

Building World-class Universities in India: Benchmarking and Policy insights

[A Dissertation submitted to the Panjab University, Chandigarh for the award of
Master of Philosophy in Social Sciences, in Partial Fulfillment of the requirement
for the Advanced Professional Programme in Public Administration (APPPA)]

By

Subrat Kumar Pradhan

[Roll No- 4718]

Under the Guidance

Of

Faculty Guide

Dr. Roma Mitra Debnath, Associate Professor



47th Advanced Professional Programme in Public Administration

(2021-22)

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION, NEW DELHI

Certificate

I have the pleasure to certify that Shri Subrat Kumar Pradhan has pursued his research work and prepared the present dissertation titled **“Building World-class Universities in India: Benchmarking and Policy insights”** under my guidance and supervision. The dissertation is the result of his own research and to the best of my knowledge, no part of it has earlier comprised of any other monograph, dissertation or books. This is being submitted to the Punjab University, Chandigarh, for the purpose of the Master of Philosophy in Social Sciences in partial fulfillment of the requirement of the Advanced Professional Programme in Public Administration of Indian Institute of Public Administration (IIPA), New Delhi.

I recommend that the dissertation of Shri Subrat Kumar Pradhan is worthy of consideration for the award of M. Phil. Degree of Punjab University, Chandigarh.

(Dr. Roma Mitra Debnath)

Supervisor

Indian Institute of Public Administration (IIPA), New Delhi

Certificate

It is hereby declared that this submission is my original piece of work and to best of my knowledge and belief, it contains no material previously published or written by any other person. I am aware of the University's norms and regulations regarding the plagiarism including the disciplinary action that it may invite. Any use of the works by any another author, in any form, is adequately acknowledged at their point of use or in the Bibliography.

Date: March 2022

(Subrat Kumar Pradhan)

Place: New Delhi

Roll No - 4718

Indian Institute of Public Administration, New Delhi

Acknowledgement

I would first like to thank my supervisor, Dr. Roma Mitra Debnath, Associate Professor, Institute of Public Administration (IIPA) whose expertise was invaluable in formulating the research questions and methodology. Her insightful feedback and guidance throughout my studies pushed me to sharpen my thinking and brought my work to a higher level. Throughout the writing of this dissertation I have received a great deal of support and assistance from her.

I would like to acknowledge the supports and cooperation I received from my wife, son and daughter for successfully completing my dissertation. I would also acknowledge the supports of my friends and colleagues of 47th batch of Advanced Professional Programme in Public Administration (APPPA) course at IIPA, New Delhi. I would also like to acknowledge and thank my Ministry (Department of Higher Education, Ministry of Education, Government of India) for giving me the opportunity to attend the 47th APPPA course at IIPA, New Delhi.

In addition, I would like to thank my parents for always there for me.

(Subrat Kumar Pradhan)

Table of Contents

Contents	Page no.
Certificate	i
Acknowledgement	iii
List of Tables	vi
List of Figures	vii
Glossary of Terms	viii
Abstract	ix
Chapter – 1: Introduction	1-7
1.1. Background	1-2
1.2. Statements of the Problem	2-3
1.3. Objective of the Study	3-4
1.4. Research Questions	4
1.5. Rationale of the Study	4-5
1.6. Limitations of the Study	5-6
1.7. Chapterisation Scheme	6-7
Chapter-2: Literature review	8-13
2.1. Literature Review on World-class Universities	8-11
2.2. Literature on Benchmarking in Higher Education Institutions	11-13
Chapter -3: Research Methodology	14-21
Chapter- 4: Current status and Growth of the Higher Education in India	22-37
4.1. Growth in Higher Education in India	22-27
4.2. The Gross Enrollment Ratio in Higher Education	27-30
4.3. Role of Private Sector in Higher Education	30-32
4.4. Research Penetration in Higher Education in India	32-34
4.5. Findings and Conclusion	34-37
Chapter-5: Overview of the New (IoE) Policy, 2017 and its Effectiveness on Indian Public Higher Education Institutions (IoEs)	38-57

5.1. Introduction	38-39
5.2. Salient features of the Regulatory Architecture	39-42
5.3. Strategy of India for Building World-class Universities	42-45
5.4. Effectiveness of the New (IoE) Policy on the Indian Higher Education Institutions (IoEs)	46-57
Chapter-6: Benchmarking of Indian Higher Education Institutions	58-73
6.1. Introduction	58
6.2. Performance of IoEs on Overall and Various Indicators of QS Ranking 2022	58-61
6.3. Comparison of IoEs and Select Top Universities on Overall and Various Indicators of QS Ranking 2022	62-73
Chapter-7: Findings and Conclusion	74-90
7.1. Findings and Conclusion on Growth of higher education in India	74-79
7.2. Summary and Conclusion on Effectiveness of the New (IoE) policy, 2017 on the Indian public higher education institutions	79-81
7.3. Summary and Conclusion on Benchmarking Higher Education Institution (IoEs) in India	81-82
References and Bibliography	83-90

List of Tables

Contents	Page no.
Table-1 : Cohen’s Standard Effect Sizes	20
Table-2: Number of Major Universities in last 5 years	31
Table-3: Level-Wise Enrollment and its Compound Annual Growth Rate	33
Table-4 : List of IoE Institutions as on 31.01.2021	44
Table-5: Performance of Three IoEs on QS Overall (2018-2022)	56
Table-6: Performance of Institutions in QS Ranking 2022	64
Table-7: Comparison of three IoEs and top 1 to 3 universities on QS overall and indicators (2022)	65
Table-8: Comparison of three IoE institutes and 48 - 50 ranked universities on QS overall and indicators (2022)	67
Table-9 Comparison of three IoE institutes and 98 - 100 ranked universities on QS overall and indicators (2022)	69
Table -10: Number of Students in Select universities in QS Ranking 2022	71-72
Table-11: Number of Faculties in Select Universities in QS Ranking 2022	72
Table-12: Student-faculty ratio in Select Universities in QS Ranking 2022	73

List of Figures

Content	Page no.
Figure-1: Characteristics of a World-class university (WCU): Alignment of Key Factors	9
Figure-2: Universities in India	23
Figure-3: Colleges in India	23
Figure-4: Students enrollment in HEIs in India	23
Figure-5: Projection of total Enrollment of Students in Higher Education in India (2025-2040)	25
Figure-6: Predicted Share of Male and Female in Total Students Enrollment in Higher Education in India	27
Figure-7: Projection of GER in Higher Education in India and China (2025-2040)	28
Figure-8: Share of Private colleges in Total Colleges in India	30
Figure-9: Share of Private Colleges in Total Students Enrollment in Higher Education in India	30
Figure-10: Number of major Universities in last five years	32
Figure-11: Changing Ranking of Indian Universities among top 500 QS Ranking (2019-2022)	50
Figure-12 : Indian Universities among 1-500 QS Ranking (2019-2022)	51
Figure-13: Performance of IIT Delhi in QS Ranking	52
Figure-14: Performance of IIT Bombay in QS Ranking	53
Figure-15: Performance of IISc Bangalore in QS Ranking	54
Figure-16: Comparative Performance of Three Public IoEs in QS Ranking (2012-22)	55
Figure-17: Comparative Performance of Three IoEs on QS Overall (2018-2022)	57
Figure-18: Comparison of Three IoEs on QS Overall and Indicators	61

Glossary of Terms

AISHE: All India Survey on Higher Education

ARWU: Academic Ranking of World Universities

ENQA: European Association for Quality Assurance in Higher Education

GER: Gross Enrollment Ratio

HEIs: Higher Education Institutions

IoE: Institution of Eminence

QS: Quacquarelli Symonds

THE: Times Higher Education

UGC: University Grant Commission

UIS: UNESCO Institute for Statistics

UNESCO: United Nations Educational, Scientific and Cultural Organization,

WCU: World Class Universities

Abstract

As one of the fast-growing economies of the world, India attempts to improve the quality of higher education and empower the higher educational institutions to enable them to become world class teaching and research institutions. In 2017, the Government of India has introduced New Institution of Eminence (IoE) Policy 2017 to promote a few good universities to compete with world best universities. The objective is to enable these institutions to break into the world's top 100 universities. Under this policy architecture, greater academic, administrative and financial autonomy are provided to the higher education institutions declared as IoEs so that they could choose their own path to become world-class institutions.

This study attempts to provide an overview of this new (IoE) policy of the Government for building world-class education institutions and analyze its effectiveness by studying three public IoEs viz. Indian Institute of Technology (IIT), Bombay, Indian Institute of Technology (IIT), Delhi and Indian Institute of Science (IISc), Bangalore in the context of global ranking competition. The findings revealed that the New IoE policy seems to be least effective thus far since the three public IoEs have failed to improve in their ranking as well as in Overall score in the (QS) global ranking. Even after the three years of their declaration as IoE, the overall score of all of these three institutes in none of the year 2020, 2021 and 2022 could able to surpass the overall score achieved by these institutes in 2018, the preceding year of their declaration as IoEs.

Further, the study attempts to understand the role of benchmarking in higher education institutions (HEIs) as a means to continually improving their global ranking and staying competitive. In this regard, attempts are made to examine the performance of three public IoEs (IIT Delhi, IIT, Bombay and IISc Bangalore) vis-à-vis the top (1 to 3) three universities, 48 to 50th ranked and 98 to 100th ranked universities in QS ranking 2022 on the Overall as well as six indicators of QS Ranking. The findings revealed that the three public IoEs have the potential to break into the world's top 100 universities in QS Ranking if they could significantly increase their Faculty-student ratio and the share of international faculty and international students in their total faculties and students respectively.

Apart from this the Study attempts to analyze the growth of Higher education sector in India. One of the major findings revealed that the number of higher education institutions and students enrollment in India has been increased very significantly during last two decade, however, the growth in institutions has not matched the growth in demand for higher education. During 2000 to 2020, while the number of universities grew at a compound growth rate of 8.0%, the number of colleges grew at a compound growth rate of 7.7%. In the same period of time, the total student enrollments in higher education in India grew at a compound annual growth rate of 8.6%.

Further, the total student enrollments in higher education are expected to increase from 38.5 million in 2020 to 58 million in 2035 and 64.3 million in 2040 thereby adding about 51% and 67% more students by 2035 and 2040 respectively. This

expected high demand for higher education in future would put huge pressure on the higher education infrastructure of the country.

Further, while, the male enrollments in higher education grew at a compound annual growth rate of 2.6% during the last decade (2011 to 2020), the female enrollment was however grew impressively at a compound annual growth rate of 6.0% in the same period of time. It is expected that while the number of male student enrollments would increase by 37% and 49 % in 2035 and 2040 respectively, whereas the female student enrollments are expected to increase by 65% and 86% in 2035 and 2040 respectively.

Furthermore, while the share of male in the total enrollment in higher education decreased in last decade (2011 to 2020), the share of the female in the total enrollment however increased during the same period of time. If the same trend continues, then it is expected that the share of female in the total enrollment will be more than the share of male in total enrollment by 2025. The female and male share in total enrollment will be 51% and 49% respectively in 2025. Thereafter, the share of female enrollment would continue to be more than male enrollment. The share of female and male would be 54% and 46% in 2035 respectively and 55% and 45% in 2040 respectively.

With this change, it seems that the female students would now play a critical role in shaping the growth and structure of higher education sector of India in coming years. Accordingly, India need to fine-tune its higher education system by developing targeted policies and programs to address the needs of women in higher education and to implement reforms that will genuinely empower women for their full and effective participation in higher education and nation building.

Furthermore, the Study revealed that India is in the stage of massification (GER between 15 and 50 %) since last twelve years (2008 to 2020) and is expected to remain in this stage for at least next 20 years before it enters into the stage of universalization (GER above 50 % mark). Since the function of higher education in a ‘mass system’ is the transmission of skills and the preparation of the population for broader range of technical and economic elite roles and the function of higher education in a ‘universal system’ is about the adaption of whole population to social and technological change, there is now a dual challenge for India not only to increase the gross enrollment ratio rapidly but also to ensure quality education and providing of professional and technical skills to most of the students at the same time.

Furthermore, the Study revealed that the expansion in higher education in India is presently driven by the private sector. The share of private colleges and universities has been constantly increased in term of numbers as well as students’ enrollments over the period of time. This rapidly increasing trend of private sectors though is a boon for the higher education sector, it would however become difficult to ensure quality education in absence of a high-quality enabling regulatory environment.

Furthermore, the research penetration in higher education in India is very low as there has been a persistent low level of enrollments in Ph. D degree over the years. This low level of enrollments in Ph. D is perhaps due to decrease in popularity of Post Graduate and M.Phil programme in India.

While the average student enrollments in Post Graduation and Ph. D were estimated at 4 and 0.16 million respectively during the last five years (2015-16 to 2019-20), the average student enrollments in Under Graduate level was estimated at 29 million during same period of time. Though, the enrollments in Ph. D degree grew at an annual compound annual growth rate of 12.5 Per cent over the last five year (2015-16 to 2019-20), the enrollments in Post Graduate degree grew at a modest annual compound growth rate of 2.8 Per cent whereas the growth of students' enrollment in M.Phil grew at a negative annual compound growth rate of (-) 14.4 Per cent over the same period of five years. Therefore, it appears that there is a serious problem in transition from graduate level to post graduate to Ph. D Level. The students' enrollment in Ph. D degree could not be increased substantially without a good growth in students enrollments in Post Graduations/ M.Phil degree levels as these two degrees are essential for enrollments in Ph. D research degree in India.

Since there is now a provision to scrap the M.Phil. programme under New Education Policy(NEP), 2020, therefore, focus should be given to increase the student enrollments in Master Programme significantly by developing targeted policies and programs to address the recent issues of decreasing popularity of this programme. Though, there is a provision in NEP, 2020 that a student with 4-year Bachelor's degree with Research can also undertake a Ph.D., it however cannot help much in improving the Ph. D research in India without any targeted policies and strategy since at recent times Indian degree programs are mostly three years in length.

Chapter-1: Introduction

1.1. Background:

In today's knowledge economy, tertiary education is increasingly recognized as a key factor in national competitiveness (Altbach and Salmi, 2011). Higher education institutions, particularly, elite and research oriented universities, with their capabilities of producing and disseminating advanced knowledge and technological innovation, have become recognized as key players in the economic growth and productivity of their respective countries (Byun et al, 2012).

As changes happen worldwide and quickly in higher education, the establishing of the World-class Universities becomes a supreme global requirement (Mehrotra, Elias, & Al-Alawi, 2019; Alhazmi & Yahmed 2017, Al-Alawi et al. 2019). As one of the fast-growing economies of the world, India has also attempted to improve the quality of higher education and empower the higher educational institutions to enable them to become world class teaching and research institutions. In 2017, the Government of India, for the first time, introduced a new policy for providing an enabling, liberal and less intrusive regulatory architecture for setting up /upgrading of ten public and ten private institutions as world class teaching and research institutions called as "Institutions of Eminence (IoEs)". The regulatory architecture has been provided in the form of UGC (Declaration of Government Institutions as Institutions of Eminence) Guidelines, 2017 for public institutions and UGC (Institutions of Eminence Deemed to be Universities)

Regulations, 2017 for private institutions. Under this new regulatory architecture, greater academic, administrative and financial autonomy are provided to the higher education institutions selected as IoEs so that they could choose their own path to become world-class institutions. This new (IoE) policy has, however, led an important question unanswered i.e. whether the Indian Higher Education Institutions (IoEs) would get benefit from this policy changes? In particular, this study attempts to provide an overview of the new policy of the Government undertaken in 2017 for building world-class education institutions and analyze its effectiveness on public institutions in the context of global ranking competition. Further, the study attempts to understand the role of benchmarking in HEIs as a means to continually improving their global ranking and staying competitive.

1.2. Statements of the Problem:

India is a very large and growing economy with 1.3 billion populations. Therefore, it deserves some world class institutions to fulfill the manpower needs of the future. However, when a reputed international ranking agency releases its ranking of educational institutions, the broad reaction is one of general dismay at Indian institutions not finding place in the list of top institutions of the world or even of Asia. Even the top reputed Indian institutions like Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs) finds lower place in the ranking.

In the latest QS World University Rankings 2022, not a single Indian institute is featured among the top 100 universities across the world. Only three institutions namely Indian Institute of Technology Bombay (IITB), Indian Institute of Technology Delhi

(IITD) and Indian Institute of Science (IISc), Bangalore are placed at the rankings of 177, 185 and 186 respectively. Besides this, there are only five institutes are placed in the rankings between 250 - 400 bracket.

While coming to India's contribution in Times Higher Education World University Rankings 2022, though a record 71 Indian universities have qualified for the Times Higher Education World University Rankings 2022, up from 63 last year, but none of them made it to the top 300 list. The Indian Institute of Science, Bangalore is India's highest-ranked institution, maintaining its position in the 301-350 bands for a third consecutive year.

While the Government has been taking a number of steps, with the objective of improving quality of higher education in India, it is, however, felt that more focused and accelerated efforts are needed to establish institutions which are of international standards.

1.3. Objective of the Study:

The Objectives of the study are to:

1. Provide the current status and growth of higher education sector in India.
2. Provide an overview of the new policy introduced by the Government of India in 2017 for setting up /upgrading of ten public and ten private institutions as world class teaching and research institutions called as “Institutions of Eminence (IoEs)”.

3. Analyze the effectiveness of this new policy, 2017 of the Government on the Indian public higher education institutions in the context of global ranking competition.

4. Explore how the Indian public higher education institutions can be benchmarked against different indicators of the top global universities for becoming world-class institutions.

1.4. Research Questions:

The study aims to answer the following three questions:

1. What is the current status and growth of the Higher Education in India?
2. What are the important aspects of the new policy introduced by the Government of India in 2017 for setting up /upgrading of ten public and ten private institutions as world class teaching and research institutions?
3. What is the effectiveness of this new policy, 2017 of the Government on Indian public higher education institutions in the context of global ranking competition?
4. How can the Indian public higher education institutions be benchmarked against different indicators of the top global universities for becoming world –class institutions?

1.5. Rationale of the Study:

The Government of India, for the first time in 2017, introduced a new policy for providing an enabling, liberal and less intrusive regulatory architecture for setting up /upgrading of ten public and ten private institutions as world class teaching and research

institutions. The present study would provide a greater insight on whether this new policy is working or not in transforming Indian higher educational institutions into global standard? Further, the study also provides insights on how the Indian public higher education institutions be benchmarked against different indicators of the top global universities for becoming world –class institutions? Therefore, this study is significant in present context.

Further, though there are many literatures & studies available on the issue of building world class institutions, they are all relating to China, South Korea, Hong Kong or any other countries. There are limited literatures available regarding India’s experience of building world class institutions. Therefore, the study would also contribute to the existing body of the literature in a significant way.

1.6. Limitations of the Study:

Under the New (IoE) policy introduced by the Government of India in 2017, as of now, eight (08) institutions in public category and three (03) institutions in private category have been declared as IoEs for becoming world - class institutions. In public category, while three (03) institutions [Indian Institute of Technology (IIT), Delhi, Indian Institute of Technology (IIT), Bombay and Indian Institute of Science (IISc), Bangalore] were declared as IoEs in 2018, the other five (05) institutions [Indian Institute of Technology (IIT), Madras, Indian Institute of Technology (IIT), Kharagpur, University of Hyderabad, Banaras Hindu University, and University of Delhi] were declared much latter in 2020. In case of private category, so far only three (03) institutions [Manipal Academy of Higher Education, Karnataka, Birla Institute of Technology, Rajasthan and

O.P. Jindal Global University, Haryana] are declared as IoEs in 2021. Therefore, those institutions which have been declared as IoEs in 2020 and 2021 respectively could not be considered for the study since they have not even spent one year under the new regime of policy changes. Therefore, to understand the effectiveness of the new policy on Indian Higher Education Institutions (IoEs) in the context of global ranking competition and benchmarking, the study would only focus on three public institutions (IIT, Delhi, IIT, Bombay and IISc, Bangalore) which were declared as IoEs in 2018 and have spent considerable time period of three years under the new regime of policy changes.

In view of the above, the study is limited to only three public institutions which were declared as IoEs in 2018. The study does not include any private institutions declared as IoEs since they have not completed even one year since their declaration as IoEs. Therefore, the study is unable to understand the effectiveness of the new policy changes on the private higher education institutions (IoEs).

1.7. Chapterisation Scheme:

The study has been structured as follows:

Chapter-1: Introduction

Chapter-2: Literature review

Chapter -3: Research Methodology

Chapter- 4: Current status and growth of the Higher Education in India

Chapter -5: Overview of the New (IoE) Policy, 2017 of the government for building World-class education institutions in India and its effectiveness on Indian Public Higher Education Institutions (IoEs) in the context of global ranking competition.

Chapter -6: Benchmarking of Indian Higher Education Institutions (IoEs)

Chapter-7: Findings and Conclusion

Chapter-2: Literature Review

2.1. Literature Review on World-class Universities:

Recent years have witnessed an obsession with "world-class" universities and global rankings, which can be traced to a steady growth in "world-class" terminology since the turn of the century (Ramirez and Tiplic 2014).

The "world-class" term refers to the objective of attaining and/or sustaining the competitiveness of the World class throughout the production of excellence accomplished by the top performers (Dudek, 2016). In the higher education context, world-class university (WCU) is reserved for topclass universities among the top 100 in teaching and research. Besides, WCU defines a higher education institution (HEI) to perform and disseminate knowledge and deliver quality teaching based on research (Baskaran, 2017).

Altbach (2015) defines World class University (WCU) as a "Top rank university based on excellence in research, academic freedom, a sense of intellectual excitement, governance (the academic community has control over the central elements of academic life), adequate facilities, and adequate funding."

Salmi (2009) defines "world-class university" based on the three main characteristics: "abundant resources," "high concentration of talent," and an operating environment that inspires managerial independence and "innovation" (Figure 1).

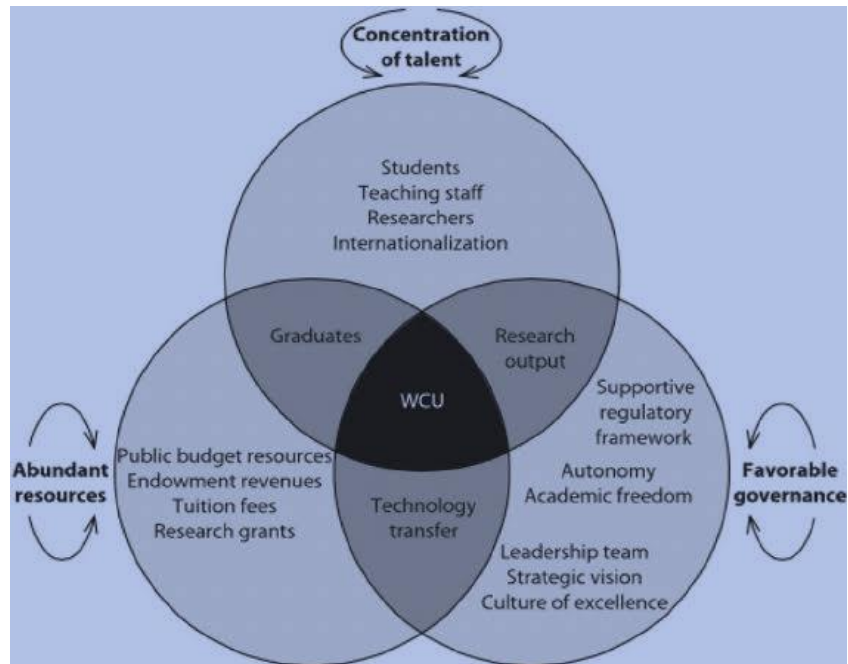


Figure -1 : Characteristics of a World-class university (WCU): Alignment of Key Factors. Source: Salmi, 2009, p. 32.

Salmi (2009) attributed the superior results achieved by a World –class University (WCU), "highly sought graduates, leading-edge research, and technology transfer," to "three complementary sets of factors: (a) a high concentration of talent (faculty and students); (b) abundant resources, to offer a rich learning environment and to conduct advanced research; and (c) favorable governance, encouraging strategic vision, innovation, and flexibility, and enabling institutions to make decisions and to manage resources without being encumbered by bureaucracy" (pp. 19-20). He further emphasized that it is these three factors in combination and their dynamic interaction that make the crucial difference.

Similarly, Rabossi & Salto (2018) specified that presence of a critical mass of International top students and outstanding faculty, Sources of financing, and the degree of academic and managerial autonomy in the university are the factors in building World-Class University.

Although more and more countries have developed both national and local policies to stimulate the emergence of world-class universities and particularly building world-class research universities has become a high on the agenda of various non-english speaking countries in Asia and Europe in recent years (Leon *et al.*, 2014), the research into this theme is still rare.

Among notable literature, some studies are concerned with the discussion of various roads to the world-class universities, challenges and issues of building a world-class university in different systems from the global perspective (Altbach and Balan 2007; Salmi 2009; Sadlak and Liu 2009; Altbach and Salmi 2011; Altbach 2013; Shin and Kehm 2013), while more focus on case studies of individual countries in non-english-speaking countries. For example, the literature review shows that a majority of these studies deal with issues concerning China's world-class universities based on one or several case studies of Chinese Projects of 211 and 985 universities, among which Wang's research is about the case study of Shanghai Jiaotong University, one of the Project 985 universities which are making tremendous efforts to become a world-class research university (Wang *et al.* 2011). Yang and Welch (2012) and Luo (2013) discussed the rationales and strategies of building world-class universities in China by analyzing the same case study of Tsinghua University. Huang (2015), however, provided an overall portrait of the rise of China's world-class research university at both policy and institutional levels. Besides, Byun and his group introduced Korean' policies and outcomes of building world-class universities (Byan *et al.* 2013).

The review of earlier studies suggests that majority of existing literatures are concerned with case studies of Chinese universities and other countries. There are

limited studies done on building world class universities in Indian context. Therefore the present study focuses on to understand the building World-class education institutions in India.

2.2. Literature on Benchmarking in Higher Education

Institutions:

Benchmarking is the key to become the best of the best (Camp, 1989). Sharing good practices and learning from the best practices of foreign universities is known as benchmarking (Love et al. 1995). According to Mann (2010), the best practice benchmarking is searching for the best way or solution by studying other organisations that are high performers in particular areas of interest. The gained knowledge is then analysed and in cases that the practice is feasible and appropriate, it will be adapted and incorporated in the organisation's own process (Mann *et al.*, 2010).

As evidenced in literature, benchmarking definitions focuses on following major areas: measurement via comparison, identification of best practices, implementation, continuous improvement and systematic process in carrying out benchmarking activity (Sarkis, 2001; Ramabadron *et al.*, 1997; Cooper et al., 1996; Maire 2002; Anand and Kodali, 2008) etc.

Benchmarking helps to diminish performance differences between organizations (Van Helden and Tillema 2005), identifies of the current state of the organization (Burquel and Van Vught 2010), promotes cooperation between universities and

networking (ENQA 2002), sets standards (ENQA 2002), stimulates the need for change (Naufal 2012) and continuous improvement of one's own processes (European Centre for Strategic Management of Universities 2010), identifies best and good practices (UNESCO New Papers on Higher Education 1998), helps to set goals (Závada *et al.*, 2006) and supports continuous learning (European Centre for Strategic Management of Universities 2008).

One of the highly cited general classifications of benchmarking is that by Camp (1989) who identifies four kinds of benchmarking:

- a) **Internal benchmarking:** It compares separate teams, units or divisions internal to an organization. This exercise identifies the entities that are work better and share the knowledge with other teams to achieve higher performance.
- b) **Competitive benchmarking:** It is a method for those who want to maintain an edge by knowing where they stand. It's a way of determining the best processes, strategies, and techniques for achieving your business goals via a set of metrics.
- c) **Functional benchmarking:** it is useful to analyze how well the functional area of an organization performs compared to functional areas of other organization.
- d) **Generic process/'best in class' benchmarking:** It focuses on excellent work processes rather than on the business practices of a particular organization.

According to Mohrman (2008), the world-class university has become the cure to guarantee the worldwide economic success based on the top 20, 50 or 100

internationally-ranked universities' characteristics. Therefore, to be “world-class”, the university has to reach the standard included in the lists of World university rankings, as Tayeb (2016) declared. Therefore, the present study focuses on the competitive benchmarking to improve the quality and standard of the Higher Education Institution (HEIs) in India and enable them to become world class universities.

Chapter 3

Research Methodology

The Government of India introduced a new (IoE) policy, 2017 for providing an enabling, liberal and less intrusive regulatory architecture for setting up /upgrading of ten public and ten private institutions as world class teaching and research institutions. The present study would provide a greater insight on whether this new policy is working or not in transforming Indian higher educational institutions into global standard? Further, the study also provides insights on how the Indian public higher education institutions be benchmarked against different indicators of the top global universities for becoming world –class institutions. Apart from this, the study would attempt to provide a greater analysis on the current status and growth of higher education sector of India.

The study uses quantitative research strategy along with descriptive and exploratory research design.

(i) Current status and growth of the Higher Education in India:

As regards the growth of higher education in India, attempts are made to provide an overview of the higher education sector of India and analyse the trend in total students enrollment and Gross Enrollment Ratio in higher education in India. Further, attempt is made to forecast the future growth of total students enrollment and Gross Enrollment Ratio in Indian higher education sector. Other important aspects of higher education in

India viz. the role of Private sector in higher education and research penetration are also analyzed.

For discussing the growth in higher education in India in general and analyzing the trend in the total students enrollment and Gross Enrollment Ratio and their future growth in particular, the quantitative data collected from the secondary data source of All India Survey on Higher Education (AISHE) Reports of Ministry of Education, Government of India and UNESCO, UIS Statistics Data are analyzed and summarized by using descriptive statistics.

(ii) **Effectiveness of the New (IoE) policy, 2017 of the Government on Indian public higher education institutions:**

The new (IoE) policy was introduced by the Government of India in 2017 for providing an enabling, liberal and less intrusive regulatory architecture for setting up /upgrading of ten public and ten private institutions as world class teaching and research institutions called as “Institutions of Eminence (IoEs)”. The new regulatory architecture has been provided in the form of (i) UGC (Declaration of Government Institutions as Institutions of Eminence) Guidelines, 2017 for public institutions and (ii) UGC(Institutions of Eminence Deemed to be Universities) Regulations, 2017 for private institutions.

As of now, eight (08) institutions in public category and three (03) institutions in private category have been declared as IoEs for becoming world - class institutions. In public category, while three (03) institutions [Indian Institute of Technology (IIT), Delhi, Indian Institute of Technology (IIT), Bombay and Indian Institute of Science (IISc), Bangalore] were declared as IoEs in 2018, the other five (05) institutions [Indian Institute of Technology (IIT), Madras, Indian Institute of Technology (IIT), Kharagpur, University of Hyderabad, Banaras Hindu University, and University of Delhi] were declared much latter in 2020. In case of private category, so far only three (03) institutions [Manipal Academy of Higher Education, Karnataka, Birla Institute of Technology, Rajasthan and O.P. Jindal Global University, Haryana] are declared as IoEs in 2021. Therefore, those institutions which have been declared as IoEs in 2020 and 2021 respectively could not be considered for the study since they have not even spent one year under the new regime of policy changes. Therefore, to understand the effectiveness of the new policy on Indian Higher Education Institutions (IoEs) in the context of global ranking competition, the study has only focused on three public institutions (IIT, Delhi, IIT, Bombay and IISc, Bangalore) which were declared as IoEs in 2018 and have spent considerable time period of three years under the new regime of policy changes.

The Public Higher Education Institutions in this study means the institutions which are selected as Public “Institutions of Eminence (IoEs)” for becoming world-class teaching and research institutions under the new regulatory architecture introduced in 2017.

To understand the effectiveness of the new policy on Indian Higher Education Institutions (IoEs), the time series data on the Ranking and performance of the three public IoEs in QS World University Rankings are collected and analyzed. The trend before and after the policy changes are observed for understanding the effectiveness of the policy changes. The trend analysis is done on the rankings as well as the Overall of the QS Global University Ranking. In this regard, it is stated that although the New (IoE) policy was introduced in 2017, however, the three public IoEs (IIT Bombay, IIT Delhi and IISc Bangalore) were declared in 2018. During the time of their declaration as IoEs in 2018, the QS Ranking 2019 (2018-19) was already published and available. Therefore, the year 2019 is used as the referencing year of policy introduction in this study is 2019 in place of the year of introduction of IoE policy i.e. 2017. Therefore, the trend before and after the year 2019 is analyzed for understanding the effectiveness of the policy change on these three IoEs. For this purpose of the study, the QS ranking data available (on <https://www.topuniversities.com/>) for the year 2012 (2011-12) to 2022 (2021-22) are used for analysis.

(iii) Benchmarking higher education institutions in India:

The main objective of the New (IoE) Policy is to bring the selected IoEs within 100 ranks in any major international university ranking overtime. Therefore, attempt is made to find out where the Indian institutions (three IoEs) stand with reference to the top universities within 100 ranks in QS ranking so that it can improve its performance and grading. The QS ranking ranks the universities based on their Overall score which is a sum of the following weighted indicator scores:

(i) Academic Reputation (40%): Based on a global survey of academics, who are asked to identify the leading institutions in their field.

(ii) Employer Reputation (10%): Based on a global survey of graduate employers, who are asked to identify the institutions producing the best graduates in their sector.

(iii) Faculty- Student Ratio (20%): An indication of commitment to high-quality teaching and support

(iv) Citation for Faculty (20%): This is normalized by subject area, and reflects the impact of an institution's research

(v) International faculty Ratio (5%): A measure of an institution's success in attracting faculty from overseas.

(vi) International Student Ratio (5%): A measure of an institution's success in attracting students from overseas.

The study uses the quantitative data of QS rankings and scores (collected from the website <https://www.topuniversities.com/>) on the Overall as well as the above six indicators with respect to the top (1 to 3) three universities, 48 to 50th ranked and 98 to 100th ranked universities in QS ranking 2022.

For convenience of the study, the top (1 to 3) three universities, 48 to 50th ranked and 98 to 100th ranked universities in QS ranking are categorized as Category A, B and C whereas the three IoEs (IIT Bombay, IIT Delhi and IISc Bangalore) is termed as category D. Then the performance of the three IoEs (category D) is compared with the top (1 to 3)

three universities (category A), three universities placed in 48 to 50th rank (category B) and three universities placed in 98 to 100th rank (category C) by using and interpreting statistics of Mean difference (MD) and Standardized Mean Differences (SMD) of their respective group scores on the above six parameters and Overall of QS ranking 2022.

The Standardized mean difference or Cohen's *d* is one of the most common ways to measure effect size. Cohen's *d* specifically measures the effect size based on the difference between two means. The effect size tells about how much one group differs from another. The formula for Cohen's *d* (for equally sized groups) is:

$$d = (M_1 - M_2) / S_{pooled} \quad \dots (1)$$

Where:

M_1 = mean of group 1

M_2 = mean of group 2

sd_1 = Standard Deviation for the group 1

sd_2 = Standard Deviation for the group 1

S_{pooled} = pooled standard deviations for the two groups. **The formula is:** $\sqrt{[(sd_1^2 + sd_2^2) / 2]}$

The calculated value of effect size is then compared to Cohen's standards of small, medium, and large effect sizes.

Table-1 : Cohen's Standard Effect Sizes	
Size of effect	d
Small	0.2
Medium	0.5
Large	0.8
The above Standards is suggested by Cohen (1988)	

Hedges' correction:

As Cohen's d is based on sample means, it gives a biased estimation of the population effect size, especially when using small sample sizes, such as those < 20 (Hedges and Olkin, 1985). This has led to d being referred to as uncorrected effect size. The corrected effect size in the d family is Hedge's g , which is often referred to as an unbiased effect size (Cumming, 2012).

$$\text{Hedges's } g = \text{Cohen's } d_s \times [1 - 3/4(n_1 + n_2) - 9] \quad (2)$$

Where n_1 = sample size of group 1

n_2 = sample size of group 2

The main difference between Hedges's g and Cohen's d is that the latter is multiplied by a correction factor for small samples. The calculated value of effect size (*Hedges's g*) is then compared to the above Cohen's Standards of small, medium, and

large effect sizes. The present study prefers Hedges's g instead of Cohen's d since the sample size in this case is less than 20.

Chapter- 4

Current Status and Growth of the Higher Education Sector in India

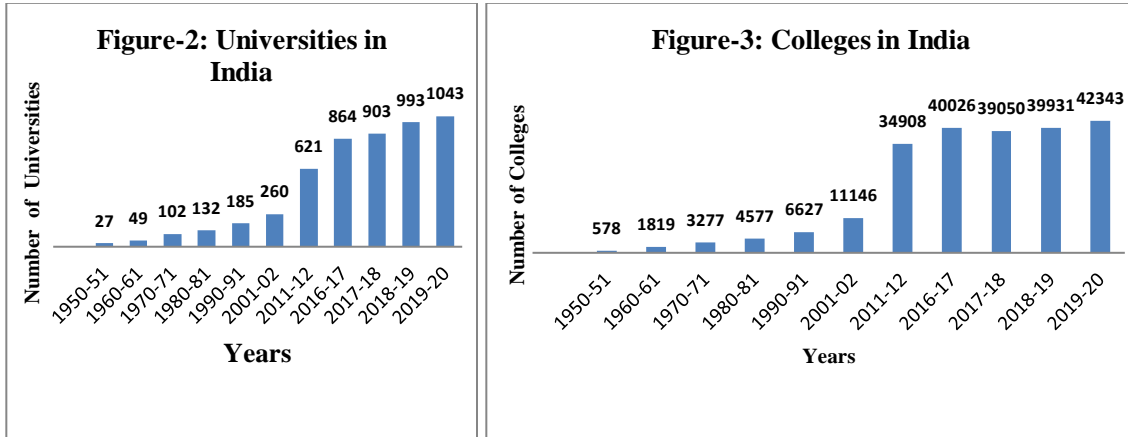
4.1. Growth in Higher Education in India:

India's Higher Education sector has witnessed a tremendous increase in the number of Universities/University level Institutions & Colleges since independence. According to the World Bank Report, India after US and China stands at third place in the world in terms of higher education system (Reddy, and Vaidyanathan, 2019)

In India, higher education institutions mainly comprise of universities and colleges, further characterized as Central Universities, State Universities, Private Universities, and Deemed to be Universities, Public Colleges, Private Colleges, Autonomous Colleges, Standalone Institutions and Institutions of National Importance (INI). Further, Distance learning and open education are also features of the Indian higher education system.

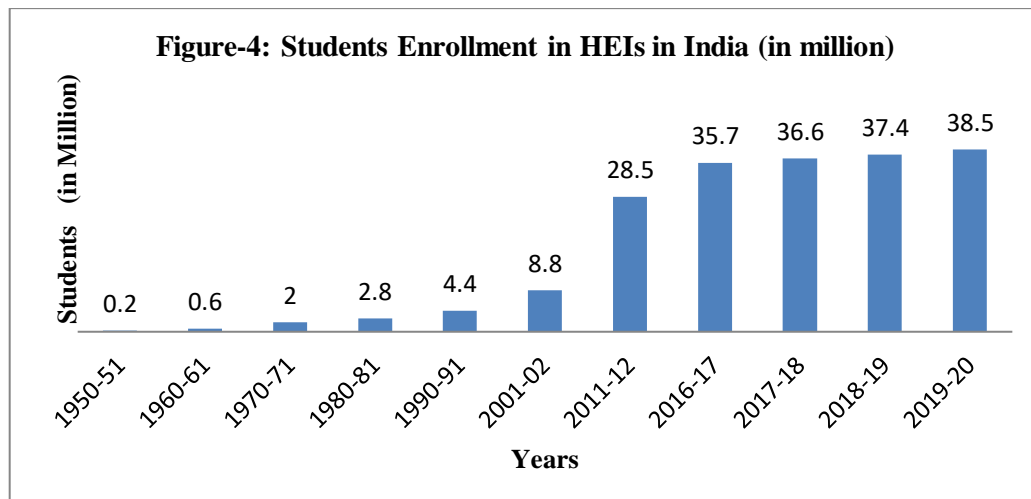
The number of higher educational institutions (HEIs) has increased from about 27 universities and 578 colleges in 1950-51 to about 1043 universities and 42343 colleges in 2019-20 (Figure-2 &3). Further, to strengthen the technical and management education in the country, the Government of India has opened 23 IITs, 25 IIITs, 32 NITs and 20 IIMs thus far. Apart from this, there are 11779 Stand-alone Institutions present in the country

in 2019-20 which are primarily meant for providing Diploma programmes (AISHE, 2019-20).



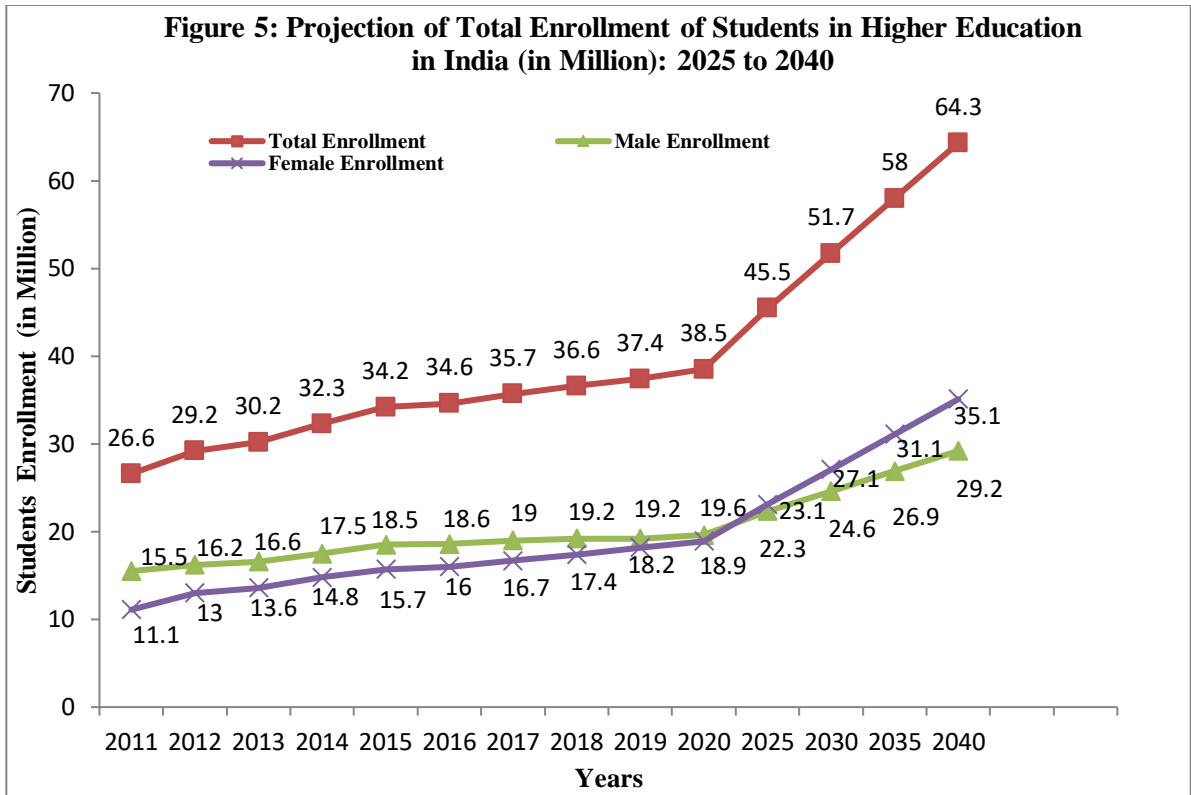
Data Source: Varghese (2015) and AISHE Reports, various years

Over the period of 69 years (1950-51 to 2019-20), while the number of universities grew at a compound growth rate of 5.4%, the number of colleges grew at a compound growth rate of 6.4%. In the same period of time, the total student enrollments in higher education in India has increased from 0.2 million in 1950-51 to 38.5 million in 2019-20 with a compound annual growth rate of 7.9%.



Data Source: Varghese (2015) and AISHE Reports, various years

More importantly, the higher education system has grown very significantly after the year 2000 in terms of the number of institutions and students enrollment. While the number of universities grew from 260 in 2001-02 to 1043 in 2019-20 at a compound growth rate of 8.0%, the number of colleges grew from 11146 in 2001-02 to 42343 in 2019-20 at a compound growth rate of 7.7% (Figure- 2&3). In the same period of time, the total student enrollments in higher education in India has increased from 8.8 million in 2001-02 to 38.5 million in 2019-20 at a compound annual growth rate of 8.6% (Figure- 4). It is evident that though the number of institutions and students enrollment has been increased very significantly during last two decade, however, the growth in institutions has not matched the growth in demand for higher education. Further, the total student enrollments in higher education are expected to increase from its current level of 38.5 million in 2020 (2019-20) to 58 million in 2035 (2034-35) and 64.3 million in 2040 (2039-40) thereby adding about 51% and 67% more students by 2035 and 2040 respectively (Figure-5). This expected high demand for higher education in future would put huge pressure on the higher education infrastructure of the country.



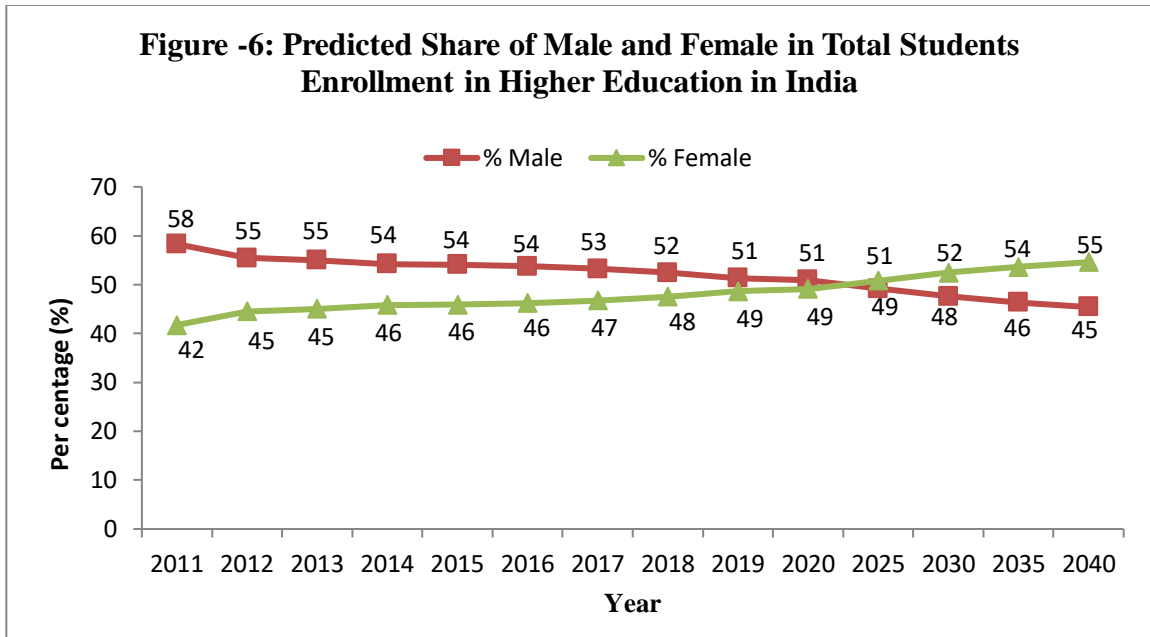
Data Source: AISHE Reports, various years

Data from 2011(2010-11) to 2020 (2019-20) are actual data collected from AISHE Reports based on which projection is done.

More importantly, while number of male enrollments in the total student enrollment have increased from 15.5 million in 2011 to 19.6 million in 2020, the number of female enrollment was increased from 11.1 million in 2011 to 18.9 million in 2020. While, the male enrollments grew at a compound annual growth rate of 2.6% during this period of 2011 to 2020, the female enrollment was however grew impressively at a compound annual growth rate of 6.0% in the same period of time. Further, it is projected that the male and female enrollments will be increased from 19.6 million and 18.9 million in 2020 to 26.9 million and 31.1 million in 2035 respectively and 29.2 million and 35.1

million in 2040 respectively. From the year 2019-20, while the number of male student enrollments is expected to increase by 37% and 49 % in 2035 and 2040 respectively, whereas the female student enrollments are expected to increase by 65% and 86% in 2035 and 2040 respectively.

Furthermore, while the share of male in the total enrollment decreased from 58% in 2011 to 51% in 2020, the share of the female in the total enrollment however increased from 42% in 2011 to 49% in 2020. If the same trend continues, then it is expected that the share of female in the total enrollment will be more than the share of male in total enrollment by 2025. The female and male share in total enrollment will be 51% and 49% respectively in 2025. Thereafter, the share of female enrollment would continue to be more than male enrollment. The share of female and male would be 54% and 46% in 2035 respectively and 55% and 45% in 2040 respectively (Figure-6). With this change, it seems that the female students would now play a critical role in shaping the growth and structure of higher education sector of India in coming years.



Data Source: AISHE Reports, various years

Data from 2011(2010-11) to 2020 (2019-20) are actual data collected from AISHE Reports based on which projection is done.

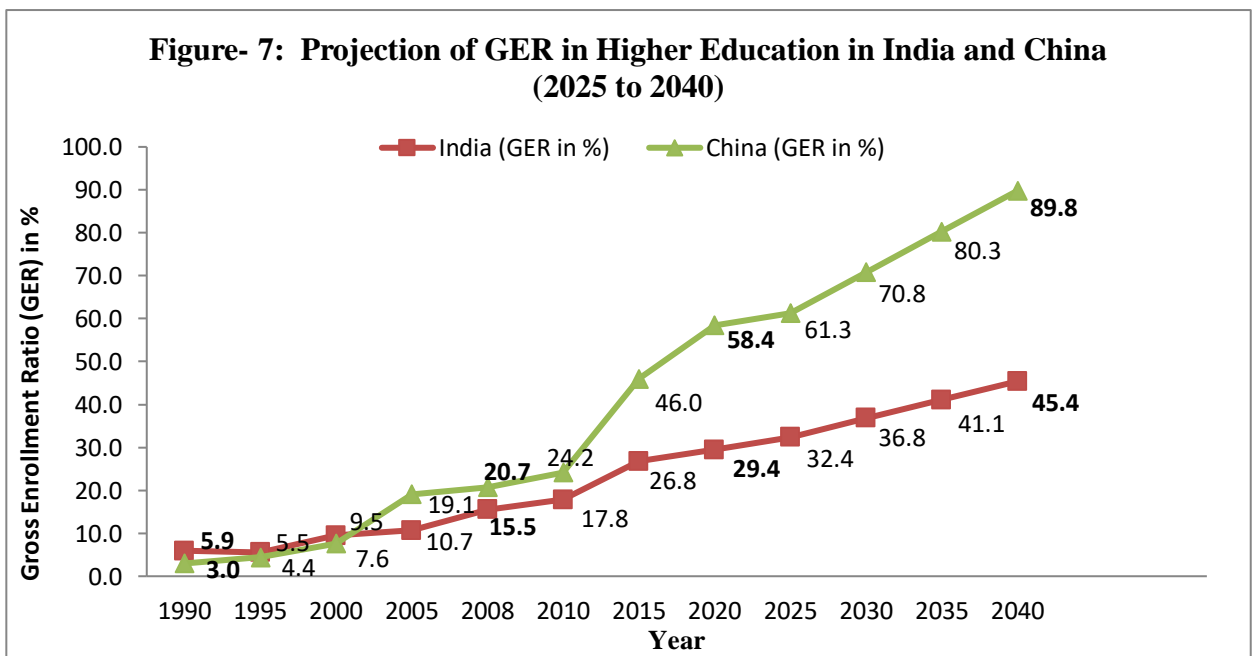
4.2. The Gross Enrollment Ratio in Higher Education:

Gross Enrolment Ratio (GER) in tertiary education is defined by the UNESCO as “The total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school year” (UNESCO 2009).

Accordingly, the Gross Enrolment Ratio (GER) in higher education in India is defined as the ratio of enrolment in higher education to the population in the eligible age group of 18-23 years. The Gross Enrolment Ratio (GER) in higher education in India increased from 3 per cent in 1990 to 29.4 % in 2020. This, in effect, means out of the

total population in the age group of 18-23 in India, only 29.4 % attended higher education in 2020.

According to Martin Trow’s classification of stages of development of higher education (Trow, 2006), a country is at an elite stage of higher education when the gross enrolment ratio (GER) is less than 15 %; at a stage of massification when the GER is between 15 and 50 % and at a stage of universalization when the GER reaches above 50 % mark. As per this definition, the higher education sector in India, with a GER of 29.4 % in 2020, is in its middle stages of massification. In India, access to higher education shifted from being a privilege in the elite phase to a right in the mass phase in the year 2008 when its Gross enrollment ratio (GER) crossed the 15 % mark. However, from the year 2008 to 2020, the ratio increased from 15.5 % to 29.4 %. India is still far away from an “obligation” in universal phase, when higher qualifications become mandatory for full and effective social engagement.



Data Source: UNESCO, UIS Statistics Data (accessed on 15.1.2022)

When we compare the GER data of India and China (**Figure-7**), it is seen that India's GER (5.9 %) was ahead that of China (3.0 %) in 1990. Further, when India entered into the stage of massification in 2008 with 15.5 % GER, the GER of China was little more (at 20.7 %) than that of India. However, thereafter, China has out spaced India in term of GER in higher education. Within period of 12 years from 2008 to 2020, China has entered into the stage of "Universalization" with registering a huge jump in its GER from 20.7 % in 2008 to 58.4 % in 2020. However, India has remained in the stage of "massification" during the same period of time with the increase in the ratio from 15.5 % in 2008 to 29.4 % in 2020.

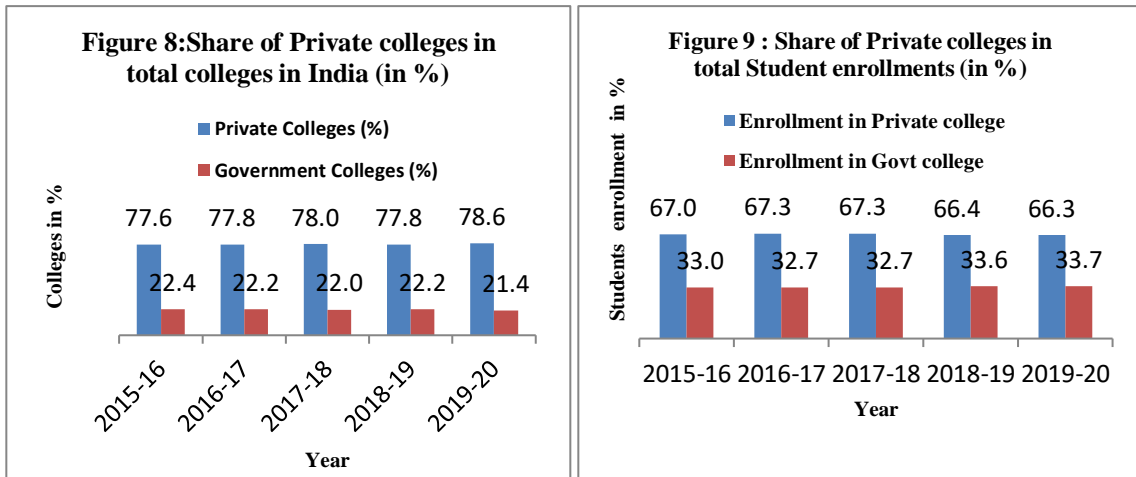
Further, when we see the projection (**Figure-7**), it seems that in next twenty years (2020- 2040) the GER of China would grow from 58.4 % in 2020 to 89.8 % in 2040 whereas the GER in case of India would increase from 29.4 % in 2020 to 45.4 % in 2040. From the projection it seems that India could not entire into the stage of "Universilasation" even in 2040.

India was in the stage of "Massification" since last twelve years and it would remain in this stage for at least next 20 years before it enters into the stage of "Universalization". According to Martin Trow (2006), the function of higher education in a 'mass system' is the transmission of skills and the preparation of the population for broader range of technical and economic elite roles whereas the function of higher education in a 'universal system' is about the adaption of whole population to social and technological change. There is now a dual challenge for India not only to increase the gross enrollment ratio rapidly but also to ensure quality education and providing of professional and technical skills to most of the students at the same time.

4.3. Role of Private Sector in Higher Education:

The expansion in higher education around the world has been driven by the private sector (Malik, Garima (2017)). India is no exceptional to this.

There were around 78 % colleges (in average) running in the private sector during the five year period of 2015-16 to 2019-20 (Figure-8 and 9). The share of private colleges was about four times that of Government colleges during this period of five years. While the average share of the private colleges in total colleges was around 78 %, the average share of private colleges in the total students' enrollments in colleges was about 70 % during this period of five years of 2015-16 to 2019-20. The average share of private colleges in the total students' enrollments was about more than two time that of share of Government colleges during this five year period.



Data Source: AISHE, Various Reports

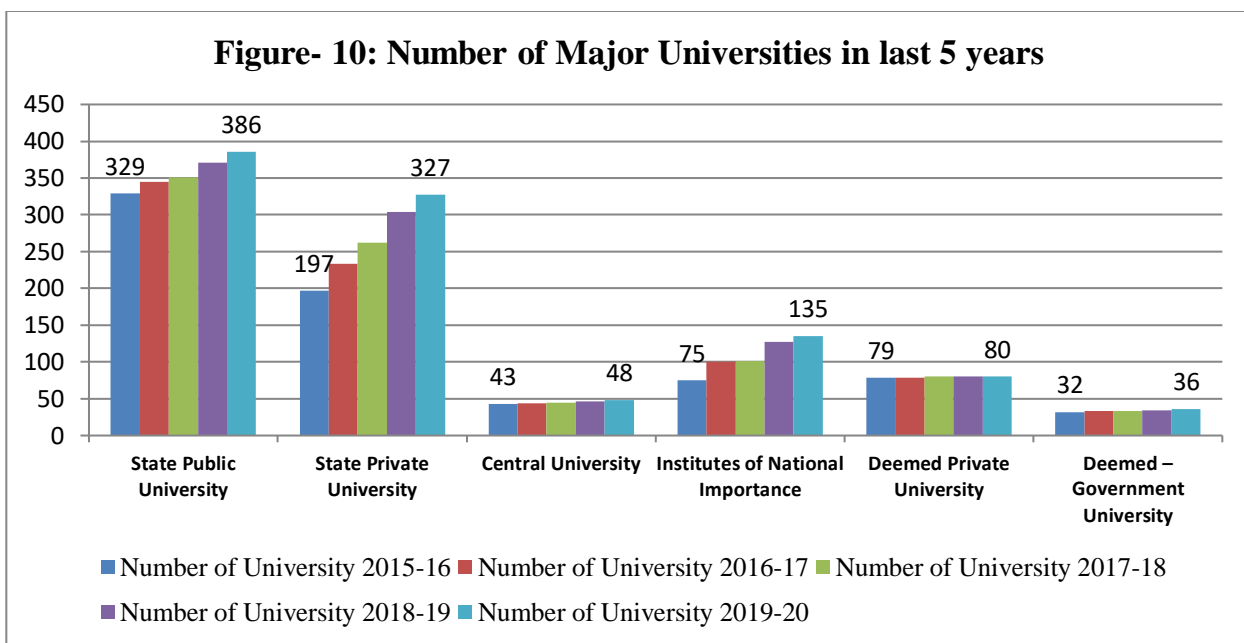
Further, out of 1012 universities (**Table-2**) in the country, there were 327 universities functioning in Private sector in 2019-20. The number of private university in

the country, which was zero in 1990-91, increased to 327 in 2019-20. Apart from the private universities, there are 80 deemed to be universities also running in the private sector in 2019-20. If we see the last five year data (2015-16 to 2019-20), it seems that the number of private universities in the countries has been increased faster than any other category of universities (**Figure-10**) over the period of time.

Table-2: Number of Major Universities in last 5 years						
Major University Type	Number of University					
	1990-91	2015-16	2016-17	2017-18	2018-19	2019-20
State Public University	137	329	345	351	371	386
State Private University	0	197	233	262	304	327
Central University	10	43	44	45	46	48
Institutes of National Importance	9	75	100	101	127	135
Deemed Private University	29	79	79	80	80	80
Deemed –Government University		32	33	33	34	36

Source: NIEPA (2005) and AISHE Report 2019-20. Figures are in actual basis.

The total number of universities registered in the AISHE was 1043 out of which 1012 responded during AISHE survey.



Source: AISHE Various Reports.

From the above analysis, it is clear that the share of private colleges and universities have been constantly increased in term of numbers as well as students' enrollments over the period of time. This rapidly increasing trend of private sectors though is a boon for the higher education sector, it would however become difficult to ensure quality education in absence of a high-quality enabling regulatory environment.

4.4. Research Penetration in Higher Education in India:

Another important issue with the higher education in India is that the student enrollments at Ph. D and Post Graduate Levels are constantly remained very low whereas the Under Graduate Programme is very popular among the students in last many years (Table-3). During 2019-20, out of 38.5 million total students' enrollment in higher education in India, 30.6 million students were enrolled in Under Graduate level whereas at Ph.D level and Post Graduate Levels, students enrollment were 0.2 million and 4.3

million respectively. The average percentage share of students' enrollment in Under Graduate level was 79 % during the five year period of 2015-16 to 2019-20 whereas during the same period of time the average percentage share of students' enrollment in Ph. D and Post Graduate Levels were only 0.4 % and 11.4 % respectively.

Table-3: Level-Wise Enrollment and its Compound Annual Growth Rate									
Student Enrollment									
Year	PhD	Mphil	Post Graduate	Under Graduate	PG Diploma	Diploma	Certificate	Integrated	Total
2015-16	126451 (0.4%)	42523 (0.1%)	3917156 (11.3%)	27420450 (79.3%)	229559 (0.7%)	2549160 (7.4%)	144060 (0.4%)	155422 (0.4%)	34584781 (100.0%)
2016-17	141037 (0.4%)	43267 (0.1%)	4007570 (11.2%)	28348197 (79.4%)	213051 (0.7%)	2612209 (7.3%)	166617 (0.5%)	173957 (0.5%)	35705905 (100.0%)
2017-18	161412 (0.4%)	34109 (0.1%)	4114310 (11.2%)	29016350 (79.2%)	235263 (0.7%)	2707934 (7.4%)	177223 (0.5%)	195777 (0.5%)	36642378 (100.0%)
2018-19	169170 (0.5%)	30692 (0.1%)	4042522 (10.8%)	29829075 (79.8%)	224711 (0.7%)	2699395 (7.2%)	162697 (0.4%)	241126 (0.6%)	37399388 (100.0%)
2019-20	202550 (0.5%)	23934 (0.1%)	4312535 (11.2%)	30647287 (79.5%)	217249 (0.7%)	2672562 (6.9%)	159869 (0.4%)	300373 (0.8%)	38536359 (100.0%)
CAGR	12.5	-14.4	2.4	2.8	-2.4	1.2	2.6	17.9	2.7
<i>Data Source: AISHE Report 2019-20</i>									
<i>Figure in parenthesis refers to per cent age share in total enrollments in that year.</i>									

Despite persistent low level of enrollments in Ph. D degree over the years, the main trends in enrolments to Ph. D research degree however revealed that the number of students opting to pursue Ph. D degree shows an increasing. The enrollments in Ph. D degree grew at an annual compound annual growth rate of 12.5 % over the last five year (2015-16 to 2019-20). However, in spite of that the persistence of low level of enrollment in Ph D degree could be due to the lack of necessary growth of students' enrollment in

M.Phil and Post Graduate degree over the years. As per the data at table -2 above, while the enrollments in Post Graduate degree grew at a modest annual compound growth rate of 2.8 %, the growth of students' enrollment in M.Phil grew at a negative annual compound growth rate of (-) 14.4 % over the period of five years (2015-16 to 2019-20).

Further, though the average student enrollments in Under Graduate level was estimated at 29 million during the last five years (2015-16 to 2019-20), the average student enrollments in Post Graduation and Ph. D were estimated at 4 and 0.16 million respectively during the same period of five years.

From the above analysis, it seems that this clearly indicates that there are some serious issues in transition from graduate level to post graduate to Ph. D Level. Further, the students' enrollment in Ph. D degree could not be increased substantially without a good growth in students enrollments in Post Graduations/ M.Phil degree levels as these two degrees are essential for enrollments in Ph. D research degree in India.

4.5. Findings and Conclusion:

From the above analysis, followings are the major findings:

(i) The number of higher education institutions and students enrollment in India has been increased very significantly during last two decade (2000 to 2020), however, the growth in institutions has not matched the growth in demand for higher education. During 2000 to 2020, while the number of universities grew at a compound growth rate of 8.0%, the number of colleges grew at a compound growth rate of 7.7%. In the same period of time, the total student enrollments in higher education in India grew at a compound annual growth rate of 8.6%.

(ii) Further, the total student enrollments in higher education are expected to increase from 38.5 million in 2020 (2019-20) to 58 million in 2035 (2034-35) and 64.3 million in 2040 (2039-40) thereby adding about 51% and 67% more students by 2035 and 2040 respectively. This expected high demand for higher education in future would put huge pressure on the higher education infrastructure of the country.

(iii) While, the male enrollments in higher education grew at a compound annual growth rate of 2.6% during the last decade (2010-11 to 2019-20), the female enrollment was however grew impressively at a compound annual growth rate of 6.0% in the same period of time. Further, from the year 2019-20, while the number of male student enrollments is expected to increase by 37% and 49 % in 2035 and 2040 respectively, whereas the female student enrollments are expected to increase by 65% and 86% in 2035 and 2040 respectively.

(iv) Furthermore, while the share of male in the total enrollment in higher education decreased in last decade (2011 to 2020), the share of the female in the total enrollment however increased during the same period of time. If the same trend continues, then it is expected that the share of female in the total enrollment will be more than the share of male in total enrollment by 2025. The female and male share in total enrollment will be 51% and 49% respectively in 2025. Thereafter, the share of female enrollment would continue to be more than male enrollment. The share of female and male would be 54% and 46% in 2035 respectively and 55% and 45% in 2040 respectively. With this change, it seems that the female students would now play a critical role in shaping the growth and structure of higher education sector of India in coming years.

(vi) India is in the stage of massification (GER between 15 and 50 %) since last twelve years (2008 to 2020) and is expected to remain in this stage for at least next 20 years before it enters into the stage of universalization (GER above 50 % mark). Since the function of higher education in a 'mass system' is the transmission of skills and the preparation of the population for broader range of technical and economic elite roles and the function of higher education in a 'universal system' is about the adaption of whole population to social and technological change, there is now a dual challenge for India not only to increase the gross enrollment ratio rapidly but also to ensure quality education and providing of professional and technical skills to most of the students at the same time.

(vii) The expansion in higher education in India are driven by the private sector. The share of private colleges and universities has been constantly increased in term of numbers as well as students' enrollments over the period of time. This rapidly increasing trend of private sectors though is a boon for the higher education sector, it would however become difficult to ensure quality education in absence of a high-quality enabling regulatory environment.

(ix) The research penetration in higher education in India is very low as there has been a persistent low level of enrollments in Ph. D degree over the years. This low level of enrollments in Ph. D is mostly due to decrease in popularity of Post Graduate and M.Phil programme in India. The students' enrollment in Ph. D degree could not be increased substantially without a good growth in students enrollments in Post Graduations/ M.Phil degree levels as these two degrees are essential for enrollments in

Ph. D research degree in India. However, there appears a serious issue in transition from graduate level to post graduate to Ph. D Level.

Since there is now a provision to scrap the M.Phil. programme under New Education Policy(NEP), 2020 (NEP,2020), therefore, focus should be given to increase the student enrollments in Master Programme significantly by developing targeted policies and programs to address the recent issues of decreasing popularity of this programme. Though, there is a provision in NEP, 2020 that a student with 4-year Bachelor's degree with Research can also undertake a Ph.D., it however cannot help much in improving the Ph. D research in India without any targeted policies and strategy since at recent times Indian degree programs are mostly three years in length.

Chapter-5

Overview of the New (IoE) Policy, 2017 and its Effectiveness on Indian Public Higher Education Institutions (IoEs)

5.1. Introduction:

With the growth of competition between nations in our knowledge-based economy, the creation of competitive research universities is becoming a national agenda in developing as well as developed countries (Altbach 2007). As a result, policymakers in many countries have prioritized building research universities that would help their countries obtain a superior position in the global competition.

India, which contributes a significant share of students and faculty in the world's leading universities, does not itself have any representation among the top-tier of global universities. Whenever a reputed international ranking agency releases its ranking of educational institutions any year, the general reaction is one of dismay at Indian institutions not finding place in the list of top institutions of the world or even of Asia. There is a pressing need for the Government to provide a suitable environment to promote the growth of Indian higher educational institutions, as globally renowned centres of excellence.

In view of the above background, the Hon'ble Finance Minister in his budget speech 2016 announced the following: *“It is our commitment to empower Higher Educational Institutions to help them become world class teaching and research institutions. An enabling regulatory architecture will be provided to ten public and ten private institutions to emerge as world-class Teaching and Research Institutions. This will enhance affordable access to high quality education for ordinary Indians.”*

In order to achieve the above objective of the Budget announcement, a new Institution of Eminence (IoE) policy was introduced in India under which a new regulatory architecture was introduced in the form of **UGC (Declaration of Government Institutions as Institutions of Eminence) Guidelines, 2017** for public institutions and **UGC (Institutions of Eminence Deemed to be Universities) Regulations, 2017** for private institutions. Under this new regulatory architecture, greater academic, administrative and financial autonomy are provided to the higher education institutions selected under this scheme so that they could choose their own path to become world-class institutions.

5.2. Salient features of the Regulatory Architecture:

According to the UGC (Institutions of Eminence) Regulations, 2017, the existing institutions of global repute, which figures at the top in all reputed ranking frameworks, have the following notable features: (i) Highly qualified faculty, with freedom to hire from across the world; (ii) Existence of academic, administrative and financial autonomy;(iii) Excellence in research;(iv) High Quality of teaching;(v) High levels of

funding; (vi) Adequate financial assistance to meritorious students to support a need-blind admissions process; Selection of students through a transparent system so as to ensure intake of meritorious students; (vii) A significant proportion of international students; (viii) Autonomous governance structures;(ix) Well equipped facilities for teaching, research, administration, and Student life; (x) Tangible and intangible contribution to the society; and (xi) Ability to leverage alumni and alternative funding sources, and the autonomy to utilize these resources.

In view of the above notable features of the existing institutions of global repute, the new regulatory architecture has provided the following freedoms and benefits to the IoEs for becoming global universities:

- (i) Freedom to have own transparent merit based system for admission of students
- (ii) Freedom to admit additionally foreign students on merit subject to a maximum of the strength of the admitted domestic students
- (iii) Freedom to fix and charge fees from foreign students without restriction
- (iv) Freedom to determine the domestic students fees, subject to the condition that no student who gets selected admission is turned away for lack of finance. Every institute to encourage scholarships and extension of loans facility
- (v) Freedom to recruit faculty from outside India (a limit of 25% of its faculty strength for public institutions
- (vi) Freedom to offer courses within a programme as well as to offer degrees in new areas, including interdisciplinary one after confirming the minimum prevailing standards.

- (vii) Freedom to have the flexibility of course structure in terms of number of credit hours and years to take degree after confirming the minimum prevailing standards.
- (viii) Flexibility in fixing of curriculum and syllabus, with no UGC mandated curriculum structure.
- (ix) Freedom to offer on-line courses as part of their programmes with a restriction that no more than 20% of the programme should be in online mode.
- (x) Freedom to hire personnel from industry etc, as faculty who, through being expert in their areas, may not have the requisite higher academic qualifications.
- (xi) Freedom to enter academic collaborations with other institutions within the country and with leading global universities figuring in the most reputed global rankings.
- (xii) The selected institutions will have complete financial autonomy to spend their resources raised and allocated.
- (xiii) Government institutions selected as IoEs to get additional funding upto Rupees 1000 Crore over a period of five years.
- (xiv) Students enrollment capacity to be 10000 in 15 years of their declaration as IoEs
- (xv) Faculty to student ratio should be 1:20 at the time of declaration as IoE and should increase to 1:10 in next five years
- (xvi) UGC inspection shall not apply to any selected IoEs.

The new policy attempts to provide a more liberal and less intrusive regulatory regime in term of for the ten public and ten private institutions selected as Institutions of Eminence (IoEs) and enable them to become world class teaching and research institutions by securing a rank in top hundred institutions in the world overtime.

5.3. Strategy of India for Building World-class Universities:

According to Salmi (2009, p. 39), there are three strategies for building a World Class University (WCU), which can be used either individually or in combination. First, governments can upgrade a small number of existing institutions with potential to excel (picking winners). Second, they can merge existing institutions to create a single WCU, through a synergistic effect (hybrid formula). Third, they can create a new WCU from scratch (clean-slate approach). The new policy initiatives (IoE Scheme) launched by the India Government in 2017 has adopted the first and the third strategy for building world class universities. The new policy attempts to set up /upgrade of ten public and ten private institutions as world class teaching and research institutions called as “Institutions of Eminence (IoEs)”. In private category, attempts are also made to create new WCU from scratch by selecting some institutions under green field category.

Till December 2021, eight (08) institutions in public category and three (03) institutions in private category have been declared as IoEs for becoming world - class institutions (Table-4). In public category, while three (03) institutions [Indian Institute of

Technology (IIT), Delhi, Indian Institute of Technology (IIT), Bombay and Indian Institute of Science (IISc), Bangalore] were declared as IoEs in 2018, the other five (05) institutions [Indian Institute of Technology (IIT), Madras, Indian Institute of Technology (IIT), Kharagpur, University of Hyderabad, Banaras Hindu University, and University of Delhi] were declared much latter in 2020. In case of private category, so far only three (03) institutions [Manipal Academy of Higher Education, Karnataka, Birla Institute of Technology, Rajasthan and O.P. Jindal Global University, Haryana] are declared as IoEs in 2021.

Table-4 : List of IoE Institutions as on 31.01.2021

Public Institutions		
Name of the Institutions	Year of declaration as IoEs	Remarks
IIT Delhi	2018	Spent three years under the New (IoE) policy.
IISc Bangalore	2018	
IIT Bombay	2018	
University of Hyderabad	2020	Spent only one year under the New (IoE) policy.
IIT Madras	2020	
Banaras Hindu University	2020	
IIT Kharagpur	2020	
University of Delhi	2020	
Private Institutions		
Manipal Academy of Higher Education, Karnataka	2021	Spent even less than a year under the New (IoE) policy.
Birla Institute of Technology, Rajasthan	2021	
O.P. Jindal Global University, Haryana	2021	

Source: Ministry of Education, Government of India at Website: <https://www.education.gov.in/en>

According to Altbach (2015) World class University (WCU) is a “Top rank university based on excellence in research, academic freedom, a sense of intellectual

excitement, governance (the academic community has control over the central elements of academic life), adequate facilities, and adequate funding.” Under the new policy (IoE scheme), the selected IoEs are provided autonomy in term of their academic plan, faculty recruitment plan, students’ admission plan, research plan, networking plan, infrastructure development plan, finance plan, administrative plan and governance plan. Apart from this, there is a provision of providing a grant of Rupees 1000 Crore to the public selected IoEs each over a period of five year from their declaration. However, the question is whether the selected IoEs are improving in their ranking in global competition after getting such autonomy and funding?

The present study attempts to answer the above question by analyzing the effectiveness of the New Policy on IoEs in term of global ranking competition. In the present study, those institutions which have been declared as IoEs in 2020 and 2021 (Table-4) respectively could not be considered for analyzing the effectiveness of the new Policy since they have not spent even one year under the new regime of policy changes. Therefore, the effectiveness of the new policy on Indian Higher Education Institutions (IoEs) in the context of global ranking competition would only focus on three public institutions (IIT, Delhi, IIT, Bombay and IISc, Bangalore) which were declared as IoEs in 2018 and have spent considerable time period of three years under the new regime of policy changes.

5.4. Effectiveness of the New (IoE) Policy on the Indian Higher Education Institutions (IoEs):

The effectiveness of the new policy, 2017 in creating world class universities are analyzed by observing the changing rankings of the selected IoEs (IIT, Delhi, IIT, Bombay and IISc, Bangalore) in the global ranking table.

There are three major international rankings: (i) the Academic Ranking for World Universities (ARWU) (ii) The QS World University Rankings, produced by Quacquarelli Symonds Ltd (QS) and (iii) The THE World University Rankings, produced by Times Higher Education (THE):

(i) The Academic Ranking for World Universities (ARWU):

The first world known university ranking is the Academic Ranking for World Universities (ARWU), also known as Shanghai University Ranking. It started in the year 2003; was compiled by the Centre for World-Class Universities at Shanghai Jiao Tong University; financially supported by the Chinese government; and operated by the Shanghai Ranking Consultancy. This ranking (Shanghai Ranking, 2021) uses six important indicators to rank universities globally that are:

1. Staff awards winning Nobel prizes in their respective areas – 20 %;
2. Highly cited researchers – 20 %;
3. Research papers published in reputed journals like Nature and Science – 20 %;

4. Papers indexed in science index-expanded and social science citation index – 20 %;
5. Quality of education (alumni winning Nobel prizes or medals) – 10 %; and
6. Per capita performance of an institution – 10 %.

(ii) The QS World University Rankings:

The QS world university ranking (QS Top universities 2022) has the following six indicators with different weightings:

1. Academic Reputation (worth 40 % of the overall ranking score)
2. Employer Reputation (10 %)
3. Citation per faculty (20 %)
4. Faculty- Student ratio (20 %)
5. International students Ratio (5 %)
6. International faculty ratio (5 %)

The universities are ranked based on the Overall which is a sum of the weighted indicator scores. The first two indicators are based on opinion surveys the data of which is understandably fallible as social measures. The remaining four indicators are based on actual counting and are most trusted. While Citation per Faculty Member is a bona fide academic indicator, Faculty-Student Ratio is used as a proxy measure of teaching quality although it is an administrative measure. If the first, third, and fourth indicators were

taken to be academic indicators, QS ranking then has assigned 80 % of the overall score for academic excellence.

(iii) THE World University Rankings Ranking:

The Times Higher Education (THE) World Universities Ranking (THE Rankings, 2022) has the following five indicators with different weightings:

1. Teaching: The learning environment (worth 30 % of the overall ranking score)
2. Research: Volume, income and reputation (worth 30 %)
3. Citations: Research influence (worth 30 %)
4. Industry Income: Innovation (worth 2.5 %)
5. International Outlook: Staff, students and research (worth 7.5 %).

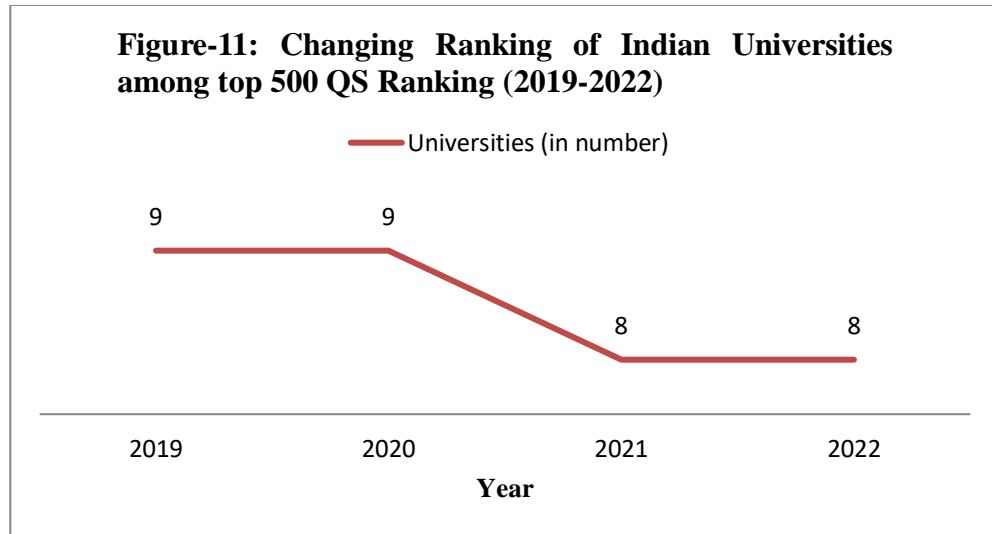
In comparison with QS World University Rankings , THE ranking weights slightly more toward academic excellence, if the first three indicators are taken together, having 90 % of the overall score, compared with the 80 % QS ranking.

The present study uses the QS ranking instead of THE ranking since the selected sample IoEs (IIT, Delhi and IIT, Bombay) are not participating in the THE ranking since the year 2020. It could not be possible to analyze the effectiveness of the New Policy in absence of THE Ranking data for these three IoEs. Further, Academic Ranking for World Universities (ARWU) gives more weight age to the universities that has Nobel Laureates (20 %), fields' medalist (10 percent) and paper published in nature and science (20 %). That's the reason why no university of India is getting individual ranking in ARWU. As

per the latest data released by ARWU for the year 2021, only IISc Bangalore got a rank in a band of 401 – 500. IIT Delhi was ranked in a band of 701- 800 whereas IIT Bombay was not even listed in the ARWU Ranking for top 10 Indian institute in 2021. It would not be possible to analyze the effectiveness of New Policy of IoE where there is no individual ranking of the universities. Therefore, in view of the above, the present study adopts QS Ranking for analyzing the effectiveness of the new policy.

5.4.1. Performance of India’s Universities in Global Ranking:

With respect to the outcomes and effects, firstly as indicated in Figure below, there has been a quick fall of Indian universities at the QS Ranking since 2020. The total number of Indian universities which were listed among top 500 in 2019 was nine, has now decreased to eight in 2021 and 2022 (**Figure-11**) of which one of the most noticeable change is that the number of Indian universities in top 500 QS Ranking has been surprisingly decreased after the selection /declaration of institutions for becoming global universities under the new regime of policy change in 2017. Further, all the institutions figured among the top 500 QS global ranking during 2019 – 2021 were public institutions.

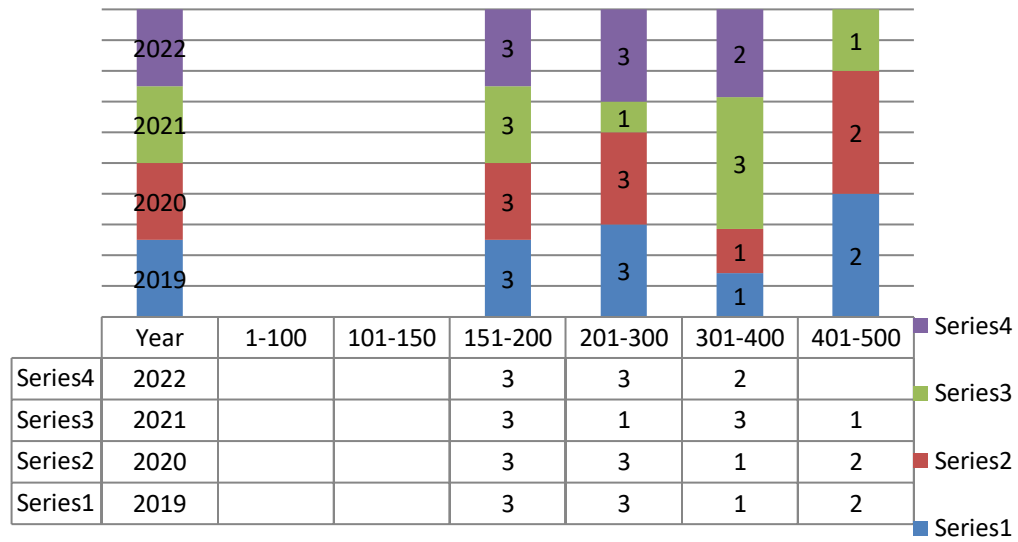


Source: QS ranking, <https://www.topuniversities.com/>

In QS ranking, the years 2019 denotes for 2018-19, 2020 for 2019-20 and so on.

Figure- 12 shows that there was not only a decrease of numbers of universities among top 500, but also the growth in the numbers of Indian universities which were listed among top 301-400 and 401-500 were also decreased. While the growth in the numbers of Indian universities which were listed among top 151-200 and 201-300 were more or less constant, however, there was no university listed among top 100 and 101-150 in the period of 2019 to 2022.

Figure- 12 : Indian Universities among 1-500 QS Ranking (2019-2022)



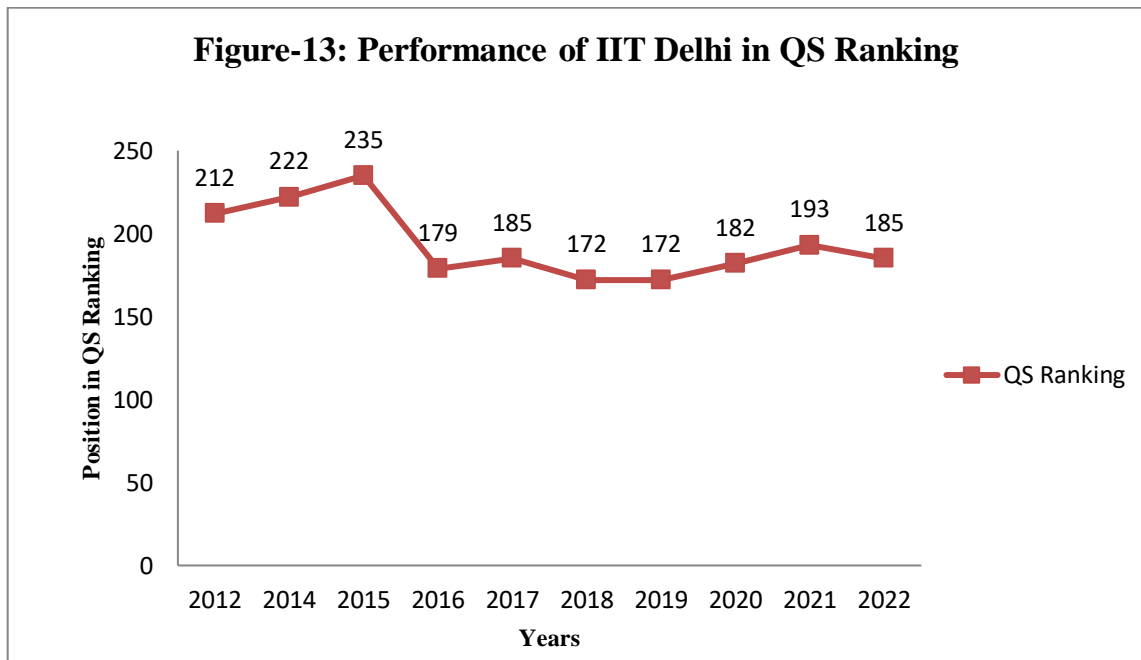
Source:QS Ranking at www.topuniversities.com

5.4.2. Comparison of the global rankings of the three public IoEs:

The New policy of IoEs was introduced in 2017. However, the three public institutions viz. IIT, Delhi, IIT, Bombay and IISc, Bangalore were declared as IoEs in 2018 at the time of which the QS rankings 2019 (2018-19) was available. Therefore, the reference year for the introduction of New (IoE) Policy, 2017 is treated as 2019. The attempts are made to analyze the effectiveness of the new policy 2017 by comparing the global rankings of these three public IoEs before and after 2019.

IIT Delhi:

IIT Delhi was declared as IoEs in 2018. At the time of declaration, it stood at 172nd position in QS global ranking of 2019. However, its rank fell down to 182 in the year 2020 and 193 in 2021. In this period of two years of 2020 and 2021, the institute's rank slipped by 21 position. Further, if we compare last three years data (2020 to 2022) with the data of 2019, it is found that the rank of the institute in the QS ranking table slipped by 13 position from 2019 to 2022 (Figure-13).



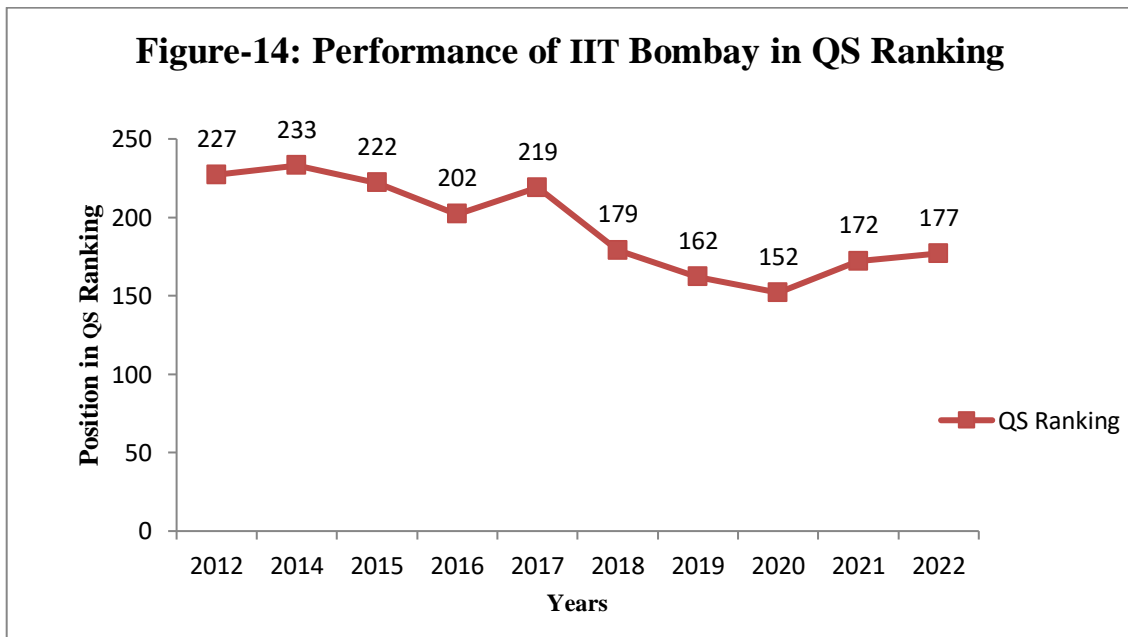
Source: Source: QS ranking, <https://www.topuniversities.com/>

Further, when compared the three years average rank held by the institute before and after its declaration as IoE, it is found that the average rank held by the institute in 2016 to 2018 was 179 whereas the average rank held by the institute in 2020 to 2022 was

187. It is evident from the above graph that the rank secured by the institute before it was declared as IoE was much better than the rank secured by it after its declaration as IoE.

IIT, Bombay:

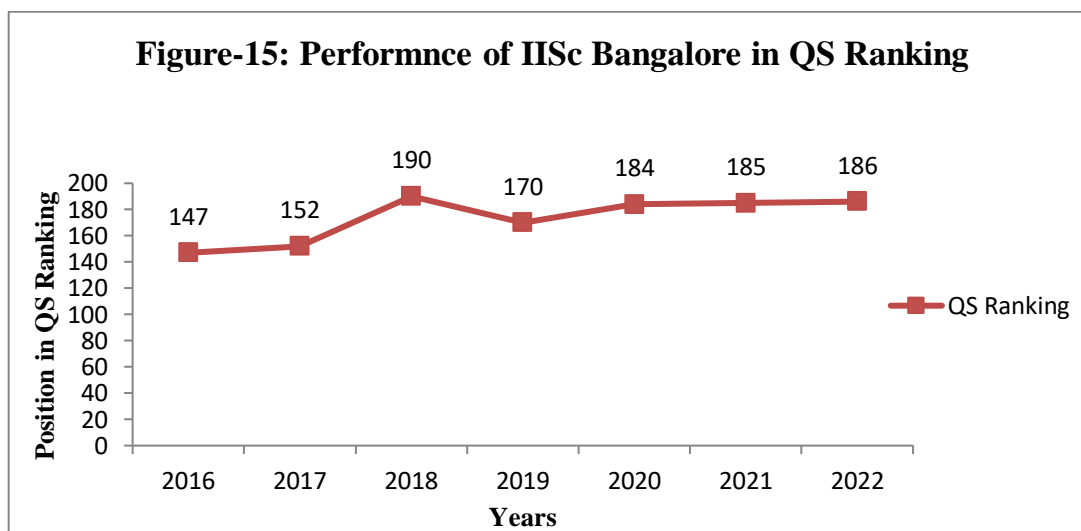
IIT Bombay was declared as IoEs in 2018. At the time of declaration, it stood at 162nd rank in QS global ranking of 2019. Then, its ranking though improved to 152nd rank in 2020, it however fell down to 172nd and 177th rank in the year 2021 and 2022 respectively. In this period of two years of 2020 to 2022, the institute's rank slipped by 27 position. If we compare last three years data (2020 to 2022) with the data of 2019, it is found that the rank of the institute in the QS ranking table slipped by 15 position from 2019 to 2022 (Figure-14).



Source: Source: QS ranking, <https://www.topuniversities.com/>

Indian Institute of Science (IISc), Bangalore:

Indian Institute of Science (IISc), Bangalore was declared as IoEs in 2018. At the time of declaration, it stood at 170th rank in QS global ranking of 2019. However, after that, its ranking continuously fell down for the years 2020, 2021 and 2022. From 170th rank in 2019, it fell down to 184th rank in 2020, 185th rank in 2021 and 186th rank in 2022. If we compare last three years data (2020 to 2022) with the data of 2019, it is found that the rank of the institute in the QS ranking table slipped by 16 position from 2019 to 2022 (Figure-15).

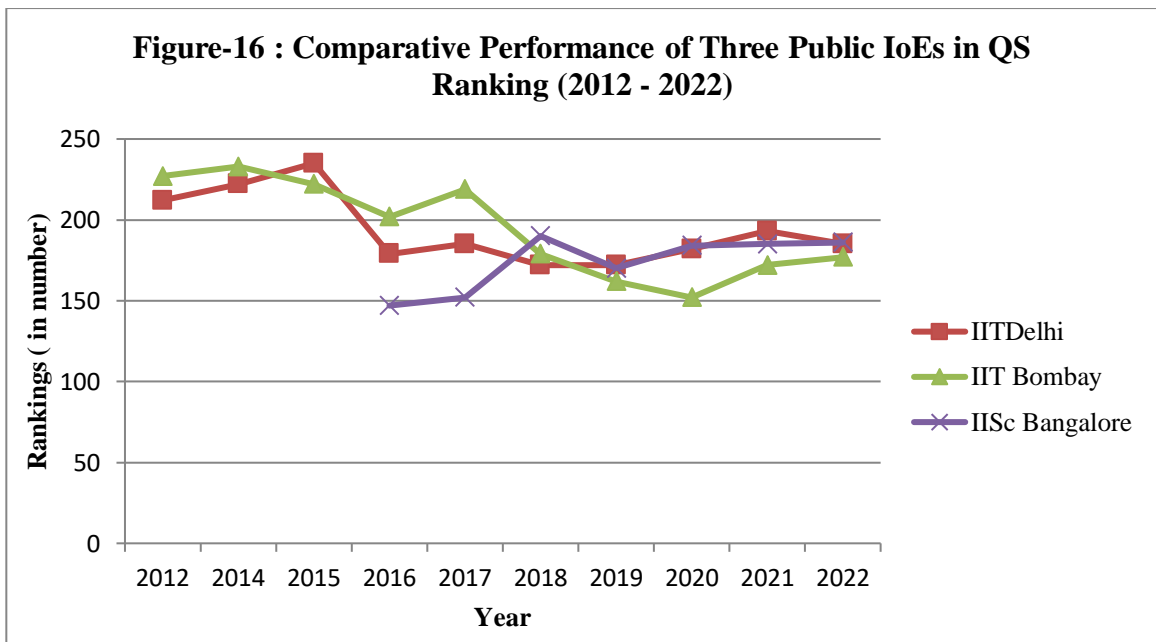


Source: QS ranking, <https://www.topuniversities.com/>

Further, if we compare the three years average rank held by the institute before and after its declaration as IoE, it is found that the average rank held by the institute in 2016 to 2018 was 163 whereas the average rank held by the institute in 2020 to 2022 was

185. It is evident from the above graph that the rank secured by the institute before it was declared as IoE was much better than the rank secured by it after its declaration as IoE.

The comparative performance of these three public IoEs in QS rankings is given at Figure-16. From the graph below, it is evident that the rank secured (in 2019) by the all three IoEs when they were declared as IoE was much better than the rank secured (between 2020 to 2022) by them after their declaration as IoEs.



Source: QS ranking, <https://www.topuniversities.com/>

5.4.3. Performance of the Institutions in term of Overall score in QS Ranking:

It is observed from the Table -5 and Figure-17 that post to their declaration as IoE in 2018, these three IoEs (IIT Delhi, IIT, Bombay and IISc Bangalore) have not only failed in term of ranking but also failed in term of improving their overall scores in the QS

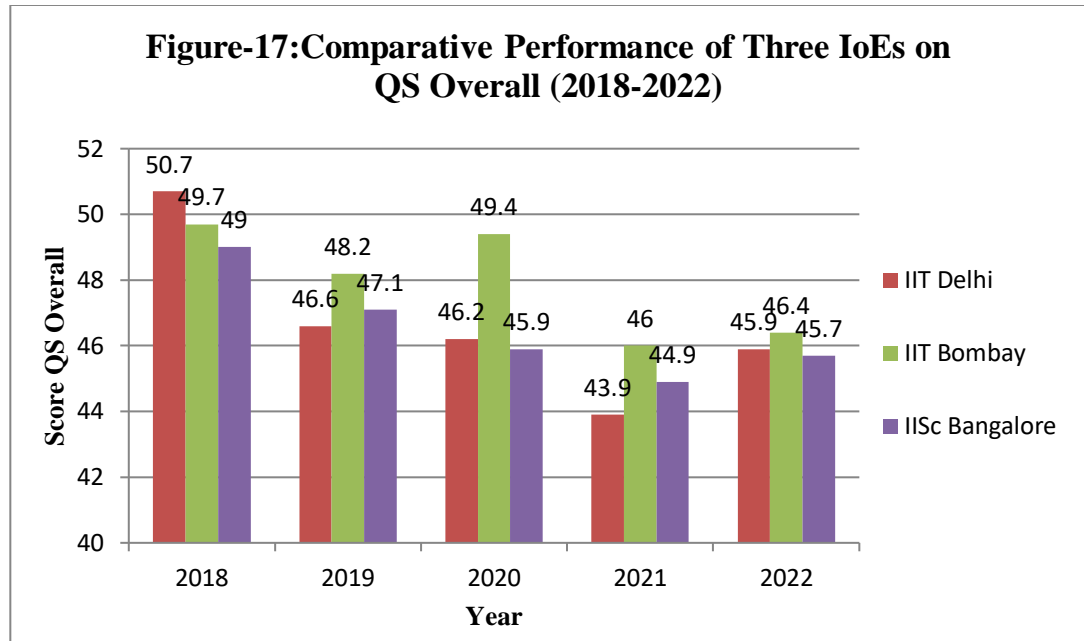
Ranking league table as well. While the overall score of the IIT Delhi at the time of declaration as IoE was 46.6 in 2019. It however decreased to 45.9 in 2022. Similarly, the overall score of IIT Bombay which was 48.2 in 2019 decreased to 46.4 in 2022. The overall score of IISc, Bangalore decreased from 47.1 in 2019 to 45.7 in 2022. It is further observed that before these three institutes were declared as IoE, their overall score in QS Ranking table 2018 were 50.7 (for IIT Delhi), 49.7 (IIT Bombay) and 49 (IISc Bangalore). However, even after the three years of their declaration as IoE, the overall score of all of these three institutes in none of the year 2020, 2021 and 2022 could able to surpass the overall score achieved by these institutes in 2018.

Table-5: Performance of Three IoEs on QS Overall (2018-2022)

Year	IIT, Delhi	IIT, Bombay	IISc, Bangalore
2018	50.7	49.7	49
2019	46.6	48.2	47.1
2020	46.2	49.4	45.9
2021	43.9	46.0	44.9
2022	45.9	46.4	45.7

Note: The Score achieved by the institute is out of 100.

Source: QS ranking, <https://www.topuniversities.com/>



Source: QS ranking, <https://www.topuniversities.com/>

From the above analysis, it is evident that the new IoE policy for building world class universities seems to be least effective since the institutes which were declared as IoE for becoming world class universities have failed to improve in their ranking as well as in overall score in the global ranking league table thus far.

Chapter- 6

Benchmarking Higher Education Institutions in India

6.1. Introduction:

The concept of quality in higher education has been drawing the attention of all the interested parties in this particular sector during the last few decades. Since quality improvement has been one of the most important features of higher education institutions, it is of equal importance to understand the role of benchmarking as a means to continually improving and staying competitive. Universities around the world embrace the concept of benchmarking and develop transformational methods and practices to improve their organizations.

In this Chapter, attempts are made to find out where the Indian institutions (three IoEs) stand with reference to the best institutions in that category so that it can improve its performance and grading to reach the global standard. The comparison has been done based on the overall as well as six indicators of QS Ranking.

6.2. Performance of IoEs on Overall and Various Indicators of QS Ranking 2022

The QS world university ranking (QS Top universities 2022) has the following six indicators with different weightings:

(i) Academic Reputation (40%): Based on a global survey of academics, who are asked to identify the leading institutions in their field.

(ii) Employer Reputation (10%): Based on a global survey of graduate employers, who are asked to identify the institutions producing the best graduates in their sector.

(iii) Faculty- Student Ratio (20%): An indication of commitment to high-quality teaching and support

(iv) Citation for Faculty (20%): This is normalized by subject area, and reflects the impact of an institution's research

(v) International faculty Ratio (5%): A measure of an institution's success in attracting faculty from overseas.

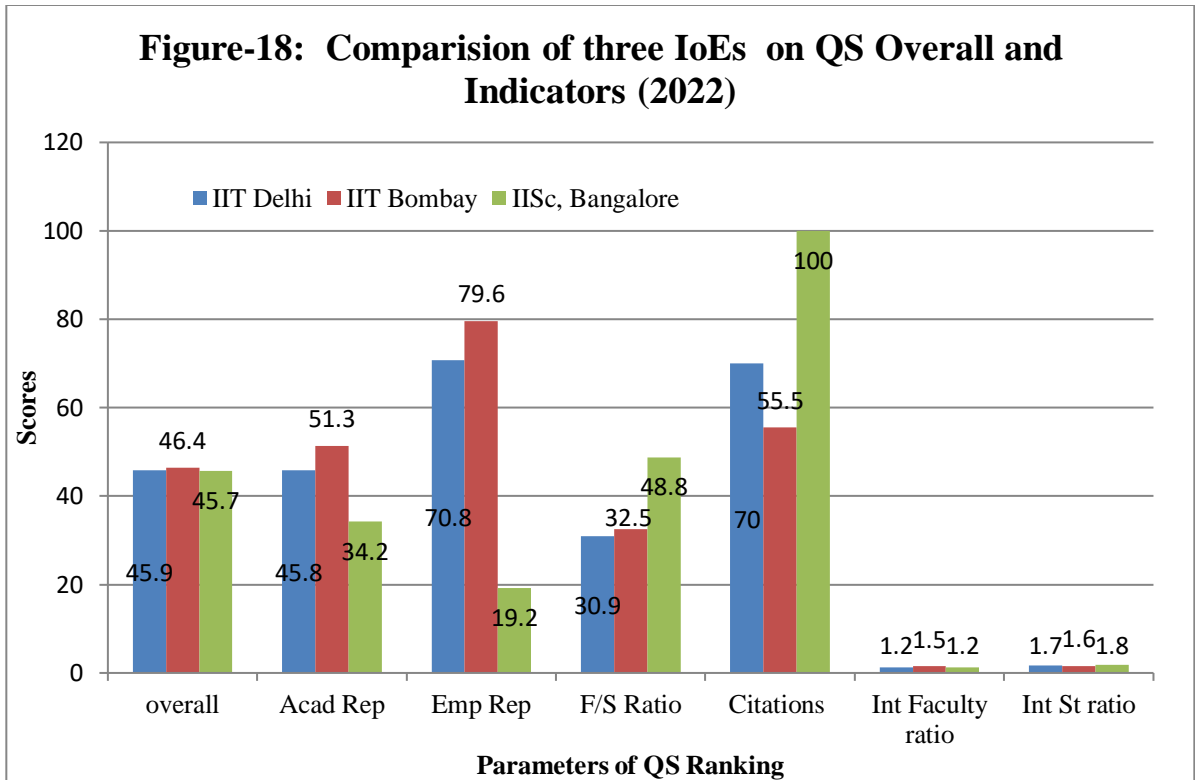
(vi) International Student Ratio (5%): A measure of an institution's success in attracting students from overseas.

The first two indicators are based on opinion surveys the data of which is understandably fallible as social measures. The remaining four indicators are based on actual counting and are most trusted. While Citation per Faculty Member is a bona fide academic indicator, Faculty- student Ratio is used as a proxy measure of teaching quality although it is an administrative measure. The faculty student ratio indicator measures the learning and teaching environment of the university. This is a simple measure, dividing the number of students by the number of faculty staff. The more academic staff that are available per student, the more we may assume that an institution has adequately funded and resourced their teaching commitments. If the first, third, and fourth indicators were

taken to be academic indicators, QS ranking then has assigned 80 % of the overall score for academic excellence.

The three IoEs (IIT, Bombay, IIT, Delhi and IISc, Bangalore) stood at 177th, 185th, and 186th in QS Ranking 2022 respectively. Their performance on Overall and indicators is given in the Figure-18. In the QS Ranking 2022, though there is no significant difference in their score on Overalls, however, their scores differ at the indicators level.

In Academic Reputation and Employer Reputation indicators, IIT Bombay did well followed by IIT Delhi and IISc Bangalore. While it scored highest points of 51.3 in Academic Reputation and 79.6 points in Employer Reputation, IIT Delhi scored 45.8 and 70.8 points in these two indicators respectively. IISc Bangalore however scored lowest points of 34.2 and 19.2 in these two indicators. In Citation indicator, the IISc Bangalore did extremely well and got maximum score of 100 while IIT Delhi scored 70 points on this indicator. However, IIT Bombay got only 55.5 points on the Citation indicator.



Note: Acad Rep: Academic Reputation, Emp Rep: Employer Reputation, F/S: Faculty Students Ratio, Int Faculty Ratio: International Faculty Ratio and Int St ratio: International Students ratio. Source: <https://www.topuniversities.com/>

In Faculty Student ratio indicator, IISc Bangalore did well compared to other two IoEs. While it got 48.8 points on this indicator, however, other two IoEs i.e. IIT, Delhi and Bombay got more or less same points of 30.9 and 32.5 respectively.

In International Faculty ratio and International Students ratio indicators, all three IoEs got very low points between one and two.

6.3. Comparison of IoEs and Select Top Universities on Overall and Various Indicators of QS Ranking 2022

In the foregoing section, the performance of three IoEs in term of Ranking, Overall and various indicators of QS Ranking 2022 was explained in details. The main objective of the New Policy of IoE is to bring the selected IoEs within 100 rank overtime. Therefore, it is necessary to know how these three IoEs are doing in term of performance vis-à-vis the top universities within 100 ranks. Attempt is made to find out where the Indian institutions (IoEs) stand with reference to the best institutions in that category so that it can improve its performance and grading.

Table-6 shows the overall and rankings of three IoEs (IIT, Delhi, IIT, Bombay and IISc, Bangalore) vis-à-vis top three (1 to 3) universities and the universities placed at 48 to 50th ranks and 98 to 100th rank in QS global university ranking, 2022.

The three IoEs (IIT, Bombay, IIT, Delhi, and IISc, Bangalore), with their Overall scores of 46.4, 45.9 and 45.7, stood at 177th, 185th and 186th in QS Ranking 2022 respectively. In QS ranking 2022, though IIT Bombay stood eight positions ahead of IIT Delhi and nine positions ahead of IISc Bangalore, however, there was no much difference in their overall score. The difference varies between 0.5 to 0.7 points only. QS Ranking, like other university ranking system, has capitalized on spurious precision and creates an erroneous impression of being highly precise (Soh 2013). Due to such spurious precision, the miniscule difference has no substantive or practical significance. The fact is, for the top 200 universities, 96% of them differ by 1.0 or less on Overall from their immediately

higher or lower university. The miniscule difference of 0.5 to 0.7 between these three IoEs is best ignored and, in spite of seeming differences, they should be therefore seen as on par. Similarly, between the universities within the Category A, B and C institutions, there is miniscule difference in their overalls. Therefore, their minuscule difference is best ignored and the universities within the same category should be treated as on par.

The Table-6 further shows that for any university to be placed in top one to three ranks in QS Ranking, its minimum score should be at least 99.4 on Overall. For getting place in 48 to 50th rank and 98 to 100th ranks, any university should have at least 75.8 and 59.9 score on Overall respectively. However, the mean score of the three IoEs (IIT, Delhi, IIT, Bombay and IISc, Bangalore) on Overall was 46.0 and they stood at 185th, 177th and 186th in QS Ranking 2022 respectively. The mean overall score of the three IoEs (Category D) was lowered by a larger difference of 53.4 points from the top one to three universities (Category A) and 29.8 points from 48 to 50th ranked (Category B) whereas it was lowered by 13.9 points from 98 to 100th ranked (Category C) universities. It is evident that the three IoEs (Category D), the top one to three universities (Category A) , 48 to 50th ranked (Category B) and 98 to 100th ranked (Category C) universities span over a very wide range in overall score. This wide variation in overall score indicates that the three IoEs need to improve very significantly in term of various indicators of QS Ranking if they wish to enter into the top 100 university league in the Ranking table. They need to increase at least 14 points on their overall for entering into the 100 ranks bracket and at least 30 points on their overall for entering into the 50 ranks bracket.

Table-6: Performance of Institutions in QS Ranking 2022

Category	Institutions/Universities	Rank in QS Ranking	Overall Score	Mean Score	Mean Difference (From Category D)
A	Massachusetts(MIT),USA*	1	100	99.4	53.4
	University of Oxford	2	99.5		
	Stanford,USA*	3	98.7		
B	University of California	48	76.1	75.8	29.8
	London School of Economics	49	75.8		
	Shanghai Jiao Tong	50	75.6		
C	University of Science and Technology of China	98	60.1	59.9	13.9
	Technical University of Denmark	99	59.9		
	University of North Carolina	100	59.6		
D	Indian Institute of Technology, Delhi	185	45.9	46.0	0
	Indian Institute of Technology, Bombay	177	46.4		
	Indian Institute of Science, Bangalore	186	45.7		

Note: Category A is the top three institutes in QS Ranking 2022

Category B is the group of institutes placed at 48th, 49th and 50th Ranks respectively in QS ranking 2022.

Category C is the group of institutes placed at 98th, 99th and 100th rank respectively in QS ranking 2022

Category D is the group of three public institutes of India which are declared as IoE. Out of these three IoEs, IIT Delhi and IISc, Bangalore are at 185th and 186th ranks respectively where as IIT Bombay is at 177 ranks. Since there is no much difference between overall score of IIT Bombay and other two IoEs, therefore, all three IoEs are categorized in same group D

Massachusetts(MIT),USA and Stanford,USA are Private Universities. Except these two, all are public universities.

Source : QS ranking, Website: <https://www.topuniversities.com/>

(i) **Comparison between Three IoEs and Top Three Universities in QS**

Ranking:

When the three IoEs (IIT Bombay, ITT Delhi and IISc Bangalore) are compared with top three (1 to 3) universities on QS Overalls and indicators, it is found (Table -7) that QS Ranking yield a higher average Overall for top three (1 to 3) universities than three IoEs with a huge difference of 53.4 points and corresponding standardized mean difference (SMD) of 80.7.

Table-7: Comparison of three IoEs and top 1 to 3 universities on QS overall and indicators (2022)				
Indicators in QS Ranking	Three IoE Institutes N=3	Top 1 to 3 universities in QS Ranking. N=3	Mean Difference	Standardized Mean Difference
Overall	46.0	99.4	-53.4	-80.7
Academic Reputation	43.8	100	-56.2	-7.3
Employee Reputation	56.5	100	-43.5	-1.5
Faculty Student Ratio	37.4	100	-62.6	-7.2
Citations	75.2	98.6	-23.5	-1.2
International Faculty Ratio	1.3	99.8	-98.5	-364.6
International Student Ratio	1.7	85.6	-83.9	-5.7

Standardized Mean Difference (SMD) was calculated as (Mean of Three IoE Institutes – Mean of Top 1 to 3 universities)/Pooled Standard Deviation and then adjusted by Hedges’ correction. The obtained SMD was then evaluated for magnitude by Cohen’s (1988) Criteria.

Source : QS ranking, Website: <https://www.topuniversities.com/>

This higher Mean difference (MD) and Standardized Mean difference (SMD) in favour of the top three (1 to 3) universities indicates that they outperformed the three IoEs on Overall score very significantly. The higher the Mean Difference (MD) and SMD between the scores of two, higher is the gap in their performance.

Apart from this, the top three (1 to 3) QS Ranking universities had a very high mean difference and SMD on all the six indicators of QS Ranking compared to the three IoEs (Table-7). While on Academic Reputation and Employee Reputation indicators the mean difference between the top three (1 to 3) QS Ranking universities and IoEs were very high at 56.2 and 43.5 respectively, the mean difference between these two groups of universities on Faculty-students Ratio, Citation, International Faculty Ratio and International Student Ratio were also very high at 62.6, 23.5, 98.5 and 83.9 respectively. Therefore, it is evident that the three IoEs are far behind from the top three global universities in term of performance on the six indicators of QS ranking.

(ii) Comparison between Three IoEs and 48 to 50th ranked Universities in QS

Ranking:

Table-8 shows that QS Ranking yield a very higher average Overall for category B (48th to 50 ranked) universities than category D (three IoEs) with a difference of 29.8 points and corresponding standardized mean difference (SMD) of 76.8. At indicators level, there was a very large mean difference and SMD for all indicators of QS Ranking in favour of Group B universities than (Group D) except Citation indicator. In Citation indicator, the category B (48th to 50 ranked) universities have a slight edge over the category D (three IoEs) universities with their mead difference of 12.1 and SMD of 0.6.

Though the mean difference (12.1) was in favour of the category B (48th to 50 ranked) universities, however, the corresponding moderate SMD of 0.6 (0.8 above, the impact/edge is high).

Table-8: Comparison of three IoE institutes and 48 - 50 ranked universities on QS overall and indicators (2022)

Indicators in QS Ranking	Three IoE Institutes N=3	48-50 ranked universities in QS Ranking. N=3	Mean Difference	Standardized Mean Difference
Overall	46.0	75.8	-29.8	-76.8
Academic Reputation	43.8	82.3	-38.5	-3.4
Employee Reputation	56.5	82.3	-25.8	-0.8
Faculty Student Ratio	37.4	54.3	-16.9	-1.4
Citations	75.2	87.3	-12.1	-0.6
International Faculty Ratio	1.3	54.7	-53.4	-1.5
International Student Ratio	1.7	66.0	-64.3	-2.3

Standardized Mean Difference (SMD) was calculated as (Mean of Three IoE Institutes – Mean of 48th to 50th ranked universities)/Pooled Standard Deviation and then adjusted by Hedges' correction. The obtained SMD was then evaluated for magnitude by Cohen's (1988) Criteria

Source : QS ranking, Website: <https://www.topuniversities.com/>

In this regard, one important point to note that although the Table-8 shows that the Group B universities were very stronger than Group D universities in term of all indicators of QS Ranking (except Citation indicator where it had slight edge over three IoEs), the advantage in favour of Group B universities on Academic Reputation and Employee Reputation measures could be ignored since these two measures are based on social surveys for which the data is highly fallible, the difference may not be taken too seriously. However, the advantage in favour of Group B universities on remaining three parameters (Faculty Student Ratio, International Faculty Ratio, and International Student Ratio) may be taken very seriously. For example, on International Faculty Ratio (mean difference of 53.4, SMD of 1.5) International Student Ratio (mean difference of 64.3, SMD of 2.3) measures, Group B universities were very stronger than Group D universities. On Faculty -Student Ratio too, Group B universities were very stronger than Group D universities with larger mean difference of 16.9 and SMD of 1.4.

(iii) Comparison between Three IoEs and 98 to 100th ranked Universities in QS Ranking:

Unlike the previous comparison where Group A (1 to 3rd ranked) and B (48 to 50th ranked) universities had dominated Category D (Three IoEs) universities very substantially on Overall as well as all six indicators, the Category D (IoEs), here, when compared with Category C (98 to 100th Ranked) universities, had some advantage on certain indicators.

Table-9 shows that QS Ranking yield a very higher average Overall for category C (98th to 100th ranked) universities than category D (three IoEs) with a difference of

13.9 points and corresponding standardized mean difference (SMD) of 35.7. However, at indicators level- On Employee Reputation measure, the Group D (IoEs) was very stronger than Group C (98 to 100 ranked) universities with mean difference of 26 and stronger SMD of 0.8. On Academic Reputation measure, though Group C universities was ahead of Group D University with mean difference of 6.5, however such advantage was meaningless since its corresponding SMD of 0.4 was a trivial one. On Citation indicator, both Category D and C universities were at par with a very trivial mean difference and SMD of 1.1 and zero respectively.

Table-9: Comparison of three IoE institutes and 98-100 ranked universities on QS overall and indicators (2022)

Indicators in QS Ranking	Three IoE Institutes N=3	98-100 ranked universities in QS Ranking. N=3	Mean Difference	Standardized Mean Difference
Overall	46.0	59.9	-13.9	-35.7
Academic Reputation	43.8	50.3	-6.5	-0.4
Employee Reputation	56.5	30.5	26.0	0.8
Faculty Student Ratio	37.4	88.2	-50.8	-4.0
Citations	75.2	76.3	-1.1	0.0
International Faculty Ratio	1.3	40.1	-38.8	-0.8
International Student Ratio	1.7	31.4	-29.7	-0.9

Standardized Mean Difference (SMD) was calculated as (Mean of Three IoE Institutes – Mean of 98-100 ranked universities)/Pooled Standard Deviation and then adjusted by Hedges’ correction. The obtained SMD was then evaluated for magnitude by Cohen’s (1988) Criteria

Source : QS ranking, Website: <https://www.topuniversities.com/>

However, the Group C (98 to 100th ranked) universities had done extremely well on the Faculty Student Ratio, International Faculty Ratio and International Student Ratio indicators compared to Category D (IoEs) universities. On Faculty Student ratio indicator, the Group C universities were very stronger than Group D with larger mean difference and SMD of 50.8 and 4 respectively. Similarly on International Faculty Ratio indicator, Group C universities were very stronger than Group D universities with a larger mean difference of 38.8 and stronger SMD of 0.8. On International Student Ratio indicator too, Group C universities had greater advantage than Group D universities with a larger mean difference of 29.7 and greater SMD of 0.9.

In view of the above, it may be concluded that though on academic reputation and citation indicators, Group C (98 to 100th ranked) universities were at par with Group D (IoEs) universities and on Employee Reputation indicator, they were far behind the Group D universities, however they did extremely well on Overall front and get rank within the 100 ranks due to their heavy scores on Faculty Student Ratio, International Faculty Ratio and International Student Ratio indicators compared to the Group D universities. Therefore, it may be concluded that universities in India lack way behind on these parameters being considered for global ranking. For breaking into the 100 ranking in the league table, the three IoEs need to improve on these three parameters substantially.

Table-10 shows that as per the QS Ranking 2022, the university at 98th rank had international student share of 5.7 per cent while, the university at 100th rank had 8.3 per cent. If it is seen further towards a little upper stage in ranking table, it can be seen that the universities at 50th rank had the international student share of 16.4 per cent. However,

the three IoEs (IIT Bombay, IIT Delhi and IISc Bangalore) had very negligible international student share of 1.0, 1.1 and 0.1 percent in 2021-22. The universities in India (IoEs) need to maintain a share of international students in their total students in between 5.7 to 8.3 percent for getting a place within the 100 ranks of the QS Ranking.

Table-11 shows that in case of three IoEs, the share of international faculties in their total faculties was also very low. While 98th and 100th ranked universities had a share of international faculty of 11.3 and 13.2 respectively, however the three IoEs (IIT Bombay, IIT Delhi and IISc Bangalore) had a very low share of 1.2, 2.7 and 1.3 percents respectively. Therefore, for entering into the 100 ranks in the league table, the Indian universities (IoEs) need to maintain a higher share of international faculty between 11.3 and 13.2 per cents.

Table -10: Number of Students in Select universities in QS Ranking 2022				
Name of University	Rank	Total Students	International Students (%)	Domestic Students (%)
University of California	48	37787	22.7	77.3
London School of Economics	49	11309	73.2	26.8
Shanghai Jiao Tong, China	50	38740	16.4	83.6
University of Science and Technology of China	98	17922	5.7	94.3
Technical University of Denmark	99	9322	26.8	73.2
University of North Carolina	100	33031	8.3	91.7
IoEs				

IIT Bombay	177	11097	1.0	99.0
IIT Delhi	185	9064	1.1	98.9
IISc Bangalore	186	4164	0.1	99.9
Source: QS Ranking 2022, https://www.topuniversities.com/				

Table-11: Number of Faculties in Select Universities in QS Ranking 2022				
Name of University	Rank	Total Faculty	International Faculty (%)	Domestic Faculty (%)
University of California	48	4545	21.4	78.6
London School of Economics	49	1172	63.1	36.9
Shanghai Jiao Tong, China	50	4386	11.2	88.8
University of Science and Technology of China	98	2708	11.3	88.7
Technical University of Denmark	99	2219	50.7	49.3
University of North Carolina	100	4646	13.2	86.8
IoEs				
IIT Bombay	177	843	1.2	98.8
IIT Delhi	185	1015	2.7	97.3
IISc Bangalore	186	446	1.3	98.7
Source: QS Ranking 2022, https://www.topuniversities.com/				

Though these two parameters i.e. International faculty ratio and International students' ratio are given smaller weightage of 5 per cent in QS Ranking, it is necessary to perform better on these two parameters especially when IoEs are performing at par with

98th to 100 ranked universities on the important parameters like academic reputation and citation.

Furthermore, for breaking into the 100 ranks in the league table, the Indian universities (IoEs) need to do better in term Student-faculty ratio. Table-12 shows that the student-faculty ratio in case of IIT Bombay and Delhi are 11 whereas in case of IISc Bangalore, it is 9. However, in case of universities at 98 and 100th ranks, it is 7. Therefore, there is a need to improve it further to a level of a ratio 7.

Table-12: Student-faculty ratio in Select Universities in QS Ranking 2022		
Name of University	Rank	Student-Faculty Ratio
University of California	48	8
London School of Economics	49	10
Shanghai Jiao Tong, China	50	9
University of Science and Technology of China	98	7
Technical University of Denmark	99	4
University of North Carolina	100	7
IoEs		
IIT Bombay	177	11
IIT Delhi	185	11
IISc Bangalore	186	9
Source: QS Ranking 2022, https://www.topuniversities.com/		

Chapter-7

Findings and Conclusion

In this study, attempts were made to (i) analyze the growth of higher education in India;(ii) provide the overview of the New (IoE) policy,2017 of the Government of India for setting up world class teaching and research institutions;(iii) Analyze the effectiveness of this new policy, 2017 of the Government on the Indian public higher education institutions in the context of global ranking competition and (iv) Explore how the Indian public higher education institutions can be benchmarked against different indicators of the top global universities for becoming world-class institutions.

Followings are the major findings of the study:

7.1. Growth of higher education in India:

(i) Over the period of 69 years (1950-51 to 2019-20), while the number of universities grew at a compound growth rate of 5.4% and the number of colleges grew at a compound growth rate of 6.4%, the total student enrollments in higher education in India has increased by 7.9 % with an increase in students enrollments from 0.2 million in 1950-51 to 38.5 million in 2019-20.

(ii) The higher education system in India has grown very significantly after the year 2000 in terms of the number of institutions and students enrollment. However, there is a mismatch in growth in institutions and the growth in demand for higher education. While the number of universities grew from 260 in 2001-02 to 1043 in 2019-20 at a compound growth rate of 8.0% and the number of colleges grew from 11146 in 2001-02 to 42343 in 2019-20 at a compound growth rate of 7.7% , in the same period of time, the total student enrollments in higher education in India has increased from 8.8 million in 2001-02 to 38.5 million in 2019-20 at a compound annual growth rate of 8.6%.

(iii) Further, the total student enrollments in higher education are expected to increase from 38.5 million in 2020 to 58 million in 2035 and 64.3 million in 2040 thereby adding about 51% and 67% more students by 2035 and 2040 respectively. This expected high demand for higher education in future would put huge pressure on the higher education infrastructure of the country.

- (iv) While, the male enrollments in higher education grew at a compound annual growth rate of 2.6% during this period of 2011 to 2020, the female enrollment was however grew impressively at a compound annual growth rate of 6.0% in the same period of time. It is expected that while the number of male student enrollments would increase by 37% and 49 % in 2035 and 2040 respectively from the year 2020, whereas the female student enrollments are expected to increase by 65% and 86% in 2035 and 2040 respectively.

(v) While the share of male in the total enrollment in higher education decreased from 58% in 2011 to 51% in 2020, the share of the female in the total enrollment

however increased from 42% in 2011 to 49% in 2020. If the same trend continues, then it is expected that the share of female in the total enrollment will be more than the share of male in total enrollment by 2025. The female and male share in total enrollment will be 51% and 49% respectively in 2025. Thereafter, the share of female enrollment would continue to be more than male enrollment. The share of female and male would be 54% and 46% in 2035 respectively and 55% and 45% in 2040 respectively.

With this change, it seems that the female students would now play a critical role in shaping the growth and structure of higher education sector of India in coming years. Accordingly, India need to fine-tune its higher education system by developing targeted policies and programs to address the needs of women in higher education and to implement reforms that will genuinely empower women for their full and effective participation in higher education and nation building.

(vi) India's GER (5.9 %) was ahead that of China (3.0 %) in 1990. When India entered into the stage of massification in 2008 with 15.5 % GER, the GER of China was little more (at 20.7 Per cent) than that of India. However, thereafter, China has out spaced India in term of GER in higher education. Within period of 12 years from 2008 to 2020, China has entered into the stage of "Universalization" with registering a huge jump in its GER from 20.7 % in 2008 to 58.4 % in 2020. However, India has remained in the stage of "massification" during the same period of time with the increase in the ratio from 15.5 % in 2008 to 29.4 % in 2020. It is expected that in next twenty years (2020- 2040) the GER

of China would grow from 58.4 % in 2020 to 89.8 % in 2040 whereas the GER in case of India would increase from 29.4 % in 2020 to 45.4 % in 2040. From the projection it seems that India could not entire into the stage of “Universilisation” even in 2040.

(vi) India is in the stage of “Massification” since last twelve years and it would remain in this stage for at least next 20 years before it enters into the stage of “Universalization”. According to Martin Trow (2006), the function of higher education in a ‘mass system’ is the transmission of skills and the preparation of the population for broader range of technical and economic elite roles whereas the function of higher education in a ‘universal system’ is about the adaption of whole population to social and technological change. There is now a dual challenge for India not only to increase the gross enrollment ratio rapidly but also to ensure quality education and providing of professional and technical skills to most of the students at the same time.

(vii) Furthermore, the Study revealed that the expansion in higher education in India is presently driven by the private sector. The shares of private colleges and universities have been constantly increased in term of numbers as well as students’ enrollments over the period of time. This rapidly increasing trend of private sectors though is a boon for the higher education sector in India; it would however become difficult to ensure quality education in absence of a high-quality enabling regulatory environment.

(viii) Another important finding is that in India the student enrollments at Ph. D and Post Graduate Levels are constantly remained very low. While the average student enrollments in Post Graduation and Ph. D were estimated at 4 and 0.16 million respectively during the last five years (2015-16 to 2019-20), the average student enrollments in Under Graduate level was estimated at 29 million during same period of time. Though, the enrollments in Ph. D degree grew at an annual compound annual growth rate of 12.5 % over the last five year (2015-16 to 2019-20), the enrollments in Post Graduate degree grew at a modest annual compound growth rate of 2.8 % whereas the growth of students' enrollment in M.Phil grew at a negative annual compound growth rate of (-) 14.4 % over the same period of five years. The students' enrollment in Ph. D degree could not be increased substantially without a good growth in students enrollments in Post Graduations/ M.Phil degree levels as these two degrees are essential for enrollments in Ph. D research degree in India.

Since there is now a provision to scrap the M.Phil. programme under New Education Policy (NEP), 2020, therefore, focus should be given to increase the student enrollments in Master Programme significantly by developing targeted policies and programs to address the recent issues of decreasing popularity of this programme. Though, there is a provision in NEP, 2020 that a student with 4-year Bachelor's degree with Research can also undertake a Ph.D., it however cannot help much in improving the Ph. D research in India without any targeted policies and strategy since at recent times Indian degree programs are mostly three years in length.

7.2. Effectiveness of the New (IoE) policy, 2017 on the Indian public higher education institutions:

Government of India has introduced New (IoE) Policy 2017 to promote a few good universities to compete with world best universities. As per the New Policy, these institutions will be permitted, *inter alia*, to admit 30 per cent of international students with no restrictions levied on the fee charged from them, and hire foreign faculty to the tune of 25 per cent out of the total faculty. They can enter into academic collaborations with the top 500 global universities without requiring UGC approval which can revolutionize the higher education sector and build a stronger foundation for a knowledge economy. They will also enjoy full flexibility in bringing the evolution in the curricula and syllabi. In addition, Public institutions will get the assistance of up to ₹1000 crore over five years. 'Institution of Eminence' tag frees universities from government interference mostly. The objective is to enable the IoE declared institutions to break into the world's top 100 universities.

As of now, eight (08) institutions in public category and three (03) institutions in private category have been declared as institutions of Eminence (IoEs) 'Eminence'. In public category, while three (03) institutions [Indian Institute of Technology (IIT), Delhi, Indian Institute of Technology (IIT), Bombay and Indian Institute of Science (IISc), Bangalore] were declared as IoEs in 2018, the other five (05) institutions [Indian Institute of Technology (IIT), Madras, Indian Institute of Technology (IIT), Kharagpur, University of Hyderabad, Banaras Hindu University, and University of Delhi] were declared much latter in 2020. In case of private category, so far only three (03) institutions [Manipal

Academy of Higher Education, Karnataka, Birla Institute of Technology, Rajasthan and O.P. Jindal Global University, Haryana] are declared as IoEs in 2021. Therefore, those institutions which have been declared as IoEs in 2020 and 2021 respectively were not considered for the study since they have not even spent one year under the new regime of policy changes. Therefore, to understand the effectiveness of the new policy on Indian Higher Education Institutions (IoEs) in the context of global ranking competition, the study only focused on three public institutions (IIT, Delhi, IIT, Bombay and IISc, Bangalore) which were declared as IoEs in 2018 and have spent considerable time period of three years under the new regime of policy changes.

By analyzing time series data of QS Ranking, the Study found that the New IoE policy for building world class universities seems to be least effective since the three public institutes (IIT, Delhi, IIT, Bombay and IISc, Bangalore) which were declared as IoEs for becoming world class universities have failed to improve in their ranking as well as in overall score in the global ranking league table thus far.

It is found that post to their declaration as IoE in 2018, the three IoEs (IIT Delhi, IIT, Bombay and IISc Bangalore) have not only failed in term of ranking but also failed in term of improving their overall scores in the QS Ranking league table as well. Even after the three years of their declaration as IoE, the overall score of all of these three institutes in none of the year 2020, 2021 and 2022 could able to surpass the overall score achieved by these institutes in 2018, the preceding year of their declaration as IoEs.

7.3. Benchmarking Higher Education Institution (IoEs) in India

The main objective of the New Policy of IoE is to bring the selected IoEs within 100 rank overtime. Therefore, it is necessary to know how these three IoEs are doing in term of performance vis-à-vis the top universities within 100 ranks. Attempt is made to find out where the Indian institutions (IoEs) stand with reference to the best institutions in that category so that it can improve its performance and grading.

The Study examined the performance of these three IoEs (IIT Delhi, IIT, Bombay and IISc Bangalore) vis-à-vis the top (1 to 3) three universities, 48 to 50th ranked and 98 to 100th ranked universities in QS ranking 2022 on the on the Overall as well as the following six indicators of QS Ranking: (i) Academic Reputation; (ii) Employer Reputation; (iii) Faculty- Student Ratio; (iv) Citation for Faculty; (v) International faculty Ratio; and (vi) International Student Ratio.

Although, the performance of IoEs have been compared to the top (1 to 3) three universities, 48 to 50th ranked and 98 to 100th ranked universities in QS ranking 2022, however, the more focus has been given to their comparison with 98 to 100th ranked universities since the objective of the New (IoE) policy is to enable the IoE institutes to break into the world's top 100 universities. Therefore bottom three universities in top hundred universities are given more importance.

The Study found that although on academic reputation and citation indicators, the group of 98 to 100th ranked universities in QS Ranking were at par with the group of three IoEs and on Employer Reputation indicator, they were far behind the group of IoEs, however they did extremely well on Overall front and got rank within the 100

ranks due to their heavy scores on Faculty Student Ratio, International Faculty Ratio and International Student Ratio indicators compared to the group of three IoEs. Therefore, it may be concluded that universities in India lack way behind on these parameters being considered for global ranking. For breaking into the 100 ranks in the league table, the three IoEs need to improve on these three parameters substantially.

The three IoEs (IIT Bombay, IIT Delhi and IISc Bangalore) had very negligible international student share of 1.0, 1.1 and 0.1 % in 2021-22. They need to maintain a share of international students in their total students in between 5.7 to 8.3 % for getting a place within the 100 ranks of the QS Ranking.

Similarly, the three IoEs (IIT Bombay, IIT Delhi and IISc Bangalore) had a very low share of international faculty 1.2, 2.7 and 1.3 % respectively. They need to maintain a higher share of international faculty between 11.3 and 13.2 % for entering into the 100 ranks in the league table.

Furthermore, for breaking into the 100 ranks in the league table, the Indian IoEs need to do better in term Student-faculty ratio. The student-faculty ratio in case of IIT Bombay and Delhi are 11 whereas in case of IISc Bangalore, it is 9. However, in case of universities at 98 and 100th ranks, it is 7. Therefore, there is a need to improve it further to a level of a ratio 7.

References and Bibliography

Al-Jayyousi, O., Al-Alawi, A., Al-Mahamid, S., & Bugawa, A. (2019). *Entrepreneurial University and Organizational Innovation: The Case of Arabian Gulf University, Bahrain. In Management and Administration of Higher Education Institutions at Times of Change.* Emerald Publishing Limited

Altbach and Balan. (2007). *World class worldwide: Transforming research universities in Asia and Latin America.* Baltimore: The Johns Hopkins University Press.

Altbach, P.G. (2009). Peripheries and centers: research universities in developing countries. *Asia Pacific Educ. Rev.* 10, 15–27 (2009). <https://doi.org/10.1007/s12564-009-9000-9>. (Accessed on 07 September, 2021)

Altbach, P., and Salmi, J. (Eds.). (2011). *The road to academic excellence: The making of world-class research universities.* New York: World Bank. <https://documents1.worldbank.org> (accessed on 07 September, 2021)

Altbach, P. (2013). The challenges of building a world-class university. *The International Imperative in Higher Education Global Perspectives on Higher Education* , 27, 95-99.

Altbach, P. G. (2015). What Counts for Academic Productivity in Research Universities? *International Higher Education*, (79), 6-7. <https://doi.org/10.6017/ihe.2015.79.5837> (accessed on 1.2.2022)

Amaral, A., Maassen, P., Musselin, C., Neave, G. (Eds.). (2009). *European integration and the governance of higher education and research*(pp. 281-299). Dordrecht: Springer

Anand, G., & Kodali, R. (2008). Benchmarking the benchmarking models. *Benchmarking: An International Journal*, Vol. 15, No. 3, p. 257-291.

Baskaran, A. (2017). UNESCO Science Report: Towards 2030. *Institutions And Economies*, 125-127. Retrieved from <https://ijie.um.edu.my/article/view/5039> (Accessed on 16.02.2022)

Bates, A. W. (2000). *Managing Technological Change: Strategies for College and University Leaders*. The Jossey-Bass Higher and Adult Education Series. Jossey-Bass Publishers, 350 Sansome St., San Francisco, CA 94104.

Burquel, N. and F. Van Vught. 2010. "Benchmarking in European Higher Education: A Step beyond Current Quality Models." *Tertiary Education and Management* 16(3), 243 – 255.

Byun, K., Jon, J. and Kim, D. (2013). Quest for building world-class universities in South Korea: Outcomes and consequences. *Higher Education: The International Journal of Higher Education and Educational Planning*, v65 n5 p645-659 May 2013.

Camp, R. C. (1989). *Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance*. Milwaukee, Wisconsin: ASQC Quality Press.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York, NY: Routledge Academic.

Coopers, B. J., Leung, P., & Mathews, C. M. H. (1996). Benchmarking a Comparison of International 83 Audit in Australia, Malaysia and Hong Kong. *Managerial Accounting Journal*, Vol. 11, No. 1, p. 23 –29.

Cumming, G. (2012). *Understanding the New Statistics: Effect sizes, Confidence Intervals, and Meta-Analysis*. New York, NY: Routledge.

Dudek, Marek. (2016). *Generations of the world-class manufacturing systems*. CLC'2016: Carpathian Logistics Congress, Zakopane, Poland, 2016. Published online by Web of Science through <https://www.confer.cz/clc/2016/2721-generations-of-the-world-class-manufacturing-systems> (Accessed on 16.2.2022)

European Centre for Strategic Management of Universities. 2008. *A Practical Guide Benchmarking in European Higher Education*. Brussels: ESMU

European Centre for Strategic Management of Universities. 2010. *A University Benchmarking Handbook: Benchmarking in Higher Education*. Brussels: ESMU.

European Network for Quality Assurance in Higher Education (ENQA). 2002. *Benchmarking in the Improvement of Higher Education*. Workshop report. Helsinki: European Network for Quality Assurance in Higher Education

Hedges, L. V., and Olkin, I. (1985). *Statistical methods for meta-analysis*. San Diego, CA: Academic Press.

Huang, F (2015). *Building the world-class research universities: a case study of China*. Published online by Springer in 2015. (Accessed on 02 September, 2021).

Leon Cremonini, Don F. Westerheijden, Paul Benneworth and Hugh Dauncey (2014). *In the shadow of celebrity? World-Class University Policies and Public Value in Higher Education*. *Higher Education Policy*, 27, 341-361. doi:10.1057/hep.2013.33; published online October 15, 2013. (Accessed on 03 September, 2021).

Love, P. G., Love, A. G. (1995). Enhancing Student Learning: Intellectual, Social, and Emotional Integration. ASHE-ERIC Higher Education Report No. 4. ERIC Clearinghouse on Higher Education, One Dupont Circle, NW, Suite 630, Washington, DC 20036-1183.

Luo, Y. (2013). Building world-class universities in China. In J. C. Shin and B. M. Kehm (Eds.). Institutionalisation of world-class university in global competition (Vol. 6, pp. 165-183). Dordrecht: Springer.

Malik, Garima (2017), Governance and Management of Higher Education Institutions in India, CPRHE Research Paper Series No. 5

Mann, S. R., Abbas, A., Kohl, H., Orth, R., & Görmer, M. (2010). (2010). Global Survey on Business Improvement and Benchmarking. Germany: Global Benchmarking Network.

Mehrotra, A, Elias, H & Al-Alawi, A.I (2019). The Power of Knowledge Sharing in Public Higher Education: A Case of X G.C.C. Public University. Chapter 16 in Book, Handbook of Research on Implementing Knowledge Management Strategy in the Public Sector, edited by Albastaki, Y. A., Al-Alawi, A. I., & Abdulrahman Al-Bassam, S. Chapter 1. Hershey, PA: IGI. Global. doi:10.4018/978-1-5225-9639. (Accessed on 28 September,2021).

Naufal, D. 2012. "Benchmarking and Implications for Universities: In Depth Look inside Universities." Paper presented at the regional workshop Lessons Learned from Benchmarking University Governance in MENA. 11 – 12 December 2012, Rabbat, Marocco

National Institute of Educational Planning and Administration (2005): The Report of the CABE Committee on Financing of Higher and Technical Education. New Delhi: NIEPA.

Norman Jackson, (2001) “Benchmarking in UK HE: an overview”, *Quality Assurance in Education*, Vol. 9 Issue: 4, pp.218 – 235

Mohrman, K. (2008). The emerging global model with Chinese characteristics. *Higher Education Policy*, 21, 29-48

Pillay, P. (2011). Pundy Pillay Higher Education and Economic Development Literature review. Published by the Centre for Higher Education Transformation (CHET) in 2011. Accessed through <https://www.borbolycsaba.ro/wp-content/uploads/2013/09/Higher-Education-and-Economic-Development-Literature-Review.pdf> (on 16 .02.2022)

Rabossi, M., & Salto, D. (2018). The Weight of Tradition. In *Pursuit of World-Class Universities: A Global Experience*, 91.

Ramabadron R., Dean, J. W., & Evans, J. R. (1997). Benchmarking and Project Management: A Review and Organization Model. *Benchmarking: An International Journal*, Vol. 4, No. 1, p. 47-58.

Ramirez, F. O., and Tiplic, D. (2014). In pursuit of excellence? Discursive patterns in European higher education research. *Higher Education*, 67(4), 439-455. doi: 10.1007/s10734-013-9681 -1. (Accessed on 23 September,2021).

Reddy, A. A. and Vaidyanathan, G. (2019). India’s higher education needs a paradigm shift. *The wire*. Available at: <https://thewire.in/education/indias-higher-education-needs-a-paradigmshift>. (Accessed on: 23/02/2020).

Sadlak, J., and Liu, N. (Eds.). (2009). *The world-class university as part of a new higher education paradigm: From institutional qualities to systemic excellence*. Bucharest: UNESCO-CEPES.

Salmi, J. (2009). *The Challenge of Establishing World-Class Universities*. *Directions in Development; human development*. World Bank. <https://openknowledge.worldbank.org/handle/10986/2600>. (Accessed on 01 September, 2021)

Sarkis, J. (2001). *Benchmarking for Agility*. *Benchmarking: An International Journal*, Vol. 8, No. 2, p. 88-107.

Shin, J. C., and Kehm, B. M. (Eds.). (2013). *Institutionalisation of world-class university in global competition*. Dordrecht: Springer

Soh, K. (2013). *Social and educational rankings: Problems and prospects*. New York: Untested Ideas Research Center.

https://www.worldscientific.com/doi/pdf/10.1142/9789813200739_0001 (Accessed on 12.1.2022)

Think Insights (2022). *Benchmarking: Comparing with peers to improve performance*. Retrieved from <https://thinkinsights.net/strategy/benchmarking/>. (Accessed on 12.1.2022).

Tayeb O. (2016) *Roadmap to Become a World-Class University*. In: Tayeb O., Zahed A., Ritzen J. (eds) *Becoming a World-Class University*. Springer, Cham. https://doi.org/10.1007/978-3-319-26380-9_1. (Accessed on 12.1.2022)

Trow, M. 2006. Reflections on the Transition from Elite to Mass to Universal Access: Forms and Phases of Higher Education in Modern Societies since WWII. In J. J. F. Forest and P. G. Altbach (Eds.), *International Handbook of Higher Education* (pp. 243-280). Dordrecht: Springer

UNESCO New Papers on Higher Education. 1998. *Benchmarking in Higher Education: A Study Conducted by the Commonwealth Higher Education Management Service*. New Papers on Higher Education: Studies and Research. Paris: UNESCO.

UNESCO, 2009. *Education Indicators - Technical guidelines*. http://uis.unesco.org/sites/default/files/documents/education-indicators-technical-guidelines-en_0.pdf (Accessed on 19.1.2022).

Van Helden, G. J. and S. Tillema. 2005. "In Search of a Benchmarking Theory for the Public Sector." *Financial Accountability & Management* 21, 337 – 361.

Varghese, N V (2015), *Challenges of Massification of Higher Education in India*, CPRHE Research Paper Series No. 1.

http://www.niepa.ac.in/download/Publications/CPRHE/March_2016/CPRHE_Research%20_%20Paper-1.pdf ((accessed on 10.01.2022)

Wang, Q. H., Wang, Q., and Liu, N. (2011). *Building world-class university in China: Shanghai Jiao Tong University*. Invited chapter in P. Altbach and J. Salmi (Eds.), *The road to academic excellence*. Washington, D.C.: The World Bank.

Yang, R., and Welch, A. (2012). A world-class university in China? The case of Tsinghua. *Higher Education*, 63(5), 645-66.

Závada, J., H. Šebková and M. Munsterová. 2006. “Benchmarking v hodnocení kvality vysokých škol.” Aula 14, 83 – 96.

Online Sources:

Institutions of Eminence, <https://ioe.ugc.ac.in/> and <https://www.education.gov.in/en/ioe> .
(Accessed on 25 August, 2021).

New Education Policy (NEP), 2020. Ministry of Education, Government of India.

Accessed through the Web site:

https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf (on 28 January 2022).

QS World University Rankings 2022, <https://www.topuniversities.com> (Accessed on 05 November, 2021).

Shanghai Ranking, 2021, <https://www.shanghairanking.com/methodology/arwu/2021>
(Accessed on November, 2021)

Times Higher Education World University Rankings 2022,
<https://www.timeshighereducation.com/world-university-rankings> . (Accessed on 10 November, 2021)
