can be a blessing and a curse. These are a few challenges common in family-owned businesses.

e) Family Consideration

Parental element misuse, mental health problems and domestic violence affect parenting and place children at risk of abuse and neglect. Families with multiple and complex problems are also often situated within a wider context of poverty and exclusion.

f) Unemployment

Extra supply of engineering graduates makes unemployment problem, at the same time deficiency of skill level also forms unemployment problems.

g) Underemployment

Underemployment was another issue of engineering graduates. It leads to engineering graduates were working in different fields not in their qualification.

h) Lack of Skills

Lack of skill level of engineering graduates was one of the main issues of the modern world. Every individual was literate in modern society, but the skill level of persons were questionable.

i) Outdated Syllabus

The technology is changing drastically but the syllabus of colleges is not changing linearly with present technologies. So how can engineers survive and compete with people with 10 year old syllabus.

f) Other Problems

There are many other problems related to engineering graduates. Low level of skill level was another problem of engineering graduates. Unlimited Supply of engineering graduates were another problem and unemployment of graduates were the problems of engineering degree holders.

9. FINDINGS AND CONCLUSION

The study found out that the trend and pattern of the supply of engineering graduates in Kerala. The secondary data collected for the analysis was from the period 2000 to 2016.The year 2000 and the preceding years marked a remarkable growth in the number of engineering institutions and a gigantic boost in the IT sector of Kerala. Non- Linear Regression were used to find out the relationship between the dependent variable years (2000-2016) and the independent variables outturn and intake respectively. The high R values (0.924 and 0.903) explained a strong relationship between the variables. The main problems as observed by the study were a)Low salary (b)Low Capability of the Students(c) less promotion facilities(d)Unemployment e)Underemployment and f)Outdated syllabus.

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