CHAPTER-1

INTRODUCTION TO THE STUDY

Introduction and Background of the Study

As India moves towards being one of the most important economies in the world, a number of   factors are at play. These include the availability of skilled human capital, a large educated young work force, a democratic system, widespread use of English language, a large and vibrant national market that is one of the largest in the world and a broad and diversified infrastructure for education, science and technology. In the global economy of the twenty-first century, India's challenges entail using its knowledge base effectively to achieve economic and social growth. India will also need to use knowledge more effectively to raise the productivity in the fields of agriculture, industry, and services (Dahlman & Utz, 2005)

As per the 2011 census, 49.9 percent of India's population is less than 25 years of age, with 41 percent less than 18 (Census of India, 2011). It is also seen from this census that 65 percent of the population is below the age of 35. This massive young population is full of hopes and aspirations and a great asset for upward social and economic mobility. About 250 million more young persons are likely to join India's workforce by 2030. As a large section moves into the working age group, the increase can be expected both in disposable incomes and in consumption. Progressively, many more will expectedly attain adulthood having pursued higher education ("India's demographic dividend", 2016)

Given this, India has to create about 1 million jobs per month in order to meet the aspirations of its youth. However, jobs growth between 2012 and the financial

year 2015-2016 was just 5 million (Sender, 2016). Also, the rate of unemployment for graduates and those with higher educational qualifications was about 28 per cent. Significantly, about 80 per cent of the total labour force comprised the self-employed persons or those in casual labour with a minuscule 17 per cent in regular wage earner category (Sender, 2016). On a longer term perspective, between 1991 to 2013 , the Indian economy could employ only 140 million people of the 300 Million who entered the workforce, suggesting a limited capacity to generate jobs. The report detailing these numbers, released by UNDP (2016), and other similar statistics, puts serious questions on the reality of the demographic dividend. However, the demographic dividend is cited as one of the key factors in India's economic growth (UNDP, 2016).

The other important factor impacting India's growth story is democratic form of government. While the maturing of democracy has ushered in growth in India, yet the focus on public goods, including education, continues to be a major aspect in need of reform. These areas are only likely to grow in significance and would be the issues surrounding the functioning and the quality of Indian democracy. In many ways, they will set the direction of the discourse for the complex interplay between the society and its socio-economic growth capabilities in the years to come. (Patnaik, 2013)

The corporate heads in India often remark about a political system like that of China where economic reforms could be pushed through in a manner that the economy would not only just take off but also stay buoyant. While this sounds simplistic, this highlights the challenges of sustaining growth in a vibrant democracy ("The democracy bottleneck", 2012).

India has many languages, official as well as unofficial. Many Indians are trilingual as well as bi-lingual (Census, 2001). According to the 2001 Census, English

was spoken as a primary language by a minuscule 0.2 million Indians. A little over 86 million reported English as their second language while 39 million people listed it as their third language. Put together, more than 125 million people in India speak English. About 422 million people spoke Hindi (Census, 2001).

In India, English has historically served two purposes. First, it provided an instrument for governance standardizing the administrative procedures in a diverse country. In addition, it worked well as a common language for communication. (Kachru, 1986). English functions in the Indian socio-cultural context to perform roles relevant and appropriate to the social, educational and administrative network of India ("English in India – and who speaks English to Whom and When", n.d.). The English language now has a third purpose of helping the Indian workforce be more capable of international transactions, especially so in business process outsourcing and in industries where India is a significant global player. Like in most other things related to India, there are widespread variations in the language and communication abilities even amongst people who know the English language.

India's population and growing economy provide a huge local market for goods as well as services. There is a substantial population at every economic stratum, and that creates a market for all kinds of price points. The large local market also insulates (to an extent) the industry from the impact of global macroeconomic factors and assures a level of consumption that is very high, even when the global economy is not going through the best of times.

India has a large and diversified education, science and technology sector as well. Over the decades, the country has built up a large network of institutions of Higher Education, with over 903 universities and 39,050 colleges (MHRD, 2018). A

large majority of these institutions offer courses related to science, technology, engineering and technical subjects. However, the current model of education is content heavy, involves a lot of information and testing with little emphasis on experiential learning, real world exposure to industries, problem solving and creative intelligence.

Even in educational institutions following the traditional models, and for whom the numbers cited above appear very impressive, a wide variation in the quality of education is observed across institutions. The deficiency in quality is observed in faculty members, course work, evaluation mechanisms, infrastructure, industry exposure, all leading to poor learning outcomes. The poor learning outcomes, in turn, lead to lack of requisite skills and unpreparedness for real world jobs. Therefore, the poor quality of education imparted impacts students as well as employers. Several surveys have pointed to the un-employability of engineering graduates even in industries that directly fit with the course work and curriculum. The skills required from the economy's standpoint need to be in line for research, design, innovation and manufacturing and these skills depend on the quality of education.

Problem Statement

In the above background and context setting, the need for increase in numbers in terms of the fields of education was discussed. As this study focusses on Engineering Education, a more detailed study in the matter was felt necessary. Engineering institutions have possibly seen one of the highest increase in the numbers when compared to other disciplines. India is now producing not only a much higher number of engineering graduates than it did a couple of decades ago, India has also expanded the number of enrolments in its elite institutions such as the Indian Institutes of Technology (IITs) and the National Institutes of Technology (NITs) through rapid and wide scale

expansion. Enormous increase both in number of Institutions and the number of seats took place starting with late 1990s and up to early 2000s. Until 2009, elite technical education was limited and restricted. Again things changed very fast after 2009 and between 2009 to 2011, the elite technical institutions recorded a 55 percent increase in seats from 90,513 to 140,000 (Loyalka, Carnoy, Froumin, Dossani,Tilak & Yang, 2014) Added to this are other categories of institutions, most notably other government run engineering institutions and private engineering institutions. When these numbers are put together, we get a very large number of students graduating from engineering courses every year.

In the year 2018-19, there are 6275 engineering institutions in India with an intake capacity of 2,712,311 students (AICTE, 2019).

However, when we step beyond the numbers, the issue of poor quality and wide variation in outcomes continues to exist even in the engineering discipline. Skill gaps and Employer dissatisfaction are rampant. Many engineers are considered unemployable. Questions are raised on the quality of such education compared to other countries, especially in the west.

The enormous increase in the number of engineering graduates from India needs to be looked at in the context of the quality of such education, its comparability with that in developed countries and its competitiveness for the economy.

Several studies have commented on inadequacies in the quality of Engineering Education. The poor quality often leads to a gap even in the quantity of skilled resources required for the industry. A McKinsey Global Institute study undertaken with NASSCOM in 2005 predicted a short fall of approximately 500,000 people with skills by the year 2010. Similarly, the U R Rao Committee projected a need for over 10,000

PhDs and 20,000 M Tech holders just for meeting the Research and Development (R&D) requirements (FICCI and NMIMS, 2013). Commenting on quality, the aforementioned NASSCOM − Mckinsey (2005) report states that according to the multinational companies that employ Engineers, only 25 percent of engineers from India have the right kind of skills and competencies for employability in the booming IT sector. Other studies have also raised concerns that the quality of IT services in specific and the fact that firms in general may stagnate because of the poor quality of technical skills of the of the employees (Dossani, 2013). Consequently, the response from the industry regarding the job preparedness of the engineering graduates has been very poor and about three-quarters of India's technical graduates are considered inadequately skilled and, therefore, unemployable by India's high-growth global industries (Anand, 2011).

Engineering institutions are also affected by lack of high quality teaching - learning at post-graduate and research level. Even the workforce which is created is not adequately trained and suited to meet the needs of the industries creating a scenario of incompatibility of education and curriculum with industry requirements (National Knowledge Commission, 2009).

This study defines the problem as 'gap between the quality of Engineering Education as being offered and as required'. Further, this study will consider whether it is required to evaluate a Total Quality Management (TQM) approach to enhance the quality of Engineering Education.

TQM is a philosophy that encompasses a broad and systemic approach to managing organizational quality (Westcott, 2006). Originating from Japan and adopted by many organizations across the world, it is an approach that aims to improve

organizational competitiveness, its effectiveness and also its flexibility. TQM is an approach involving all the personnel at all the levels in an organization in order to continuously improve the processes, working conditions and techniques to be able to deliver products and services that satisfy all concerned stakeholders. The approach focuses on ensuring that all parts of an organization must work together towards the same goals. Thus, TQM is management approach oriented around stakeholder satisfaction in a long term perspective. It is a comprehensive approach that brings together people, processes and products in a way that all of these participate in a manner that improves organizational effectiveness ("ASQ Total Quality Management", 2019)

Therefore, TQM is an approach of managing organizations in a way that achieves excellence in a manner that focuses on stakeholder satisfaction. It has a long term approach and is sustainable as a philosophy or broad guiding principles. An important part of the approach is its dynamism in terms of continuous improvement. It is the application of a management tool in a manner that all inputs, including the human resources improve and strengthen the processes within an organization. A long terms perspective means that this is achieved both in terms of improvements in the present systems and in the future outcomes.

Engaging with quality in education from TQM perspective, it is possible to conceptualize educational institutions as open systems that include three aspects. These are : a set of management system, a set of technical system and a broader social system (Sahney, Banwet and Karunes 2004) These further includes a set of inputs and their quality (for example, the students, the teaching and research faculty, the institutional support staff and the entire infrastructure), the quality of processes (specifically, the learning -teaching processes, mechanisms for governance, systems of

taking and working on feedback, existing channels of communication) and the output quality (for example, assessments and evaluations,, employability, economic benefits through earning and job satisfaction) (Sahney et al, 2004) .

Purpose and justification for the study

The main purpose and justification for this study is given below :-

(a) To understand the relevance of a TQM approach in the context of engineering education, taking into account all stakeholders, viz. students, faculty, top management, industry and parents.

(b) To cover diploma, UG and PG degree courses.

(c) To focus on Institutions located in Punjab and Chandigarh.

This study aims to understand the existing system of Engineering Education, how it fares in terms of skills, employability, relevance to industry, etc. Once these aspects are understood, we understand how TQM can enhance quality and then develop a model for it.

Given the situation outlined above, Engineering Education in India needs a systemic change and a major overhaul in the way it is envisioned and imparted. The situation calls for a new paradigm to address the problem statement listed above and for looking at Engineering Education that balances expansion and increase in quantity with improvement in quality.

Justification for the Research

While there have been attempts to consider the application of TQM to industries, research in the field of applying TQM to technical education and within it to Engineer-

ing Education has been limited. Even though some studies have been made, there is no comprehensive study that captures all aspects of TQM for Engineering Education. Specifically, in Punjab and Chandigarh, there has been an exponential rise in the number of institutions imparting Engineering Education. This study provides an opportunity to examine the quality issues related to them. Also, most of the existing studies in the process of focusing on the quality aspects and defining quality standards tend to neglect the core of TQM, that is, stakeholder satisfaction. Also, unlike the previous studies, that are process oriented, the present study, while looking at processes, also captures TQM in much greater detail from the perspective of multiple stakeholders- institutions, faculty members, students, parents and industry representatives. This gives a holistic view of the issues. In addition, the present study builds on the existing body of knowledge by virtue of the breadth that classifies the different types of institutions – both government and private. Using the UGC classification it reaches out to all different categories of institutions to examine quality issues across each type of institution, viz. Central Universities, State Universities, National institutes under the Ministry of Human Resource Development, Deemed universities and Private Universities. The present study is comprehensive as it also looks at different levels of Engineering Education from Diploma to Graduate and Post Graduate levels. It attempts to engage with and understand the quality issues across these levels. In this way, the study provides a thorough and systematic understanding of the quality issues in Engineering Education and the application of TQM to enhance quality.

In this way, this study will enable an understanding of the existing system of Engineering Education as imparted by the various types of institutions mentioned

above and will evaluate how it fares in terms of key output parameters such as skills, employability, research orientation and relevance to industry.

Justification in terms of Managerial/ Technical implications for the industry:

The present study assesses TQM as an approach that has the potential to bring about such changes. Given that the approach involves all stakeholders and impacts all levels, it is worthwhile to examine whether it is capable of bringing about systemic changes that can enhance the quality of Engineering Education. Given that it promises high degree of engagement, it is important to see the concrete steps through which this can be achieved across stages of planning, partnership formations and implementation that finally lead to enhanced results. Also, the processes through which it can be used for greater stakeholder participation and whether or not this results in greater satisfaction of all concerned stakeholders. For example, it is important to assess if such an approach can lead to the development of greater market linked skills leading to greater employability, or whether such an approach can lead to greater innovation through enhanced quality of research. In an era of massive changes in technology, this becomes critical towards achieving competitiveness and relevance for not only the industry, but also the entire economy of the country.

Justification in terms of National/ Economic/ Technical competitiveness

Given that India is positioning itself as a knowledge economy and in the context of rapid expansion that has been seen in Engineering Education, it is important to engage with quality issues. Given that there are concerns regarding quality and employability, the study would provide important directions that can create the conditions for addressing such concerns balancing growth aspirations of the country with quality assurance.

Once the above mentioned aspects around TQM are understood, this study will develop a model for TQM with respect to Engineering Education in Punjab and Chandigarh.

Assumptions

It is assumed that this study will give an in-depth picture of the situation regarding the quality of Engineering Education in Punjab and Chandigarh by studying a representative sample of institutions of various categories.

It is also assumed that this representative sample of institutions will cover all categories of institutions.

It is also assumed that this will provide insights into the picture for the country as a whole.

This study also assumes a direct linkage of the applicability of the TQM model to the operating model of Engineering Educational Institutions.(EEIs)

This study assumes that industry representatives will be able to clearly articulate their specific expectations from the workforce which is joining them after education from these institutions and also convey their thoughts linking those expectations to the processes at the educational institutions.