

# **Role of Strategic Partnership of Industry Academia in Skill Development**

By

**MANOJ KUMAR**

**Roll No. 2K17/Ph.D/DSM/06**

Under the Guidance of

**Prof. Suresh Kumar Garg**  
Department of Mechanical Engineering  
Delhi Technological University

**Dr Shraddha Mishra**  
Manager, Applied Research  
GIST Impact



**Delhi School of Management**

**Delhi Technological University**

Shahbad Daultapur, Main Bawana Road Delhi-110042 India

**March 2023**

**DELHI TECHNOLOGICAL UNIVERSITY – 2023**

**ALL RIGHTS RESERVED**

## CANDIDATE'S DECLARATION

I, hereby certify that the thesis titled “Role of Strategic Partnership of Industry Academia in Skill Development” submitted in fulfilment of the requirements for the award of the degree of Doctor of Philosophy’ is an authentic record of my research work carried out under the guidance of Dr. Suresh Kumar Garg and Dr. Shraddha Mishra. The matter presented in this thesis has not been submitted elsewhere in part or entirely to any other university or Institute for award of any degree.



MANOJ KUMAR

2K17/PHD/DSM/06

DELHI SCHOOL OF MANAGEMENT

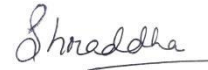
Delhi Technological University

## CERTIFICATE

This is to certify that the thesis titled, “Role of Strategic Partnership of Industry Academia in Skill Development”, submitted in fulfilment of the requirements for the award of the degree of Doctor of Philosophy is an original research work carried out under our supervision. The matter presented in this thesis has not been submitted elsewhere in part or fully to any University or Institute for the award of any degree, to the best of our knowledge.



**Prof. Suresh Kumar Garg**  
Department of Mechanical Engineering  
Delhi Technological University



**Dr Shraddha Mishra**  
Manager, Applied Research  
GIST Impact

## **ACKNOWLEDGEMENT**

I would like to express my gratitude to Almighty God for showering his blessings for completing my PhD work. Throughout my journey, I came across many researchers, academicians and practitioners who guided and motivated me. I am thankful to my faculty members for guiding me to carry out research work. The work completion would have not been possible without their constant support and guidance.

Special thanks to my PhD guides for supervising me and enabling me to learn the new concepts, grow and make effective decisions. I do not have right words to express my gratitude for my supervisor Prof. Suresh Kumar Garg for his constant guidance and mentoring. He has guided and handheld me throughout this journey of completing the Ph.D. research, questionnaire analysis, usage of statistical techniques in validating the data. I would also like to thank Co-guide Dr. Shradha Mishra for guiding at every step and helping in statistical tools and usage of relevant softwares in analysis.

I would also like to thank all the industry experts who took the time and filled out my questionnaire. I am thankful to my erstwhile colleagues Mr. O.P. Shukla, Joint Director, Department of Training and Technical Education and Mrs. Suman Dhawan, Deputy Director, Skill Development for motivating me to undertake this project and helping me in collection of primary data.

I owe a special debt of gratitude to my family. I am grateful to my wife Ms. Neena Garg for always supporting me and being so understanding.

MANOJ KUMAR

2K17/PHD/DSM/06

## EXECUTIVE SUMMARY

Skill Development is gaining tremendous importance in our country in recent years. The lack of employability as an outcome of the education system has given rise to the need for skill-based education. The development and economic growth of India will be accelerated if the youth of our country get Skill Development and acquire relevant skills. A new generation of youth with many skills is necessary for India to make the transition to a knowledge-based economy. Its ability to successfully develop, share, and apply knowledge will decide its competitive edge. In order to succeed in a knowledge economy, India must produce workers — knowledge workers and knowledge technologists — who are adaptable, analytical, and capable of being the engine for growth and innovation.

India requires a flexible educational system to accomplish this: the development of key competencies in secondary and postsecondary education; basic education to lay the groundwork for learning. India needs a flexible educational system to improve core competencies and practical skills; and additional ways to promote lifelong learning. In order to adapt the educational system to the new global context, creativity must be encouraged and training and education quality must be improved at all levels.

The research thesis entitled “Role of Strategic Partnership of Industry Academia in Skill Development” is written with intention to explore industry role towards skill development, and to know the various aspects of industrial collaborations and their impact on the skill ecosystem of the country. Present study is guided by following research objectives to have an overview about the skill ecosystem of India and to explore the role of industry in skill development in India and its future potential. In order to understand the industry perspective on the advantages and policy requirements for skill development in India, we need to develop a policy/strategic framework for industry association in skill development.

In order to satisfy the relevant objective, this research is designed to be a descriptive as well as exploratory in nature, as the research is supposed to be about finding the facts and drawing the conclusions. Based on the study, it is also about exploring something new to some extent. The larger study in this area uses primarily qualitative methods in that it focuses mostly on content analysis.

In the sequence of discussing all key topics of this research it is indispensable now to focus the main objective of the research and chapter plan as well. The foremost focus of this study is to explore and understand the Role of Strategic Partnership done between Industry and Academia in Skill development. The study has shown a good effort in enumerating the key objective of the research through the perspective of faculty and students. The research has made a first of its own kind of effort to draw the understanding of the Role of Strategic Partnership done between Industry and Academia in Skill development with the involvement of all key stakeholders in this domain. The study has gained the perception from the following key stakeholders; like trainers or educators, administrators, industry experts and Students.

The present study is divided into seven chapters and details of these chapters have been discussed in Introduction chapter. First chapter gives detail discussions about skill development eco-system. It covers the role of state and central government in India, the various policies and the strength-weaknesses of the skill development system. It also provides a discussion on the role of industry academic partnership in skill development. The chapter second has reviewed the literatures related to the research area, objectives and methodology. The review covers the various studies in different countries and the role of industry, government and institutions in skill development. Systematic Literature Review (SLR) is has become the differentiator of this chapter, it has been conducted on the research papers having studies in the area of skill development that had been carried out in Indian context. The chapter concludes with identifying the gaps in literature. The influence of skill training, the expectation of training, and the abilities that training are transferring to the students are the main topics of the research. Research Methodology, research design, sampling, research objective, sources of data collection, limitations & scope with significance of the study is widely been discussed in the chapter three. It also integrates the sources of data information along with the research tools & techniques such as Descriptive Statistics, Factor Analysis, Exploratory Factor Analysis, Confirmatory Factor Analysis, Generalized linear model etc. Students Perception of Skill Education is been shown in chapter four. This chapter provides the results and discussion of the responses received from the students on a structured questionnaire to understand the student's perspective on skill development. The trainer-trainee relationship, according to the model presented in chapter, functions best when there is stronger industry backing and institution infrastructure. Chapter five is about understanding academia industry association and gaining insights on it by capturing the perception of Trainers, Administration and Industry.

This chapter covers the results and discussions of the responses received on the structured questionnaire from the industry executives, trainers, government officials and institution administration. The analysis helps in understanding the role of industry academia partnership in enhancing the quality of skill development. The urgent need for employability skills has been argued as a means of enhancing job results, assisting individuals in adjusting to change, and enhancing their employment prospects. The sixth chapter identifies the drivers and enablers of developing educational skill excellence centres and then using the technique of Interpretive Structural Modelling (ISM) develops the diagraph which provides the key driver and enabler having high driving power. The results suggests that the skill-based education sector, requires a lot of changes and scrutiny to resolve the issue of unemployable youths in Indian economy. It is a time of call for action to address various issues of skill-based education. Last chapter compiles the key results and provide the conclusions based on the research carried out on role of industry academia partnership in skill development. The chapter also includes the limitations of the study and scope for future research. It came with the conclusion that, for India to maintain its competitive advantage, the educational institutions need to produce industry –ready candidates. This requires substantial intervention on part of higher education institutions to impart IT skills to students.



## TABLE OF CONTENTS

	Candidates Declaration	i
	Certificate	ii
	Acknowledgement	iii
	Executive Summary	iv
	Table of Content	vii
	List of Figures	xi
	List of Tables	xii
<b>1</b>	<b>CHAPTER 1: INTRODUCTION</b>	1-22
1.1	Introduction	1
1.2	Objectives Of Skill Education, Training & Development	5
1.3	Skill Education, Training And Development In National Policies	6
	1.3.1 The National Policy on Education (NPE)	6
	1.3.2 Skill Education in National Five-Year Plans	8
	1.3.3 Central Advisory Board for Education Committee Recommendation	12
	1.3.4 The National Skill Development Policy, 2009 (NSD)	13
	1.3.5 New Education policy 2020	15
1.4	Research Rationale	18
1.5	Research Objectives	20
1.6	The Chapter Plan	20
<b>2</b>	<b>CHAPTER 2: LITERATURE REVIEW</b>	23-41
2.1	Systematic Literature Review	24
2.2	Skimming Literature	24
2.3	Skill Development In India	27
2.4	Students' Satisfaction From Skill Education	31

2.5	Students' Expectation From Industry	32
2.6	Industry Outlook Towards Skill Education	34
2.7	Research Gap	40
<b>3</b>	<b>CHAPTER 3: RESEARCH METHODOLOGY</b>	42-54
3.1	Introduction	42
3.2	Research Rationale	42
3.3	Research Objectives	43
3.4	Research Design	44
	3.4.1 Perspective of Trainees	45
	3.4.2 Perspective of Trainers, Educators, Employers and Administration	46
	3.4.3 Drivers and Enablers of Developing Skill Centre of Excellence	47
3.5	Research Data & Analysis	48
	3.5.1 Descriptive Statistics	49
	3.5.2 Factor Analysis	49
	3.5.3 Exploratory Factor Analysis	49
	3.5.4 Confirmatory Factor Analysis	50
	3.5.5 Generalized Linear Model (GLM)	51
	3.5.6 Model Fit	52
3.6	Limitations Of The Study	53
3.7	Scope Of The Study	54
<b>4</b>	<b>CHAPTER 4: STUDENTS PERCEPTION OF SKILL DEVELOPMENT PROGRAMS</b>	55-81
4.1	Introduction	55
4.2	Students' Perception On Skill Development Programs	56
	4.2.1 Skill Education & Economic Infrastructure	57
	4.2.2 Skills development & Job Opportunities	58

	4.2.3	Industry Support & Employability Skills	59
	4.2.4	Trainer & Trainee Relation and Employability	60
<b>4.3</b>	<b>Research Methodology</b>		61
	4.3.1	Demographic characteristics	62
	4.3.2	Students Perception of the Role of Industry in Skill Development	64
	4.3.3	Role on Institutions in Skill Development	67
	4.3.4	Skills Provided in the Training Programs	67
	4.3.5	Exploratory Factor Analysis	69
	4.3.6	Principal Component Analysis	70
4.4	Findings		71
4.5	Discussions		76
4.6	Conclusions		80
<b>5</b>	<b>CHAPTER 5: INDUSTRY ACADEMIA PARTNERSHIP</b>		82-110
5.1	Introduction		82
5.2	Studies About Industry Academia Partnership		83
5.3	Research Methodology		85
	5.3.1	Demographic characteristics	86
	5.3.2	Requirements of Skilled Manpower	89
	5.3.3	Industry Institute Partnership	89
	5.3.4	Government Role in Skill Development	90
	5.3.5	Nature of Skills Required	90
	5.3.6	Funds Required for Skill Devolvment	91
	5.3.7	Skill Development Centre With Industrial Association	92
	5.3.8	Global Collaboration	93
	5.3.9	Ranking of Skill Development Dimensions	93
	5.3.10	Exploratory Factor Analysis	95
	5.3.11	Principal Component Analysis	96
5.4	Findings		98

5.5	Discussion	104
5.6	Conclusion	107
<b>6</b>	<b>CHAPTER 6: ISM OF DRIVERS AND ENABLERS FOR EXCELLENCE IN SKILL DEVELOPMENT</b>	111-132
6.1	Introduction	111
6.2	Literature Review	113
6.3	Identification of Drivers and Enablers of Skill Centre of Excellence	115
6.4	Research Methodology	121
6.5	Findings & Discussions	123
6.6	Robustness Testing	131
6.7	Conclusions	132
<b>7</b>	<b>CHAPTER 7: CONCLUSIONS</b>	133-138
7.1	Key Finding from the Research	133
7.2	Practical Implications of the study	136
7.3	Limitations of the Study	136
7.4	Scope for Future Work	137
7.5	Conclusions	137
	Bibliography	139-159
	Annexure 1	160-161
	Annexure 2	162-163
	Annexure 3	164-169
	Annexure 4	170-176

## LIST OF FIGURES

		Page No.
Figure 1.1	Local skills strategies	2
Figure 1.2	OECD's 64 Skills for employment indicators	7
Figure 2.1	Steps of Systematic Literature Review (SLR)	25
Figure 2.2	Analysis based on years	25
Figure 2.3	Content analysis through word cloud	26
Figure 2.4	Various strands of the review	27
Figure 2.5	Seminal Authors	37
Figure 2.6	Authors Affiliation	39
Figure 2.7	Funding agencies	40
Figure 2.8	Subject based reviews	40
Figure 3.1	Research Process	45
Figure 3.2	Sources of Data	48
Figure 4.1	Theoretical Framework	57
Figure 4.2	Demographic Characteristics of Trainees	65
Figure 4.3	Scree Plot	71
Figure 4.4	Path Analysis	77
Figure 4.5	Model Diagram	79
Figure 5.1	Path Analysis for Trainers	102
Figure 5.2	Model Diagram for trainers	106
Figure 6.1	Diagrammatic representation of Enablers through ISM model	130

## LIST OF TABLES

		Page No.
Table 4.1	Demographic Characteristics of Trainees	63
Table 4.2	Students Perception of the Role of Industry in Skill Development	65
Table 4.3	Role on Institutions in Skill Development	68
Table 4.4	Skills Provided in the Training Programs	69
Table 4.5	Trainer Aspects	69
Table 4.6	KMO Sample Adequacy of Trainees	70
Table 4.7	Factor Analysis of Trainees	72
Table 4.8	Factor Statistics of Trainees	73
Table 4.9	Factor Loadings of Trainees	73
Table 4.10	Factor Covariances of Trainees	74
Table 4.11	Model Fit of Trainees	77
Table 4.12	Models Information of Trainees	78
Table 4.13	Mediation Analysis of Trainees	79
Table 5.1	Demographic Characteristics of Trainers	87
Table 5.2	Requirements of Skilled Manpower	89
Table 5.3	Industry Institute Partnership	90
Table 5.4	Government Role in Skill Development	91
Table 5.5	Nature of Skills Required	91
Table 5.6	Funds Required for Skill Devolvement	91
Table 5.7	Skill Development Centre With Industrial Association	92
Table 5.8	Global Collaboration	93
Table 5.9	Various dimensions of skill development	94
Table 5.10	KMO Sample Adequacy of Trainers	96
Table 5.11	Factor Analysis of Trainers	97
Table 5.12	Factor Statistics of Trainers	98
Table 5.13	Factor Loadings of Trainers	99

Table 5.14	Factor Covariances of Trainers	100
Table 5.15	Model Fit of Trainers	103
Table 5.16	Models Information of Trainers	105
Table 5.17	Mediation Analysis of Trainers	106
Table 6.1	Structural self-interaction matrix (SSIM)	124
Table 6.2	Reachability Matrix	125
Table 6.3	Partitions of reachability matrix	127
Table 6.4	MICMAC Analysis	128

## **CHAPTER 1: INTRODUCTION**

In recent years, skill education has become incredibly important in our nation. The demand for skill-based education has arisen as a result of the education system's failure to produce employable graduates. The youth of our nation will benefit from faster development and economic growth if they receive skill education and acquire the necessary skills. The development of skilled human resources is a priority for both the central government and state governments. The National Skill Development Mission was established by the Hon. Prime Minister of India with the audacious goal of producing 500 million skilled workers over the course of the following five years. To better realize this goal, the National Skill Development Corporation was founded as at that time, the system for skill education and training is was disjointed, poorly governed, and of poor quality. Therefore, the goals of skill education, training, and development need to be revised in order to be consistent with the demands of industry and the changing environment. In this context, it is important that we examine the current situation, its issues, and develop any potential recommendations for the skill education, training, and skill development industry.

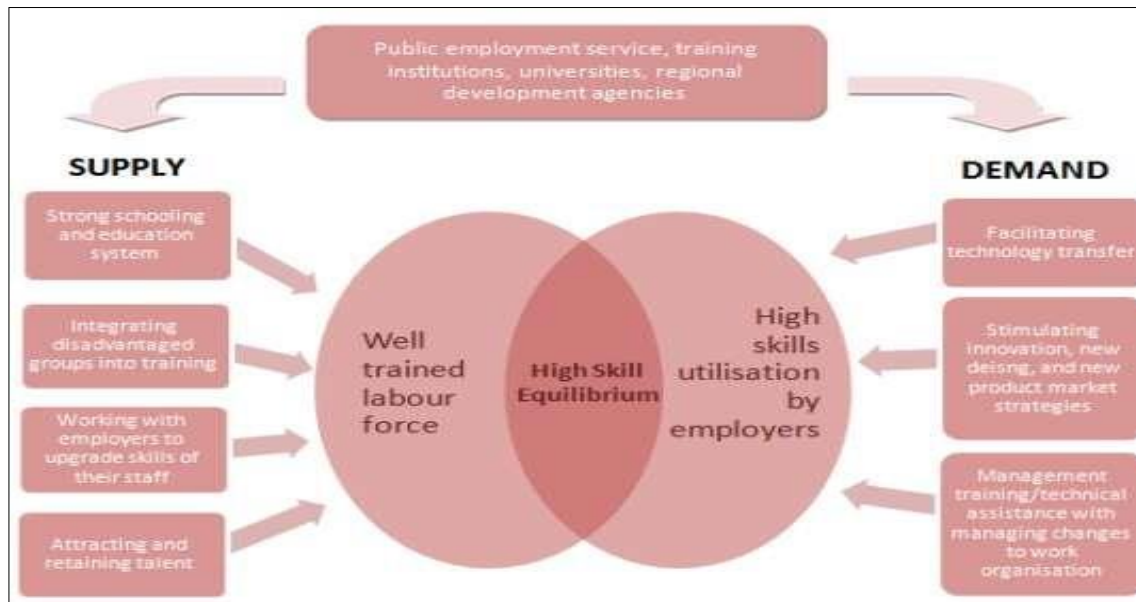
### **1.1 INTRODUCTION**

India benefits greatly from having a young population, which increases its ability to supply labor to the market. The Ministry of Skill Development and Entrepreneurship was established after research revealed a significant demand for skilled laborers worldwide. In June 2014, the ministry made an announcement. Given the changes in the labor market, India's Prime Minister, Shri Narendra Modi, felt it was important to concentrate on skill development; as a result, the ministry was created. It concentrated on collaborating closely with other ministries to address the enormous demand for qualified workers. Its objectives were to establish uniform, shared standards for instruction and to coordinate organizational efforts focused at skill development. It aimed at developing and laying down uniform and shared standards of instruction and coordinating the organization's efforts to build skills. It also emphasizes uniting all the other ministries to work towards skill development in a coordinated way. The organization of skills development with significant parties involved is well planned. The National Skill Development Corporation and the Ministry collaborate closely (NSDC). It aids in the mapping of skill sets, market research, and curriculum creation for training institutions. By supporting skill development programmes, it seeks to close the skills supply-demand gap as shown in Figure 1.1.



The integrated approaches to skill development at the local level, involving partners from a variety of different sectors (such as education, training, economic development, migration, and employment), and various types of actors are suggested by the OECD (e.g., between education providers, local businesses, employment agencies, NGOs, social innovators and economic-development actors). The best methods will strike a balance between the supply and demand of abilities.

***Well trained labor force + High Skill utilization by the employer = High Skill Equilibrium***



**Figure 1.1 Local skills strategies**

Source: <https://www.oecd.org/cfe/leed/localskillsstrategies.htm>

Government-run Industrial Training Institutes, sometimes known as ITIs, are a significant source of skill training in the nation. In addition to this, there are privately run skill schools and Industrial Training Centers, or ITCs. The Labor Laws in India also make sure that students pursuing technical education receive training through apprenticeship programmes offered by business. Even though the private sector contributes significantly to skill development, the public sector still predominates in the nation's skill development programmes.

In order to support the nation's skill development programmes, the National Policy on Skill Development was created in 2009. The Ministry of Skill Development and Entrepreneurship is responsible for this Public Private Partnership approach. By establishing a sizable, exceptional skill institution with the required training infrastructure, it was created to encourage skill development. India has a large number of aspirants, but it lacks the infrastructure

necessary to provide skill education and training. As a result, the government has increased the number of these partnerships to ensure the model is successful in providing skill training. On December 27, 2013, the National Skills Qualifications Framework (NSQF) came into effect. The framework was created using the most recent competences approach, which examines the knowledge, abilities, and aptitude required for each qualification. The levels are numbered one through 10 and each level's learning objectives are specified. Whether or not the abilities were acquired through formal, informal, or non-formal learning is irrelevant. The framework is built on competence modelling, which is regarded as a very effective way to map the skills required for a certain function. India has a vast, varied, and extremely complicated skill development model.

India has a sizable population that is entirely diverse in makeup. In India, skill expansion is divided into two groups. They are skill-based skill training and skill education. In India, the Ministry of Human Resource Development oversees education and skill development. It oversees the nation's public primary, secondary, and higher education systems. Engineering colleges and polytechnic institutions are the sources of technical education. The University Grants Commission oversees the operation of both colleges and universities that provide education (UGC). They provide funding, guarantee the establishment of uniform standards for instruction, assessment, and learning at universities, and they also provide grants. The All India Council for Technical Education oversees the technical institutions in India (AICTE). The Ministry of Skill Development and Entrepreneurship's (MSDE) Skill Development Initiative (SDI) prioritized growing the number of Plans.

The programme, which will last for five years, aims to train one million people. The programme seeks to give participants the abilities needed to do their jobs well. It concentrated on giving skills to young graduates and school dropouts in addition to current employees and students. The PPP concept appeared promising since it created a pool of talented workers, narrowing the gap between supply and demand. It attempts to design and construct curricula for various levels and trades, generate instructional materials that are pertinent and engaging, train the instructors, staff, and professors, and create a supportive environment for training. Skill Education, Training, and Skill Development refers to all forms and levels of the educational process that include, in addition to general knowledge and academic skills, the study of technologies and related sciences, as well as the acquisition of practical skills, know-how, attitudes, and understanding relating to professions in various sectors of societal and economic life.

Skill Education, Training, and Skill Development is defined as:

- a) a means of preparing for occupational fields and effective participation in the world of work;
- b) an aspect of lifelong learning and a preparation for responsible citizenship; and
- c) an instrument for promoting environmentally sound sustainable development.

A crucial component of the country's education effort is vocational and technical education (VET). It is essential to reframe the goals of skill education and training and to make it adaptable, modern, relevant, inclusive, and innovative in order for it to effectively contribute to the changing global environment.

It is crucial to understand that India is predicted to overtake the United States as the world's leading source of human resources by 2025, with more than 35% of its population under the age of 15, 700 million individuals under the age of 35, and population growth of 1.8% annually. India has the chance to establish itself as a reliable supplier of skilled labor in the new era of the knowledge-driven society, dwindling workforce, and ageing population in industrialized nations.

Focusing on offering high-quality skill education and training will benefit the country's enormous population. The career opportunities for undergraduates and post-graduates in broad disciplines are decreasing due to the changing global environment. The degree-level education provided does not focus on developing skills or being market-oriented. People today seek out more adaptable and multi-skilled learning options in order to be mobile across employment sectors and geographical places as a result of the changing nature of work and employment. These opportunities have not been made available by the regular education system. Additionally, it has never been easier to see the close connection between the economy and education than it is right now. The market economy has had a significant impact on both how educational institutions operate and how young people choose their educational paths. Prospective students are no longer just driven by a desire to learn; instead, they are also motivated by the possibility of finding employment after graduation. The emphasis has shifted to skill-based, sector teaching and learning pedagogy as a result of the dearth of employment options for conventional graduates.

Though essential for a person's fundamental development, traditional education that just produces knowledge is rapidly losing its significance as a tool for individual and societal development. The rising rate of unemployment among young people with college degrees in our nation is raising major questions about the value of traditional education in the context of leading a better life in a better society. Because they are unable to use what they have learned to better their everyday lives or find productive jobs, our youth are beginning to doubt the whole purpose of such an educational system. As a result, it is essential that we as a society reconsider what should be the goal or result of our educational system.

In the modern economy, a society's goals have also shifted from meeting its most basic requirements to promoting empowerment. Instead of relying solely on textbook instruction, the educational system needs to be supported by skill-based teaching and learning pedagogy. The human resource should be competent, empowered, and flexible rather than unskilled or semi-skilled.

## **1.2 OBJECTIVES OF SKILL EDUCATION, TRAINING & DEVELOPMENT**

The fundamental purposes of education delivery have undergone a paradigm shift as a result of the enormous advances in science, technology, and socioeconomics. While factors like escalating competition, a slowing economy, poverty, illiteracy, population imbalances, and political unrest are putting pressure on policymakers and ordinary citizens alike, the significance of education, and particularly "relevant education," is rising as a viable solution to address these issues in our society.

Thus, skill education, training, and development must now be a fundamental component of our general education system. Additionally, new connections between education, the workplace, and the community at large are required. In this context, skill education, training, and development should be a component of a lifelong learning system that is tailored to the demands of the local community and the advancement of technology on a global scale. In order to allow horizontal and vertical articulation within the educational system and between school and the workplace, skill education, training, and skill development should start with a wide foundation. This will help to eliminate all forms of prejudice. The success of the VETSD paradigm depends on the integration of Skill Education, Training, and Development into the academic community.

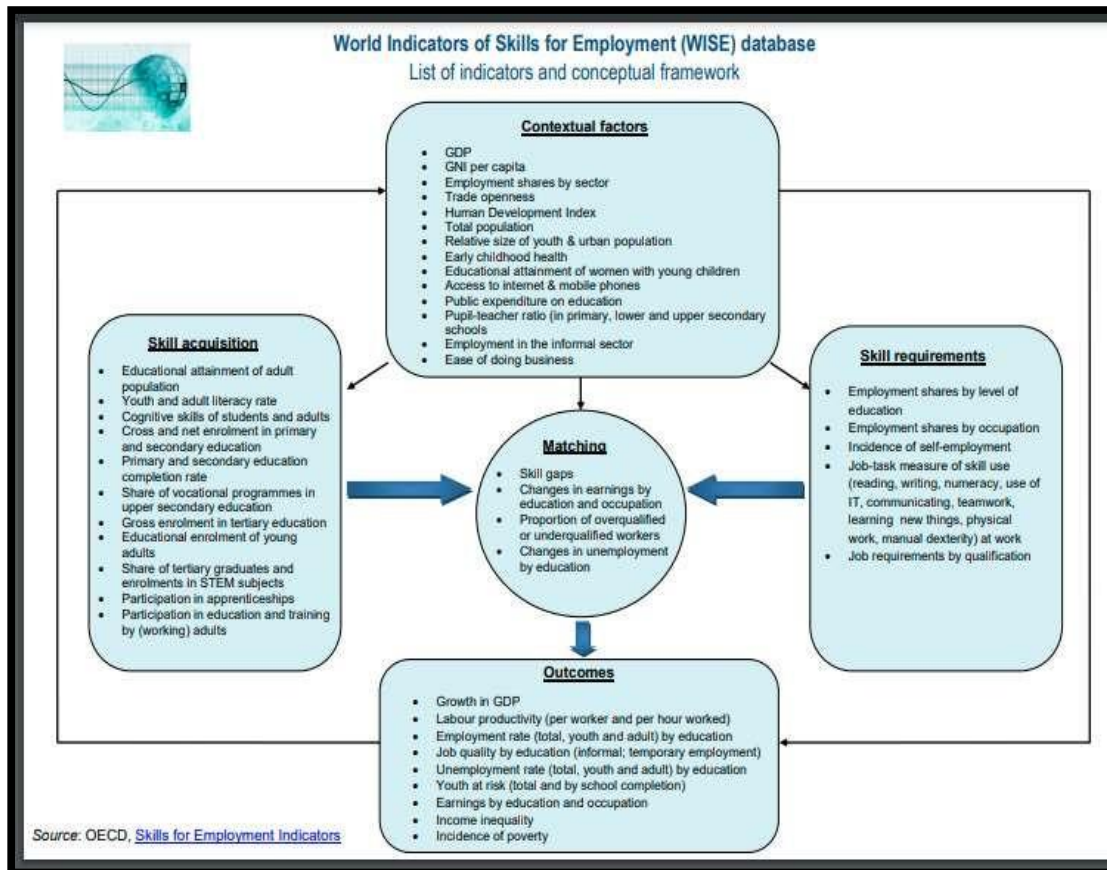
### **1.3 SKILL EDUCATION, TRAINING AND DEVELOPMENT IN NATIONAL POLICIES**

Over time, attempts have been made to reform Indian education. The Skill education system, however, has continued to be of a terminal nature. The option of vertical mobility into degree programmes in the student's preferred skill sector is not available to those taking courses in the skill streams. The failure of has been attributed to this, as well as issues with quality, standards, recognition, and fragmentation. A number of national initiatives and strategies have placed an emphasis on skill education, employment, and development. In the paragraphs that follow, the specifics of the various programmes, plan and policies are discussed in detail.

#### **1.3.1 The National Policy on Education (NPE)**

According to the policy, "The proposed educational restructure is vital to the adoption of systematic, carefully planned and rigorously conducted programmes of Skill education." These components are intended to help students cultivate positive attitudes towards work and life, to improve individual employability, to lessen the mismatch between supply and demand, and to offer a different option for those who plan to pursue higher education without having a specific goal or interest. In accordance with additional policy, graduates of skill courses will be given options for professional advancement, career advancement, and lateral admission into general, technical, and professional education programmes through bridge courses. Full-fledged skill education at skill institutions and schools following VIII+ and X+ was also stressed in the Kothari Commission Report.

According to the global stakeholder group working in the OECD Future of Education and Skills 2030 project, skills are the capacity and ability to carry out procedures and to be able to utilize one's knowledge responsibly to attain a goal. The mobilization of knowledge, skills, attitudes, and values to handle complex demands is part of a comprehensive view of competency. People must rely even more on their uniquely (so far) human capacity for creativity, responsibility, and the ability to "learn to learn" throughout their lives. Trends like globalization and advances in artificial intelligence change the demands of the labor market and the skills needed for workers to succeed. In line with globalized trends, there are 64 skills for employment indicators as defined by OECD are shown in Figure 1.2.



**Figure 1.2 OECD's 64 Skills for employment indicators**

Only a very small portion of the Indian workforce in the age range of 19 to 24 (less than 5%), according to the 12th Five-Year Plan (2012–2017), got formal skill education. In contrast, the percentage is 52% in the USA, 75% in Germany, and as high as 96% in South Korea. These numbers only serve to emphasize how urgently India needs to spread skill education. The fact that skill education in the past has mostly concentrated on Grades 11–12 and on dropouts in Grades 8 and up is one of the main causes of the modest numbers of students receiving it today. Additionally, many students with Skill courses who graduated from Grades 11 and 12 lacked clear pathways to continue their education with their chosen vocations in higher education. Additionally, the admission requirements for general higher education were not intended to give opportunities to students with skill education credentials, putting them at a disadvantage in comparison to their countrymen who had "mainstream" or "academic" education. For students in the Skill education stream, this resulted in an absolute lack of vertical mobility. This problem was only recently resolved with the introduction of the National Skills Qualifications Framework (NSQF) in 2013.

Generally speaking, skill education is intended for pupils who cannot succeed in mainstream education and is thought to be inferior to it. Students' decisions are impacted by this perception. It is a major issue that can only be resolved by completely redesigning the way kids will receive skill education in the future. This policy mandates the gradual integration of skill education programmes into mainstream education in all educational institutions in order to address the social status hierarchy associated with skill education. High-quality skill education will be seamlessly incorporated into higher education, starting with early exposure to skills in middle and secondary school. Every youngster will be taught at least one profession and be exposed to several more. This would lead to a greater emphasis on the value of many professions involving Indian arts and artisanship as well as the dignity of work.

Over the next ten years, skill education will be gradually incorporated into all institutions of higher learning and education. Based on a mapping of local opportunities and analysis of the skills gaps, focus areas for skill education will be determined. To oversee this project, MHRD will establish a National Committee for the Integration of Skill Education (NCIVE), which will be composed of professionals in skill education and officials from various Ministries.

### **1.3.2 Skill Education in National Five-Year Plans**

The Eighth Five Year Plan designated the skillification of education as a major area. However, the policy framework established by the NPE was still included in the amended policy formulations that outlined the changes to the NPE. Nevertheless, the target coverage was changed to divert 10% of upper secondary pupils by 1995 and 25% by 2000.

The Ninth Plan put an emphasis on closing gaps, updating curricula with a focus on skill-based and career-oriented courses, expanding and diversifying the open learning system, restructuring teacher preparation, and making greater use of information and communication technology. Skill education and training has been noted as a key thrust area in the tenth five-year plan. In order to ensure that there is consistency between the need for and supply of skills, a special emphasis has been placed on skill education. The Skill Education Mission has received an additional 650 crores rupees in funding under the Tenth Plan.

The Planning Commission established a special Working Group on Skill Education for the Tenth Plan in 2000 with the growing issue of unemployment in mind. According to the working group's suggestions, it was suggested that the centrally supported scheme be reformed into the Tenth Plan with the following characteristics: -

- There is a need to develop a relationship between Skill courses at the +2 level and courses at the university level.
- Skill courses should be competency-based and in modular form with a credit transfer mechanism and facilities for multi-point entry/exit. It is also necessary to alter the current graduation-level entry requirement for Skill courses.
- The current programme should be strengthened by integrating industries through Memorandums of Understanding in course design, curriculum development, faculty/student training, and course certification.
- In order to maintain the programme, schools may think about imposing fees and designing the courses to be self-supporting.
- The facility for apprenticeship training needs to be used entirely and made obligatory.
- To do this, the Board of Apprenticeship Training should decide the placement of individuals who have finished Skill studies for apprenticeship and training as soon as the results of the +2 tests are announced.
- Local business and industry should be heavily involved in determining the need and carrying out district-wide skill surveys prior to the introduction of skill courses in schools.
- The Kendriya Vidyalaya and Navodaya Vidyalaya school systems should be required to have the resources necessary to provide skill training.
- When creating skill courses, consideration should be given to the needs of people with disabilities as well as their incorporation into the curriculum.
- Under the plan, states may get financial support to establish testing and certification programmes in collaboration with user organizations and professional associations.
- The Skill Education Board of the All-India Council for Technical Education (AICTE) has to be reactivated in order to provide technical assistance to the educational system and to forge connections with other technical institutions.

In order to improve networking, linkages, targeted targeting, and resource utilization, the Tenth Five-Year Plan's Steering Committee on Secondary, Higher, and Technical Education recommended that Industrial Training Institutes (ITIs), polytechnic education, and skill



education at the secondary school level all fall under one department of the state government. The Centrally Sponsored Scheme of Skillization of Secondary Education in the Tenth Plan has a budget of Rs. 350 crores set aside for it.

The Tenth Five Year Plan of India, which was launched in 2002 and ran till 2007, focused on several key areas of development, including education, agriculture, and infrastructure. While the overall focus of the plan was to achieve sustainable and inclusive economic growth, it did place significant emphasis on the skill education sector, recognizing the crucial role that skill development and vocational education would play in driving economic growth and alleviating poverty.

As part of the Tenth Five Year Plan, several new policies and initiatives were launched to boost the skill education sector, including the National Skill Development Mission, the National Vocational Education Qualification Framework, and the Pradhan Mantri Kaushal Vikas Yojana. These policies aimed to boost the participation of women and underserved populations in vocational training programmes, enhance the quality and accessibility of skill education, and support the skill education industry financially and institutionally. Overall, the Tenth Five Year Plan was crucial in establishing the groundwork for the growth of the skill education industry in India, and its policies still influence how the nation views skill development and vocational training.

The tenth five-year plan for India, which began in 2002 and ran until 2007, placed a strong emphasis on a number of important development sectors, including infrastructure, agriculture, and education. While achieving sustainable and equitable economic growth was the plan's main goal, it did place a lot of attention on the skill education industry because it understood the critical role that skill development and vocational education would play in promoting economic growth and reducing poverty.

The National Skill Development Mission, the National Vocational Education Qualification Framework, and the Pradhan Mantri Kaushal Vikas Yojana are just a few of the new policies and programmes that have been introduced as part of the Tenth Five Year Plan to help the skill education sector. These regulations seek to boost the availability and quality of skill education. These policies aimed to boost the participation of women and underserved populations in vocational training programmes, enhance the quality and accessibility of skill education, and support the skill education industry financially and institutionally.

Overall, the Tenth Five Year Plan was crucial in establishing the groundwork for the growth of the skill education industry in India, and its policies still influence how the nation views skill development and vocational training.

- The skill classes should be based on demand and need, taking into account how quickly technologies and sectors are developing. In order to accommodate variations in demand patterns, skill courses must be structured with flexibility.
- The current programme should be strengthened by integrating businesses through MoUs in the creation of courses, their certification, and the instruction of teachers and students.
- The manufacturing industry currently makes up the majority of skill courses. Given this industry's sluggish growth and the booming potential in the services sector, skill training ought to place more of an emphasis on the latter.
- At schools, ITIs, polytechnics, community colleges, etc., there should be a focus on the convergence of programmes like the Sarva Shiksha Abhiyan, Adult Education, and Skill Education Programme.
- Given that a number of districts in Uttar Pradesh, Bihar, Haryana, Rajasthan, and Madhya Pradesh have a weak industrial foundation, the Skill education programme has to be reviewed.
- To stay up with technological advancements, the syllabi for Skill subjects should be updated frequently. Trades like food processing, dairy technology, leather and tanning technology, etc. are particularly relevant in this regard.
- To stay current with technical advancements, skill institutes should network with professional institutions like the Central Food and Technology Research Institute (CFTRI), Mysore, the Central Leather Research Institute (CLRI), Chennai, etc.
- The ability of the local industry to hire graduates of a particular trade should be the main focus of the skill education programme. It's important to prevent an oversupply of students studying a particular trade. Even within a trade, diversity is necessary in this situation.
- The need for skill education teacher training requires immediate attention.
- Teachers of skill education, master artisans, and apprentices should often share ideas and skills.

In order to effectively implement skill education programmes and impart skills, the apex industry associations such as the Federation of Indian Chambers of Commerce and Industry

(FICCI), Associated Chambers of Commerce and Industry (ASSOCHAM), and Confederation of Indian Industry (CII) need to be more involved. Despite the Tenth Five Year Report's compelling recommendations, these were not implemented in all the sector of Skill Education, Training and Skill development as foreseen.

### **1.3.3 Central Advisory Board for Education Committee Recommendation**

India's national and state governments receive recommendations from the Central Advisory Board for Education (CABE), an advisory body that covers a wide variety of educational-related topics. The CABE Committee was established to advise and assist the Indian government with many facets of implementing education policy.

The CABE Committee's main proposal was to raise the standard and applicability of skill education and vocational training programmes in India. The Committee stressed the need to increase the appeal and accessibility of vocational education for students, particularly those from disadvantaged families, and to equip them with the abilities and information required to succeed in the job market. The CABE Committee also suggested that, in order to improve the effectiveness and engagement of vocational education, information and communication technology (ICT) be incorporated into the skill education sector. The Committee also stressed the importance of industry and academics working closely together to make sure that the skill education programmes being given are in line with the demands of the labour market.

Overall, the CABE Committee's recommendations have had a considerable impact on the growth of India's skill education industry and the promotion of the value of vocational education for the nation's economic and social development.

The Central Advisory Board for Education (CABE) Committee report on the universalization of secondary education, which was published in 2005, concentrated on the opportunities and challenges in carrying out the Right to Education Act, which aims to provide free and compulsory education to all children in India between the ages of 6 and 14 years. The necessity for secondary education to be made available to all people was one of the main recommendations made by the CABE Committee in this report. The Committee stressed the importance of secondary education access for children's total development, including their cognitive, social, and emotional growth, as well as for their prospects for employment in the future.

Consequently, it was suggested that there was a need to raise the standard of secondary education, particularly through the creation of a more adaptable and inclusive curriculum, the use of technology in teaching and learning, and the establishment of stronger teacher preparation programmes. The Committee also advocated for increased community participation and involvement in the educational field, including the support of PTAs and the participation of local communities in the design and delivery of secondary education curricula. Overall, the CIBE Committee's report on the universalization of secondary education underscored the necessity of a holistic and inclusive approach to education policy and execution in India and highlighted the significance of secondary education in determining the future of the nation.

#### **1.3.4 The National Skill Development Policy, 2009 (NSD)**

In order to expand the country's skill education market, India introduced the National Skill Education Qualification Framework (NSEQF) and the National Skill Development Policy (NSDP) in 2009. The goals of these projects were to build a thorough and integrated system for skill development and vocational education and to give people the knowledge and abilities they required to succeed in the job market.

The National Skill Education Quality Framework (NSEQF) is a hierarchical framework that offers a framework for the classification and identification of various levels of skill education programmes, from basic to advanced. The National Skill Education Quality Framework (NSEQF) intends to guarantee the calibre and applicability of skill education programmes and to offer a uniform framework for the accreditation of various kinds of vocational and technical education programmes across the nation.

The NSDP, on the other hand, is a thorough policy that outlines the vision, objectives, and plans of action for the growth of India's skill education industry. In order to ensure that skill education programmes are in line with the demands of the labour market and to support the efficient integration of technology in skill development programmes, the NSDP emphasises the necessity for strong collaboration between industry, government, and academia.

The NSEQF and NSDP have significantly influenced the growth of the skill education industry in India and have contributed to the establishment of a more cohesive and successful system for skill development and vocational education in the nation. Additionally, these initiatives

have assisted in raising the caliber and relevance of skill-education programmes, as well as in gaining the job opportunities in the market.

Aiming to skill 12–15 million youth annually is the National Skill Development Policy's ambitious goal. The Government of India has established the National Skill Development Mission (under the auspices of the Hon. Prime Minister of India), the Coordination Committee, and the National Skill Development Corporation as part of this programme and to assure its execution. The Policy includes the creation of a National Skill Education Qualification Framework among many other proposals. The framework proposes the following features: -

- a) Competency-based certification and credentials based on nationally recognized benchmarks and requirements
- b) Learning achievement and qualification certification
- c) A variety of national qualification levels based on factors including responsibility, activity complexity, and transferability of skills.
- d) The avoidance of qualification overlaps and duplication while ensuring that all training requirements are met.
- e) A character with a modular structure that allows for incremental success that can be accumulated to produce an identifiable qualification.
- f) A system of quality assurance that would support skill portability and labor market mobility.
- g) Recognition of prior learning from formal, non-formal, and informal settings in order to promote lifelong learning through an improved skill recognition system.
- h) Flexible and open system that will allow capable people to advance their diplomas and degrees by testing and certification of their knowledge and skills.
- i) A variety of academic and skill-based learning routes that include formal and informal learning, including learning at work, and provide vertical mobility from skill to academic learning Multiple certification agencies/institutions will be encouraged within the NVQF.
- j) Guidance for individuals in their choice of training and career planning.
- k) Comparability of general educational and skill qualifications at appropriate levels.

- 1) Nationally agreed framework of affiliation and accreditation of institutions.

### **1.3.5 New Education policy 2020**

The Ministry of Human Resource Development (MHRD) emphasized the importance of skill education more in the National Education Policy (NEP) 2020, which was approved by the Union Cabinet. According to the NEP, "at least 50% of learners" enrolled in formal education programmes "must receive exposure to skill education."

According to the NEP highlights, "Quality Skill education will be seamlessly incorporated into higher education beginning with Skill exposure at early ages in middle and secondary school." According to NEP, throughout Classes 6 to 8, key Skill crafts including carpentry, electric work, metal work, gardening, pottery making, etc. will be "sampled" based on decisions made by States and local communities. The Indian government approved the National Education Policy (NEP) 2020, a framework for the country's educational system, in July 2020. By embracing fresh and cutting-edge approaches to instruction, learning, and evaluation, it seeks to transform the Indian educational system. The NEP 2020 has a strong emphasis on holistic education and places special emphasis on students' total development by fusing together different learning domains like physical, cognitive, emotional, and social learning.

The NEP 2020 places a strong emphasis on incorporating innovation and technology into education to give students improved learning possibilities. The NEP 2020 seeks to transform India into a knowledge-based society and offer its people access to high-quality education that meets international standards. The goal of the policy is to make the educational system more accessible and inclusive by promoting transdisciplinary courses, reducing test-related stress, and encouraging the use of regional languages. It also aims to advance research in all facets of education and increase the bar for teacher preparation. The NEP 2020 programme strongly prioritizes that every youngster should learn "at least one vocation" and be "exposed to numerous others," according to the proposed legislation. The Policy also promotes a 10-day bag-free period with "local Skill experts" to help the students gain a better understanding of the vocation.

The policy also mentions implementing Skill courses "in a stepwise manner over the next decade" in secondary schools. The NEP also mentions establishing "skill labs" in association with polytechnics and nearby businesses. Another idea is to offer up skill courses in an online format. The National Education Policy declares that "a concerted national effort will be made

to offer universal access and affordable opportunity to all children of the country to get quality holistic education-including Skill education-from preschool to Class 12."

The National Education Policy (NEP) 2020 lays a strong emphasis on students' ability to enhance their skills and competences. The strategy acknowledges that the educational system must give students the practical skills and competences they will need for their future employment in addition to the theoretical information they will need. The educational system will be reoriented as part of NEP 2020 to encourage multidisciplinary and holistic education with an emphasis on skill development. All tiers of the educational system, from elementary school to higher education, will be subject to the policy's introduction of vocational education and training.

The offered vocational courses will be created to meet the demands of the sector and will be instructed by authorities in those sectors. Additionally, the NEP 2020 seeks to give students practical experience and to promote innovation and entrepreneurship while giving students practical experience through internships and apprenticeships. The policy promotes the use of technology in the classroom to give students hands-on experience with the newest tools and methods employed in a variety of professions. In conclusion, the NEP 2020 encourages vocational education, practical experience, entrepreneurship, and the incorporation of technology in education, all of which are critical to the development of skills and competences among Indian students. The proposal also suggests "local teacher education programmes," wherein schools might contract local experts to conduct shorter courses in skill crafts. There are ten attributes to think about Education and training for skills in NEP 2020

**i) Vision for balanced education – Socially meaningful and aspirational**

“In order to remove damaging hierarchies and silos between various fields of learning, there should be "no hard separations between arts and sciences, curricular and extracurricular activities, between Skill and academic streams, etc."

**ii) Re-imagination of Skill Education for building competencies**

“Skill education is thought to be subpar to traditional education and mostly intended for kids who struggle with the latter. Students' decisions are impacted by this perception. It is a major issue that can only be resolved by completely reimagining how children will receive skill education in the future.”

**iii) Inclusive, Interoperable, interdisciplinary and outcome-based education**

“The General Education Council (GEC), commonly known as the "graduate attributes," will describe the anticipated learning outcomes for higher education programmes as the fourth vertical of HECI. A national framework for higher education qualifications also known as National Higher Education Qualification Framework (NHEQF) will be articulated by the GEC and it shall be in synchronise with the National Skills Qualifications Framework (NSQF) to affluence the integration of Skill education into higher education.”

**iv) For 21-century capacity building**

"A holistic and multidisciplinary education will help develop well-rounded individuals with critical 21st-century competencies in fields across the arts, humanities, languages, sciences, social sciences, and professional, technical, and Skill fields; an ethic of social engagement; soft skills, such as communication, discussion, and debate; and rigorous specialization in a chosen field or fields," according to the report.

**v) School internships for skill appreciation and craft-centric learning**

As determined by States and local communities and as mapped by local skilling needs, "every student will take a fun course, during Grades 6 to 8, that gives a survey and hands-on experience of a sampling of important Skill crafts, such as carpentry, electric work, metalwork, gardening, pottery making, etc."

**vi) Professional development of teachers**

“By 2022, the National Council for Teacher Education in its reorganised new form as a Professional Standard Setting Body (PSSB) under GEC, in consultation with NCERT, SCERTs, teachers from across levels and regions, expert organisations in teacher preparation and development, expert bodies in Skill education, and higher education institutions, will develop a common guiding set of National Professional Standards for Teachers (NPST).” The National Council for Teacher Education will create a set of National Professional Standards for Teachers (NPST) that will serve as a common framework by the year 2022.

**vii) Integration of Skill Education with formation of NCIVE**

“Over the next ten years, skill education will be gradually incorporated into all educational institutions, whether public and private. Based on a mapping of local opportunities and analysis of the skills gaps, focus areas for skill education will be determined. The Ministry of Human Resources and Development (MHRD) will establish a National Committee for the Integration of Skill Education (NCIVE), which would include representatives from across Ministries, in partnership with industry, to oversee this effort.”

**viii) Job market orientation with multiple-entry and exit options**



“The undergraduate degree will last for either three or four years, with a variety of exit options and appropriate certifications, such as a certificate after one year in a discipline or field that includes skill and professional areas, a diploma after two years of study, or a bachelor's degree after three years of study.”

**ix) Recognition of Prior Learning (RPL) and alignment with International Standards**

“Further information about the National Skills Qualifications Framework for each discipline, occupation, and profession will be provided. The International Labour Organization's International Standard Classification of Occupations will also be matched with Indian criteria. This Framework will serve as the foundation for prior learning recognition.”

**x) Technological development and student entrepreneurship**

“Given the rapid rate of technical advancement and the blatant ingenuity of tech-savvy educators and businesspeople, especially student entrepreneurs, it seems inevitable that technology will have a significant impact on education in a variety of ways, only some of which can currently be predicted.”

## **1.4 RESEARCH RATIONALE**

Only 2% of our workforce between the ages of 15 and 29 is formally skilled at the moment. However, data indicate that 90% of job openings call for skill sets that aren't taught in our schools and institutions. A new generation of youth with many skills is necessary for India to make the transition to a knowledge-based economy. Its ability to successfully develop, share, and apply knowledge will decide its competitive edge. In order to succeed in a knowledge economy, India must produce workers — knowledge workers and knowledge technologists — who are adaptable, analytical, and capable of being the engine for growth and innovation.

India requires a flexible educational system to accomplish this: the development of key competencies in secondary and postsecondary education; basic education to lay the groundwork for learning. India needs a flexible educational system to improve core competencies and practical skills; and additional ways to promote lifelong learning. In order to adapt the educational system to the new global context, creativity must be encouraged and training and education quality must be improved at all levels.

India needs an adaptable educational system that can change with the demands of the workforce and society. It may not be possible to adequately educate kids for the fast-paced and dynamic world of today using the traditional education system, which is mostly centered on rote learning

and testing. Students might choose from a variety of learning pathways, including as academic and vocational programmes, internships, and apprenticeships, under a flexible educational system. This would expose pupils to real-world situations and provide them with the abilities needed for future employment.

A flexible educational system would also enable students to choose between courses, study at their own speed, and take breaks for vacations or employment without interfering with their education. Education would become more open to all students as a result.

Particularly for students from underrepresented groups who might not have access to traditional educational institutions, this would increase education's accessibility and inclusivity. The National Education Policy (NEP) 2020 outlines various reforms intended to make education more inclusive, accessible, and student-centered while acknowledging the necessity for a flexible educational system. With a focus on skill development, the NEP 2020 seeks to advance multidisciplinary and holistic education while also promoting the use of technology and innovation in the classroom.

In conclusion, India requires a flexible education system to adapt to the changing demands of the workforce and society, and the NEP 2020 is a positive beginning in that regard.

India has been pursuing a skill development programmes since gaining its independence in the form of ITIs and Polytechnics. In the beginning, foreign nations like Holland and Germany offered assistance by providing cutting-edge equipment for skill development, but as time went on, the upgrading of ITIs and Polytechnics system failed to happen, and these became routine institutions focusing on finishing the curriculum and providing some hands-on training. They lost touch with the market and did not improve these schools' marks, which caused a significant gap between the skill sets of trained students from ITIs and Polytechnics and what the industry expected of them. Due to this, the students' placement in the sector has been quite bad. Instead of being hired as full-fledged operators or supervisors, the students were taken on as trainees at very low salary, trained for the minimum of six to twelve months in the business, and then participated in regular employment.

Now, every business with a net worth of at least INR 500 crore, a turnover of at least INR 1,000 crore, or a net profit of at least INR 5 crore is required to form a CSR committee and devote at least 2% of its average net earnings over the previous three years to corporate social responsibility. The majority of reputable companies, including LG Electronics, Samsung India Pvt. Ltd., Oriental Insurance Co. Ltd., Honda Motors, Honda Motorcycle and Scooters Pvt.

Ltd., and Maruti Suzuki India Ltd., have stepped forward to support training programmes being provided in various industrial training institutes. Positive outcomes have been seen in a number of areas, including better training, industry-ready individuals, improved industry absorption, and improved compensation. Nevertheless, it is noticeable that there are several universities where no industry relationships have occurred. It is crucial to uphold quality assurance of these programmes at this time, when the world is paying attention to Indian skill development programmes and when Indian human resources are required everywhere. Successful industrial partnerships with training institutions may be found in industrialized nations like Germany, Finland, Brazil, and others. Even though skill development is a hot topic in India and all stakeholders are aware of its significance, it is crucial that efforts to promote it are coordinated with a clear knowledge of the responsibilities played by each stakeholder.

### **1.5 RESEARCH OBJECTIVES**

To comply with the research rationale, few following are the research objectives of the study:

1. To have an overview about the skill ecosystem of India.
2. To understand the global perspective of industry role in skill development.
3. To explore the role of industry in skill development in India and its future potential.
4. To understand the industry perspective on the advantages and policy requirements for skill development in India.
5. To develop a policy/strategic framework for industry association in skill development.

### **1.6 THE CHAPTER PLAN**

In the sequence of discussing all key topics of this research it is indispensable now to focus the main objective of the research and chapter plan as well. The foremost focus of this study is to explore and understand the Role of Strategic Partnership done between Industry and Academia in Skill development. The study has shown a good effort in enumerating the key objective of the research through the perspective of faculty and students. The present study is divided into seven chapters and details of these chapters have been discussed as follow:

#### **Chapter 1: Introduction**

First chapter gives detail discussions about skill development eco-system. It covers the role of state and central government in India, the various policies and the strength-weaknesses of the

skill development system. It also provides a discussion on the role of industry academic partnership in skill development. The chapter also includes the research objectives.

### **Chapter 2: Literature Review**

The chapter reviewed the literatures related to the research area, objectives and methodology. The review covers the various studies in different countries and the role of industry, government and institutions in skill development. Systematic Literature Review (SLR) is conducted of the research studys having studies carried out in Indian context. The chapter concludes with identifying the gaps in literature.

### **Chapter 3: Research Methodology:**

Talking about the research methodology this chapter deals basically the Research design, Sampling, research objective, sources of data collection, limitations & scope with significance of the study. It also integrates the sources of data information along with the research tools & techniques. Research Methodology is considered as a systematic way of understanding the social problems and questions related to present social atmosphere.

### **Chapter 4: Students Perception of Skill Education**

This chapter provides the results and discussion of the responses received from the students on a structured questionnaire to understand the student's perspective on skill development. Descriptive statistics and inferential statistical tools like factor analysis has been used to analyze the data. The chapter highlights that the trainer-trainee relationship, according to the research model, functions best when there is stronger industry backing and institution infrastructure.

### **Chapter 5: Academia-Industry Association: Perception of Trainers, Administration and Industry**

This chapter covers the results and discussions of the responses received on the structured questionnaire from the industry executives, trainers, government officials and institution administration. The analysis helps in understanding the role of industry academia partnership in enhancing the quality of skill development.

## **Chapter 6: ISM of Drivers and enablers for Excellence in skill Development**

This chapter identifies the drivers and enablers of developing educational skill excellence centers and then using the technique of Interpretive Structural Modelling (ISM) develops the diagraph which provides the key driver and enabler having high driving power. The chapter also includes the MICMAC analysis whereby the enablers are classified into four categories.

## **Chapter 7: Conclusions**

This chapter compiles the key results and provide the conclusions based on the research carried out on role of industry academia partnership in skill development. The chapter also includes the limitations of the study and scope for future research.

\*\*\*

## **CHAPTER 2: LITERATURE REVIEW**

Literature review is indispensable part of research work to recognize that how researcher will pursue his or her work. It gives immense understanding to researcher. Additionally, it provides lens to watch for the new and better approaches to do any task or work with more authenticity. According to a McKinsey Global Institute poll, just 25% of Indian engineers are considered marketable by global corporations, and India anticipates a shortfall of 500,000 knowledge workers. The number of technical colleges and the number of students who complete technical courses each year is enormous. Despite the fact that there are more technical colleges and graduates, it is reasonable to wonder why there are still so many people without work or who aren't receiving the positions they want. Does this imply that there are just more of these courses available? What about the caliber of the technical graduates India issues each year? Despite the fact that technical colleges and universities consistently generate a sizable number of graduates, the business sector believes that the vast majority of alumni lack the essential skills required by the business.

India has to concentrate on its educational institutions at this time, since industry partnerships with training institutions have shown to be a successful strategy in industrialized nations like Germany, Finland, Brazil, and others. In India, skill development has become a hot topic, therefore it's critical that efforts are coordinated with a clear knowledge of each stakeholder's role. It is primarily a significant time to investigate a thorough understanding of studies related to employability skills, such as Institute infrastructure, job opportunity, relationship of trainer with trainee, and Industry Support. This is true when considering all the industry reports and government of India initiatives. Therefore, it is crucial to conduct a thorough literature evaluation of research conducted both in India and overseas.

In order to conduct this systematic literature review (SLR) more efficiently, the SCOPUS database was chosen because it was the most comprehensive and it produced more results for this topic than the Web of Science database did. The keywords selected to find the articles used in this study were "Skill training" OR "Skill education" OR "Skill development" AND "INDIA", which produced a total of 635 documents. However, after excluding reviews, books and book chapters that were repeated or that did not directly deal with the subject in question, only 453 articles served as the basis for the SLR described below.

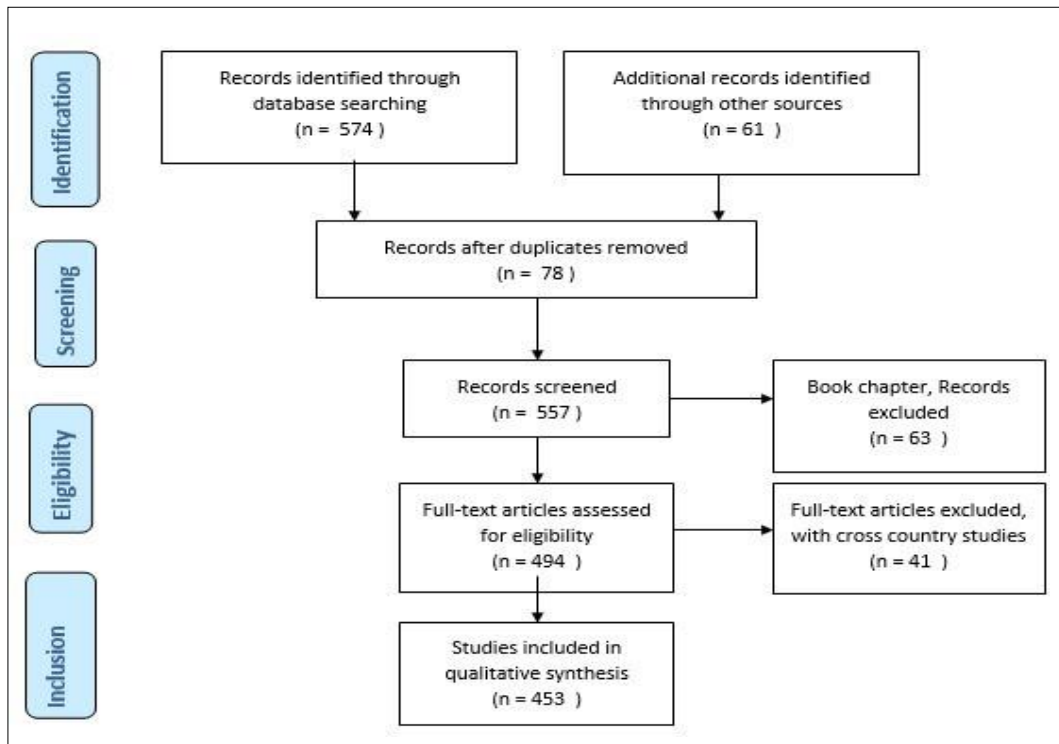
The present study consisted of a systematic literature review (SLR) of research on education and training for Skill education and their influence on educational development, seeking thereby to identify the trends and growth of knowledge in this area. The review also sought to measure the impact of publications on this topic, identify the journals that publish more of these articles and ascertain more productive authors and institutions, as well as identifying neglected themes and methodologies. According to Schaap and Bruijn (2012), SLRs are a suitable tool for analysing studies on skill education. When dealing with several articles dispersed over a lengthy period of time, this strategy is particularly helpful. Additionally, the fundamental ideas of SLRs offer sufficient openness and dependability as a research methodology (Tranfield et al., 2003; Armitage and Keeble-Allen, 2008). To conduct the present SLR more efficiently, the Scopus database was chosen, and the search limited to publications from 1991 to 2020 that contain the keywords "Skill training" OR "Skill education" OR "Skill development" AND "INDIA" (i.e. in titles, keywords and abstracts).

## **2.1 SYSTEMATIC LITERATURE REVIEW**

To conduct the present SLR more efficiently, the Scopus database was chosen, and the search limited to publications from 1991 to 2020 that contain the keywords "Skill training" OR "Skill education" OR "Skill development" AND "INDIA" (i.e. in titles, keywords and abstracts). The steps of systematically literature review as adopted in this thesis is given in Figure 2.1. To arrive at the required number of documents, only articles with empirically validated knowledge were included (Podsakoff et al., 2005), thus excluding articles from conferences, reviews, books and book chapters. The main reason for choosing the Scopus database was its wide coverage of internationally indexed scientific journals of a quality recognized by the academic community, although some of the articles identified were also available in the Web of Science. The search of this database resulted in 453 publications.

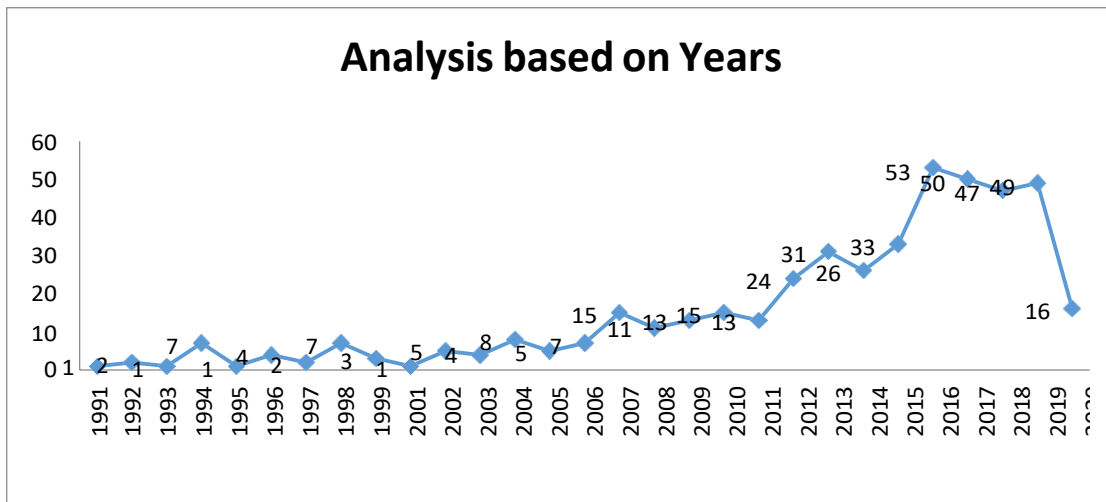
## **2.2 SKIMMING LITERATURE**

While processing some of the data obtained by the review, the analysis options provided by Scopus, and content analysis through word cloud platform were used. The results showed that publications in area of Skill training has been picked up from 2006 and showed highest number of publication in 2016. The trend of publication in the area of Skill education and training has been shown in figure 2.2. The Tenth Five-Year Plan (2002-2007) and its Steering Committee on Secondary, Higher, and Technical Education recommended that the Industrial Training Institutes (ITIs), polytechnic skill education, secondary school level, and all other forms of skill education be brought together under one roof and constitute one department of the state government.



**Figure 2.1: Steps of Systematic Literature Review (SLR)**

Better networking, targeted marketing, strong connections, and efficient resource usage will all be aided. 350 crores of rupees are still owing for the Skillization programme supported by the central government. As a result, we can see that, in the Indian context, the contribution of literary academics has improved since 2006.



**Figure 2.2: Analysis based on years**

These facilitated analyses of the results presented in the figure 2.3 suggest that Skill training and Skill education is highly linked with the words like: skill, development, students, training,



employment, expectation, higher education, economies, knowledge, technology, education, countries and management. Considering these as the keywords, the study has formulated the affirmation through these words. The abstracts of 453 studies were used to dig out the basic content and themes through word cloud. The major themes which have been searched out from the literature are related to skill development, corporate, satisfaction, expectation and industry outlook towards the Skill education. From these wider themes the entire study has been sub divided into various strands shown in figure 2.4.



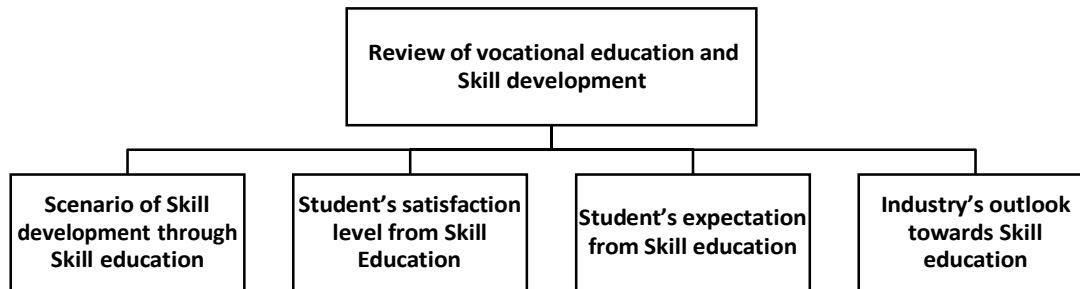
**Figure 2.3: Content analysis through word cloud**

This article is the basic building block of any research topics related to Skill education and sorting out the research gaps. Literature reviews were performed on the following strands:

- Skill development through Skill education
- Student’s satisfaction from Skill education
- Student’s expectation from Skill education
- Industry’s outlook towards Skill education

The current study seeks to focus on the following areas in order to understand what corporations anticipate from Delhi's skill education system: students' satisfaction levels with Delhi NCR's skill education, students' expectations for corporations recruiting them, Corporate expectations from Delhi's skill education in terms of the knowledge, attitude, and skills they impart to the students, and the effect of skill education on the state's economy. In a nutshell, the research will concentrate on and examine the views of the students, the business world, and

the skill education system. The causes for the gap between skill education and business expectations will be determined once a holistic viewpoint has been established, and remedies to the gap will then be explored.



**Figure 2.4: Various strands of the review**

### **2.3 SKILL DEVELOPMENT IN INDIA**

This section aims to evaluate surveys conducted in India with reference to higher education and skill. Many engineering graduates are attracted to the IT and software sectors by their rich job offers and elevated social standing. This tendency has made the skill sectors less appealing to potential students. Despite the fact that many students enrol in core engineering branches of non-computer or non-information technology schools, they do not use their knowledge and talents in the appropriate engineering domains, making these branches obsolete and a waste of money.

According to Sajal K. Palit (1998), universities and other educational institutions should design their curricula so that they may be connected to the business world. According to the research, numerous schools have adopted both the object-oriented engineering curriculum and conventional competitive research to keep up with the fast-paced business sector. According to a research by K.G. Viswanadhan et al. (2005), the majority of the quality issues in the engineering education sector are caused by a lack of trained, experienced, and competent professors. Although the study found that the number of engineering colleges and students graduating from them has grown dramatically, measures are needed on the part of the institutions to engage in the Research and Development activities that would ultimately lead to the upgrading of student's performance.

The construction of a successful Curriculum was emphasised in research conducted by H.A. Padmini et al. (2009). Additionally, they suggested that creative and corrective measures be

implemented at the university level of education, such as industry-academic partnership, curricular changes, training in soft skills, cultural sensitivity, professional and social responsibility, etc. According to Zahid Ali's (2008) study, there should be an ongoing, dynamic relationship between engineering training institutions and industry. For the engineering educational institutions and its foundations to produce graduates that meet business needs, industry impedance and intervention should become mandatory. To keep students informed about current trends in business and in the engineering field, modern industrial visits should be distributed across the whole engineering curriculum.

Study of Technical Institutions According to Vinay K. Nangia and Cashmira Pramanik (2011), India must move forward through creative partnerships between business and academia through collaborative knowledge generation and sharing. There is a great need to develop alternative avenues that must be intensified, stimulated, and above all integrated, for a close academic and industrial interaction through all stages of technology development, starting from conceptualization down to commercialization. Cooperative research is the key to filling the gaps existing in the current structure. The fact that these collaborations recognise and take advantage of the respective advantages of academia and industry is the most significant feature. Along with business organisations, colleges should establish connections with the government bodies in charge of industrial policy.

Government should implement an integrated policy of academia-industry collaborative interaction that includes a number of strategies enabling such an initiative to thrive in the country's quest for technological leadership, despite some shortcomings and inhibiting factors with respect to the collaboration between academia and industry. Deepali Wankhade and Pravin Dhokane (2012) suggested that there should be regular interaction between industry and academia to know the changing trends in technology required in terms of IT processes in order to improve the employability of students and enhance the quality of manpower needed in the industry. Industry experts should instruct the faculty on the newest trends and technology. A gateway for HR requirements has to be created and utilised efficiently on both sides. Industry and institutions should train workers with a global perspective so they can adapt to various social and cultural contexts. Albert P'Rayan and Ramakrishna T. Shetty (2008) performed a survey at the engineering institutions connected to Annamalai University in Chennai and came to the conclusion that steps should be done to help students get over their fear of communicating. This method places a heavy burden on the teacher. They also

noted that English language teachers are required to have an active role as diagnosticians, counsellors, communication specialists, and trainers of soft skills in addition to teaching grammar and sentence structure.

In their 2010 study, P.K. Shetty, M.B. Hiremath, M. Murgan, and K.G. Seeraja examined 10 state universities in India from 2000 to 2006. They ended by saying that Indian institutions needed to be flexible and responsive to the shifting demands and goals of society and should provide young, creative brains a platform for expression. The Total Quality Management (TQM) and Skill Education Quality Assurance and Assessment (TEQ-AA) systems were also highlighted by several researchers. The idea of TQM must be included into the campus culture, according to research done by Irfan G, Ghori A.A, and Soma.V.Chetty (2008), in order to maintain control over the appropriate operation of the campus. P Venkataram and Anandi Giridharan (2007) created the Skill education Quality Assurance and Assessment (TEQ-AA) method for the assessment and development of skill education.

Due to the fact that TEQ-AA identifies the institutions' strengths and skills in certain specific emphasis areas, it was also utilised to create new curricula and research initiatives. Major work should be done at the institutional level rather than the industrial level, according to several scholars. Institutions were divided into three categories by Vishnu Prasad Nagadevara & S. Nayana Tara (2007): Top, Average, and Low category institutions. The top category institutions' key distinguishing characteristics are the "flexi-time" facility offered to its faculty, special coaching for academically weak students, access to the most recent knowledge for students and faculty through a well-stocked library with subscriptions to a large number of national journals, and special coaching for the academically weak students.

According to a study conducted by Kareena Bhatia and Manoj Kumar Dash in 2010, there is a need for reform in the Indian educational system at all levels, from basic schools to top-tier institutes of higher learning and national research. It is necessary to increase both access and excellence on all scales. Improving access to basic education is an issue at the base of the "Knowledge Pyramid." Making world-class higher education and research institutions is necessary at the top of the "pyramid." According to Sekar and S. Sathya Narayanan's (2006) analysis, an institution's work culture has a significant impact on the intrinsic motivation of its faculty, which raises the aspirations of the institution. However, the study also showed that the work culture of the college had no bearing on students' academic performance. Instead of

choosing one specific model, technical institutions should investigate many types of collaboration and adhere to a pattern where the institution feels at ease cooperating with the industry, according to Bhusari, R.T. (2010). Additionally, he emphasised the need to pinpoint the locations where the best chance of collaboration exists.

According to Sandhya Karachiwala's 2000 survey, employers are increasingly choosing to hire people who have solely received education in India. There were disparities in expectations for the university degree, evaluation of "soft Abilities," and quantity of work experience needed for people educated in India, despite the fact that the level of satisfaction with the degree and assessment of technical skills were the same for India and the USA. Additionally, additional elements including India's domestic software sector, Indians' global experience, and cultural presumptions affect the impression of Indians as having strong potential. It can be challenging to determine whether employers' perceptions of improvements in India's higher education system are based on the system's real ability to provide better skills to employees or whether they are based on stereotypes about Indians as a whole. According to Modi (2009), when recent graduates enter the workforce, it takes them between six and two years to demonstrate their value, and frequently, they quit the company before doing so. The difference between theory and practice is the fundamental cause of this. Therefore, businesses and R&D facilities ought to collaborate with academic institutions.

A unified platform for industry and universities to develop value-based curricula while taking the demands of industry into consideration has been stressed by Patil and Popker (1998). According to research by Bhuria and Dixit (2011), the government of Madhya Pradesh is also working to improve the standard of technical education in the state and the degree to which students are satisfied with these institutions. The government has established online off-campus counselling so that students may learn more about the schools they are interested in attending and feel more satisfied.

Parthasarathy and Pingle's (2013) study on the demand for talent included teachers and college management from 46 educational institutions across India, including the state of Madhya Pradesh. They emphasized the need for academics and management at technical schools to establish a unique talent management system that would support the "sticking to core competency" strategy. In research, Dwivedi and Mahara (2013) placed focus on the creation of a Quality Model for Management Education. The model will contribute to increased

productivity and employability. Additionally, they emphasized the need for educational institutions to nurture students' ethical, creative, and disciplined minds.

## **2.4 STUDENTS' SATISFACTION FROM SKILL EDUCATION**

When students can access enough resources to pursue their academic and social interests in the education sector, their level of good emotion or satisfaction increases. The expectations of students have undergone a significant transformation during the past three decades, claims Tricker (2003). It is obvious that expectations have become more complicated as a result of the emergence of new institutions. It's interesting to learn that in the 1970s, the expectations for students were straightforward and unambiguous. Institutions were seen by them as a place to learn. Institutions were seen as a setting for academic study and education. The student-teacher interaction was only one-sided. Expectation began to take on a complicated structure in the 1980s and 1990s. Expectations began to rise mostly as a result of the fee structure increase. Nowadays' pupils are crystal clear with their expectation from the education institutions. They demand value for their money. They anticipate two-way contact with the institution, truthful information about their courses, a fair evaluation process, a fair placement process, etc. According to a research by Ziethaml, Parasuraman, and Berry (1990), with the increase in tuition fees and other costs incurred by educational institutions, they must be aware of the wants and requirements of their customers, who are students. As a result of Sender, Stevenson, King, and Coates, students are becoming more conscious of their "consumer rights" (2000). They made an important discovery about the contentment of the students. The institution benefits much from the contentment of its students. Since they have no university experience, students may not have very realistic expectations when they first enroll. However, by the time kids enter their second, third, and fourth years, they begin to have a range of expectations and levels of satisfaction with their institution. 35 Hong Kong students were interviewed for Kember and Wong's (2000) survey. He discovered that more engaged students believed that effective teaching involved active engagement by the teachers and the use of various techniques to make things understandable, whereas passive students believed that effective teaching was more about organisational goals, a good pace, clarity of communication, and the management of student workload. Additionally, they conducted research on the teaching techniques of 395 students and discovered that students ranked discipline as the most crucial need. According to a research by Rolfe published in 2002, students now need more guidance and direction from the lectures that are given to them. Additionally, they desire more one-on-one engagement programmes, more resources, and are

more driven by evaluation. Approachability of the teachers came in second, knowledge came in third, and lastly excitement. Smith and Wertlieb (2005) made a comparison between the social and academic expectations of first-year college students and their experiences in the middle and at the conclusion of the year. There was a discrepancy between first-year student experiences and academic and social expectations. Additionally, they found that pupils with high and unreasonable academic expectations typically performed worse than those with medium expectations in terms of grades. Telford and Massion (2005) made a significant discovery. They made the argument that students' expectations and values affect how highly they value their education. Students who set reasonable expectations of the institution based on the accurate data they have gathered have a higher chance of reducing the gap between the expected and perceived quality. Pithers and Holland (2006) discovered that there are several turning points where the expectations of students and the experiences that institutions provide diverge. The primary causes of these discrepancies may be (i) institutions' ignorance of students' expectations or (ii) universities' misinterpretation of students' demands. According to a poll by Tektas et al. (2010), students' expectations are based on their prior academic experiences and encounters with other students. The reputation of the school, the staff who instructs them, the area in which the institution is located, the entertainment amenities given by the institution, the social life, and the possibilities provided by the institution all influence the expectations of the students. According to Strikes (1984), the degree of a student's pleasant emotion or satisfaction is related to the student's capacity to locate sufficient resources to satisfy their academic and social interests. Academic success, the calibre of instruction, the calibre of academic counselling, and the calibre of the curriculum are considered to be important factors of students' happiness, according to Atiken (1982). In addition to these variables, interactions between students have an impact on satisfaction. Danielson (1998) refers student's satisfaction to the desirability, pride or positive feeling that the student grows towards the institution.

## **2.5 STUDENTS' EXPECTATION FROM INDUSTRY**

When picking their first job, students' expectations play a significant influence. Would they prefer companies who are able to provide growth chances on both a professional and personal front? This section of the thorough review gives a quick overview of the expectations that students have for the corporate world. Behling and Rodkin performed a survey of over 2,500 college seniors from 46 colleges (1969). The type of labour or service provided, the level of difficulty or responsibility involved with the job, and the likelihood of promotion and pay seemed to have the most impact on the student's decision to work for the first time in that

business. 51 male students who were either majoring in engineering or business at South Western University in the US participated in Gluek's 1974 research. The students' top 13 priorities for their first employment were revealed through an interview process. Using Maslow's Hierarchy of Demands as a framework, Cloeman et al. (1977) conducted a study with 15 recruiters and 80 college students from five east coast institutions in the US to see how well the needs of the students matched those of the recruiters' organisations. It was discovered that student needs in the areas of physical and security were greater than those stated by recruiters. In order to determine if instructors, recruiters, and students had comparable expectations for employment attributes, Posner (1981) performed research.

Students were expected to have varying levels of employment diversity, corporate repute, competent coworkers, job stability, capacity to demonstrate quality work to superiors, company reputation, and fringe perks. Students gave the following factors the highest ratings: challenging work, employing abilities, and learning environment. Job title, firm size, and opportunity for considerable travel received the lowest ratings. Students search for occupations that have the potential for future wages, advancement chances, and company location, according to Parmley et al. (1987). Manter and Benjamin (1989) discovered that graduates seek employment opportunities that allow them to put their abilities to use, offer career promotion, pay growth, and the chance to pick up new skills. Moravec and Wheeler agreed that employees nowadays place a greater emphasis on long-term values in their work.

Students in the 1950s sought for high pay, employment stability, and advancement chances, according to Peterson and Devlin (1994). They were looking for a feeling of civic duty, answers to societal issues, and a purpose in life in the 1980s. According to Anderson et al. (1991), this altered in the 1970s and 1980s as a result of widespread office automation and computerization, which caused students to adjust their goal orientation in favour of personal success and financial reward through jobs. They also noted that the early 1990s saw students appear to be focussing on a combination of attempts to obtain a job, maintain a job, and increase one's own position in the field. To determine what entry-level job candidates expect, Assari and Karia (2002) conducted research in Malaysia. Location of the work place, difficult jobs, and flexible hours received the lowest ratings, while opportunity for self-improvement, potential for career growth, and job stability received the highest ratings. Zhao (2006) performed the research in China with the aim of examining the disparity between applicants' and recruiters' expectations in that country. According to Zhao's research, there are



considerable discrepancies between recruiters and students in terms of the size of the company, the reputation of the profession, the organisational culture, the job stability, and the chance for voice.

In their 2010 study, Andrew Dutta and Eldos M. Punnose found that graduates choose companies that can offer possibilities for advancement on both a professional and personal level. The study was conducted in the Indian environment. Parental background may change these criteria, but the importance of the position and the company's reputation also play significant roles. In addition, graduates search for positions that allow them to manage their social lives while also allowing them to use their newly acquired talents. Jobs that are provided to female candidates in India should be carefully planned and structured, putting greater emphasis on factors like a good job location and a reputable employer.

## **2.6 INDUSTRY OUTLOOK TOWARDS SKILL EDUCATION**

According to the FIOR Markets research from 2019, the global market for skill training will grow at a 9.8% CAGR over the following five years, from US\$ 30100 million in 2019 to US\$ 48200 million in 2024. International Business Machines (IBM), Adobe Systems, Assima, Career Education, Cegos, Desire2Learn, Fischer, Knoblauch, Cisco Systems, Hewlett Packard Enterprise, IMC, City & Guilds Kineo, , Inspired E-Learning, IntraLearn Software, Bit Media, Blackboard, Articulate Global, Knowledg ePool, Lumesse,, Dabur India, HealthStream, Microsoft, and others are among the major brands that are responsible for hiring trainees Dabur India believes it's critical to assess other applicants' collaborative skills. The capacity for communication and cultural understanding has also been highlighted as an important attribute. According to S.L. Rao, institutions are rated according to how soon students are hired and how much money they make. Therefore, avarice is ingrained at a young age when idealism ought to be.

Technical education must place a strong emphasis on society and the common good rather than just maximising business profits. "Students who attend for the interview should possess solid understanding of the principles they have learned in school/college," according to CRISIL, Mumbai. In their primary subject of graduation or post-graduate, basic knowledge is frequently lacking. Behavioral testing to determine profiles will be helpful, according to Wipro Spectramind, Delhi. In a research on the expectations of employers for new graduates, the study focuses on the kinds of soft skills that businesses want in young workers. Beyond

specialised training and proficiency. It was discovered that companies, regardless of the sector of education, have comparable expectations of fresh graduates and are particularly harsh on their language abilities, real-world experience, and motivation levels. According to a poll conducted in the United States, students rank their work ethic and teamwork skills among their greatest talents, but employers place emphasis on communication skills, analytical skills, collaboration skills, technical skills, and work ethics in that order.

According to Narayan N. R. Murthy, a number of reasons have led to a progressive decline in educational talent. There are valid reasons for concern, such as the fact that one of the numerous causes of the reduction in IITs' capacity to draw in top talent is government intervention. A foreign academic must obtain authorization from the government before being invited to a debate by an educational institution. In a similar vein, Philips, Mumbai claims that it is challenging to evaluate competencies through a group discussion or personal interview. They can be deduced via psychometric tests or from pupils who have worked with you. Students must possess more than just street smarts. On the other hand, Hyatt, Calcutta asserts that "potential students should have some job experience, even if it is only for three months. Students can then put the knowledge they learned in school to use. Written tests are not crucial since a smart applicant might not always make a good employee. "Sustained leadership roles/activities are significant factors for selection," claims Proctor & Gamble (P & G) Mumbai. Written and psychometric exams are administered by P & G at the summer/final placement to screen candidates. "Group tasks should be assigned a specific assignment, which has to be done in a short amount of time with a team," said Everready Industries, Calcutta. Since the students that form a team do not already know one another, it can be a useful test of their team orientation. According to Bata India, Calcutta, "Short listed applicants should have a one-week exposure in a firm so that they know what they are going for before the final selection.

Prior job experience is not always a good idea because employers sometimes prefer new students because they are simpler to train and mould to a company's unique needs. New candidates do not have any baggage from prior working styles that need to be unlearned. According to Deutsche Bank, the students lack interpersonal skills, lack the capacity to lead a team, and frequently establish close-knit groups that are undesirable for the business. According to Neev Information Technologies Pvt. Ltd, many students lack the skills necessary to communicate effectively in a business setting, write appropriate emails, and use simple

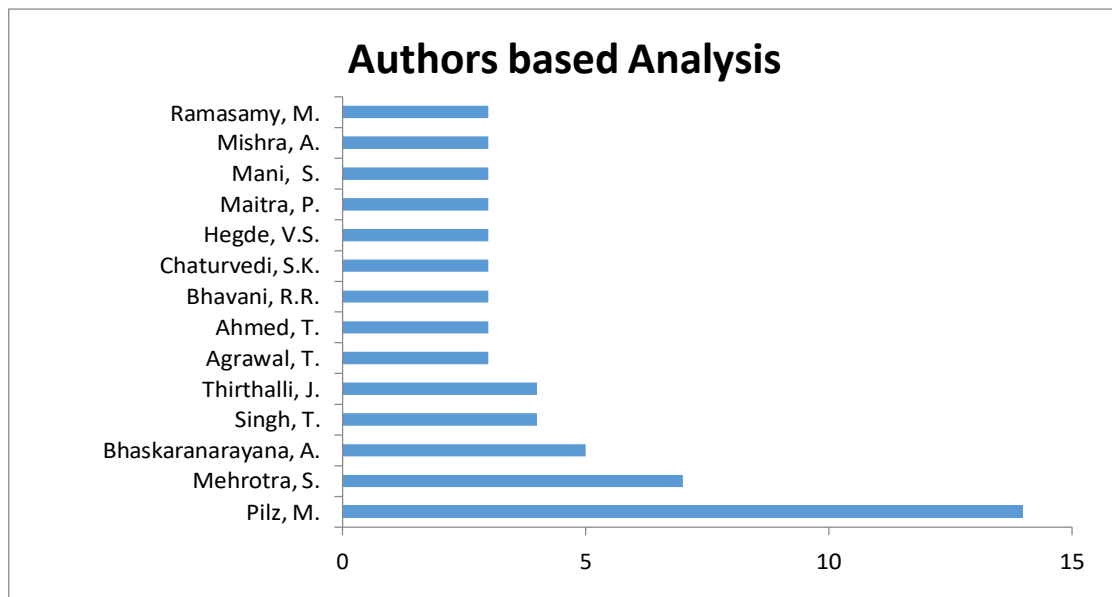
computer programmes.

According to Global Talent Track, employee expectations are never constant and constantly shift in response to the changing business environment. When freshmen begin looking for career prospects, according to Dr. Uma Ganesh COE of Global Talent Track, it is crucial to know what the employers are looking for rather than applying haphazardly to many firms. Employer expectations are never constant; they constantly shift in response to the changing commercial environment, particularly those of their own clients. The problem of today's young is that they continue to believe certain misconceptions about education, such as whether a university awards a degree that is recognised or whether communication skills are necessary for marketing or customer service professions, etc. They must realise that a thorough comprehension of the subject is what is expected of them.

According to Amit Bhatia, CEO of Aspire Human Capital Management, a company that provides educational services, there is a significant skill gap between the applicants' and workers' skill sets, which raises the number of unemployed people. Senior Vice-President of NASSCOM Sangita Gupta: In India, over 50% of the engineering output is unusable. There are several engineering colleges in India, all of varying calibre. In addition to several private engineering institutions in various cities and states, there are IITs and NITs. Private colleges in tier II and tier III cities are more of the problem than the former with regard to employability. Sunil Goel, director of Global Hunt India, claims that over half of the companies would be concerned about the employability of potential employees and won't want to hire and train someone who may just leave after a short time. But 30 to 40% of businesses want to employ and train. Lt. Gen. MG Datar placed emphasis on the idea of "pre-engineering" along the lines of "pre-medical," which is practiced in Europe. Before enrolling in engineering institutions, the students who wish to become engineers are required to complete a six-month apprenticeship at a plant. Instead of spending time in the office, emphasis should be placed on fundamental technical skills and hands-on work in the shop. The technical universities must figure out how to integrate this into the time frame following 'counseling', when the basic stream of engineering for students is decided in the course.

India's Engineering Graduate Talent Pool According to a research study filed by Merit Trac in July 2005, there is little association between "Academic Performance" and "Test Performance," which points to a misalignment between the academic system and business expectations and calls for more thought on both sides.

The career opportunities for graduates and post-graduates in broad disciplines are decreasing due to the changing global environment. The degree-level education provided does not focus on developing skills or being market-oriented. The study also discovered a dearth of research that is focused on student needs and the regional job market. However, a select few influential writers have made significant contributions to the skill development side of skill education. The major contributors in this research area are shown in Figure 2.5.



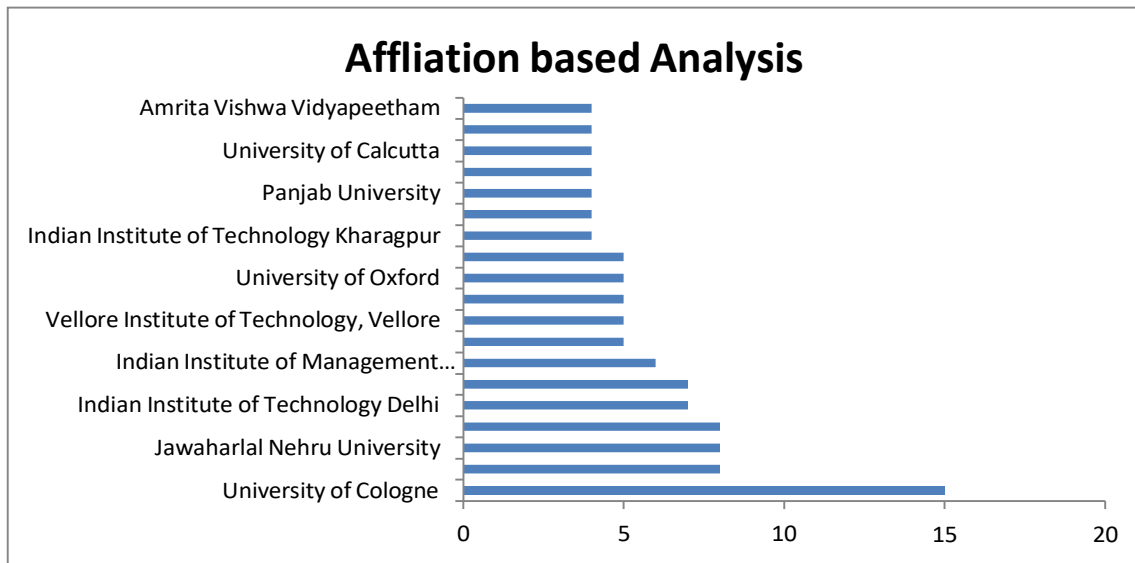
**Figure 2.5: Seminal Authors**

India had one of the largest economies with the quickest rates of growth in the first ten years of this century, but it also started to experience severe labour shortages due to a lack of employees with the necessary skills. The country's TVET system has not sufficiently addressed the rise in demand for skilled and semi-skilled workers. S. Mehrotra (2014). Particularly VET systems may be described as diverse due to their tight relationship with national labour market arrangements (Pilz 2016). In compared to many other Asian nations, with the exception of China, skill education and training is a problem and a large-scale responsibility in India (Tara & Kumar 2016; Pilz 2016a). ITIs were underfunded and required potential students to travel great distances to access them, according to Pilz and Wilmshöfer's (2015) research of learning possibilities among fisher households in the state of Orissa. Additionally, it was discovered through research into street food sellers in two states that the official training programmes provided by ITIs did not adequately prepare potential trainees (Pilz, Uma & Venkatram 2015). It is important to take into account how society views educational initiatives. The reputation of

skill education is quite poor, particularly when it comes to manual labour. The caste system in India and its impact on culture are to blame for this predicament (Pilz 2016b).

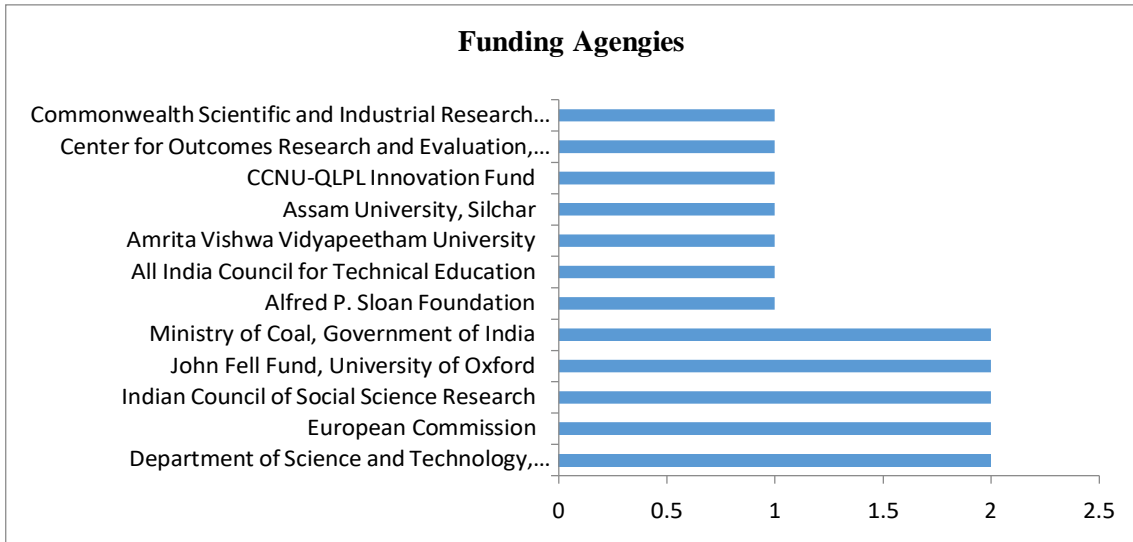
Numerous studies have shown that skill development and trained labourers will only be tolerated in the future if social perceptions of manual employees improve. Their salaries and career prospects must in particular reflect this (Pilz 2016a) Sharing experience will become more and more crucial in the future, allowing India to benefit from other Asian nations' expertise in quality management. However, collaborative learning based on other nations' VET systems would also be beneficial (Pilz & Pierenkemper 2014). India and Germany have increased their interactions steadily over several years (Preuß 2013; FICCI & BIBB 2013). Individual Indian universities and the German Research Center for Comparative Skill Education and Training (G.R.E.A.T. ), located at the University of Cologne (<http://www.great.uni-koeln.de/en/great/>), have successfully collaborated on research into VET systems. This collaboration resulted in the publication of a new book (Pilz 2016b) that provides a thorough review of the status of research, findings, and trends in the area of skill training in India. This research will probably continue to be developed in the future. India has lately started a very creative initiative called the Village Resource Centers to provide a range of services coming from satellite systems and other Information Technology (IT) instruments straight to rural villages through a "single window" (VRCs). The VRCs' range of services includes tele-education, which focuses on skill development to enable supplemental instruction for remote students (Bhaskaranarayana, Bhatia, Bandyopadhyay & Jain, 2007).

It's interesting to notice the institutions from which the seminal writers in the field of skill education and training hail, as well as if these institutions are located in India. The affiliation of the writers is shown in Figure 2.6. One of the influential authors is a member of the University of Cologne and has the largest number of publications in the field. Leading institutions for making contributions in the field of skill education and training include Jawaharlal Nehru University, Indira Gandhi National Open University, Indian Institute of Technology Delhi, and Indian Institute of Management Bangalore.

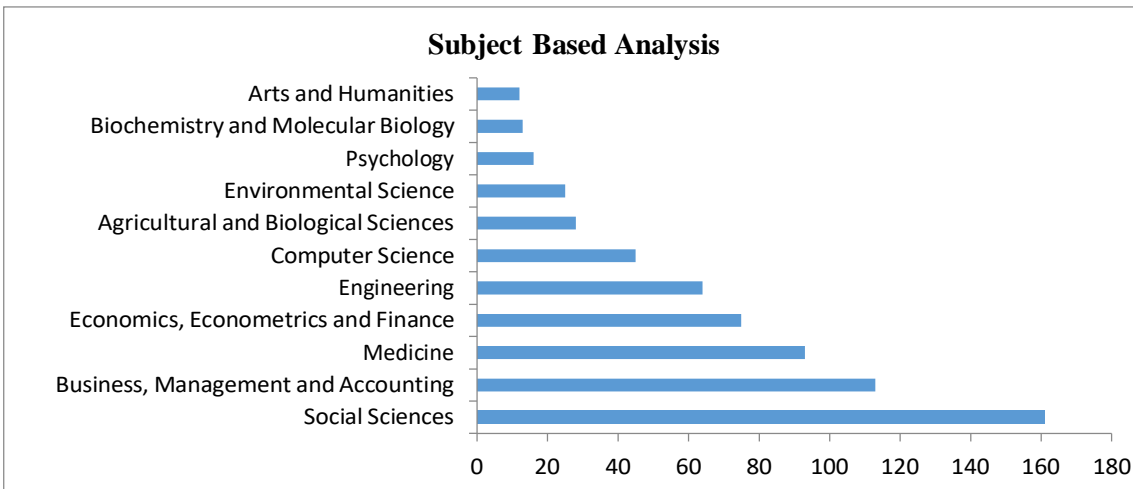


**Figure2.6: Authors Affiliation**

These articles describe various sets of reforms that India’s educational planners and policy-makers must put into place if these shortages are not to constrain India’s ability to benefit from the demographic dividend. However, the funding really makes difference to the researcher to evaluate and review the status of Skill training in India. Figure 2.7 shows the names of the funding agencies who have promoted the researches on Skill training by the appropriate amount of funding given to the authors and research institutes. Department of Science and Technology, Government of Kerala, European Commission, Indian Council of Social Science Research, John Fell Fund, University of Oxford, Ministry of Coal, Government of India, Alfred P. Sloan Foundation and All India Council for Technical Education are the organizations which are considered among the top funding agencies for research in area of Skill education and training. The factors affecting employability of Indian Skill graduates were mentioned by authors; hence, it becomes essential to understand the most of researchers conducted their survey or research for which subject. Subject specific knowledge and transferable skills like comprehension, computer skills, communication, and application were found to significantly affect employability (Neroorkar & Gopinath, 2020). Subject based reviews in area of Skill education are mentioned in figure 2.8. The analysis suggests that most of the vocation training researches have been done in the area of social sciences. However, Agricultural and Biological Sciences, Environmental Science, Psychology, Biochemistry, Arts and Humanities are the areas in which Skill education is been given by the researches in order to review their status has not been found in a significant amount.



**Figure 2.7: Funding agencies**



**Figure 2.8: Subject based reviews**

## 2.7 RESEARCH GAP

The motive of this study is to conduct the systematic literature review (SLR) in area of skill development and Skill education, the SCOPUS database was chosen because it was the most comprehensive and it produced good results in literature for these topics. The keywords selected to find the articles were "Skill training", "Skill education", "Skill development" the results were limited to "INDIA", which is shaped through PRISMA model.

The study provides a thorough vision for the research done in the field of skill education and skill development, which will need to be filled by new research directions. This study tries to concentrate on the literature of skill training in order to comprehend the expectations of corporations about skill training in India. The influence of skill training, the expectation of

training, and the abilities that training are transferring to the students are the main topics of the research. The necessity of industry engagement was discovered by Sajal K. Palit (1998), Nangia & Pramanik (2011) with Zahid Ali (2008), and Wankhade & Dhokane (2012). K. Viswanadhan et al. (2005) have demonstrated the lack of qualified teachers in the skill world. H. Padmini et al. extensively discuss curriculum development in their writings (2009). Most crucially, these review connections acknowledge the relationship between social duty, professional growth, and cultural orientation. Despite the fact that academics are working hard in the field, several research gaps on themes linked to skill training and education have been discovered. The biggest gaps in the literature may be found in the areas of skill development, corporate satisfaction, expectations, and industry perspectives on skill education. India benefits greatly from having a young labor force since it can supply a large amount of labour to the global market. Numerous evaluations provide the few guidelines for professional training that have been adopted by various countries and are typically examining changes in higher, advanced, and skill education in relation to professional schooling and learning. It is important to concentrate on improving the employability of the students enrolled in understudies' programmes and the quality of workforce required by businesses. Future literature should concentrate on the development of skills obtained via skill education, student satisfaction with their experience, future student expectations, and the industry's perception of skill education and associated viewpoints.

\*\*\*



## **CHAPTER 3: RESEARCH METHODOLOGY**

Research methodology is regarded as a methodical approach to comprehending the social issues and topics relating to the current social climate. Research methods are a scientific way to comprehend any study issue with the application of numerous instruments & procedures often for simple pursuit of research. Research methodologies primarily address the study's purpose, constraints, and importance. Along with the research tools & methodologies, it also incorporates the data sources.

### **3.1 INTRODUCTION**

The approach, design, sample process, tool description, and statistical methods utilized to conduct this study are all laid forth in this chapter. To accomplish the research's goals, the researcher employed a mixed research design approach.

### **3.2 RESEARCH RATIONALE**

As of right now, we are dealing with significant unemployment or underemployment. However, although employing around 60% of the workforce, the agriculture industry only contributes 15% of the GDP. This demonstrates unequivocally that the majority of those engaged in the agricultural industry are either underemployed or unemployed, which is known as "masque unemployment" (RBI, GDP data). The urgent requirement is to teach these employees in fields where they can independently contribute to the expansion of the economy, ultimately increase GDP, and begin to support themselves well.

India has been pursuing a skill development programme since gaining its independence in the form of ITIs and Polytechnics. In the beginning, foreign nations like Holland and Germany offered assistance by providing cutting-edge equipment for skill development, but as time went on, the upgrading of ITIs and Polytechnics system failed to happen, and these became routine institutions focusing on finishing the curriculum and providing some hands-on training. They lost touch with the market and did not improve these schools' marks, which caused a significant gap between the skill sets of trained students from ITIs and Polytechnics and what the industry expected of them. Due to this, the students' placement in the sector has been quite bad. Instead of being hired as full-fledged operators or supervisors, the students were taken on as trainees at very low salary, trained for the minimum of six to twelve months in the business, and then participated in regular employment.

According to the India Skills Report 2017 (Wheebox), many occupations are anticipated to be at danger of automation as a result of the ongoing evolution of business models, as well as forthcoming technological advancements and socio-economic developments. To meet consumer expectations, a completely new set of employment is also emerging. Automation and industrial transformation would have an influence on jobs and skills in India, according to Krishnan & Nambiar (2017). What kind of skills will be necessary for future workplaces? How can we develop our youth's resilience and adaptability to these changes by embracing lifelong learning, upskilling, and re-skilling? Skilling must combine knowledge, aptitude, attitude, and the relevant competences required to carry out diverse job duties in order to create capable, globally skilled labor. Significant changes to Indian company law were made with the passage of the Companies Act in 2013, particularly in the areas of accountability, disclosures, investor protection, and corporate governance.

Now, every business with a net worth of at least INR 500 crore, a turnover of at least INR 1,000 crore, or a net profit of at least INR 5 crore is required to form a CSR committee and devote at least 2% of its average net earnings over the previous three years to corporate social responsibility. The majority of reputable companies, including LG Electronics, Samsung India Pvt. Ltd., Oriental Insurance Co. Ltd., Honda Motors, Honda Motorcycle and Scooters Pvt. Ltd., and Maruti Suzuki India Ltd., have stepped forward to support training programmes being provided in various industrial training institutes. Positive outcomes have been seen in a number of areas, including better training, industry-ready individuals, improved industry absorption, and improved compensation. Nevertheless, it is noticeable that there are several universities where no industry relationships have occurred. It is crucial to uphold quality assurance of these programmes at this time, when the world is paying attention to Indian skill development programmes and when Indian human resources are required everywhere. Successful industrial partnerships with training institutions may be found in industrialised nations like Germany, Finland, Brazil, and others. Even though skill development is a hot topic in India and all stakeholders are aware of its significance, it is crucial that efforts to promote it are coordinated with a clear knowledge of the responsibilities played by each stakeholder.

### **3.3 RESEARCH OBJECTIVES**

To comply with the research rationale, few research objectives were devised to satisfy the main objective of the study. The main focus of study is to explore industry role towards skill development, various aspects of industrial collaborations and their impact on the skill ecosystem of the country. Present study is guided by following research objectives:

1. To have an overview about the skill ecosystem of India.
2. To understand the global perspective of industry role in skill development.
3. To explore the role of industry in skill development in India and its future potential.
4. To understand the industry perspective on the advantages and policy requirements for skill development in India.
5. To develop a policy/strategic framework for industry association in skill development.

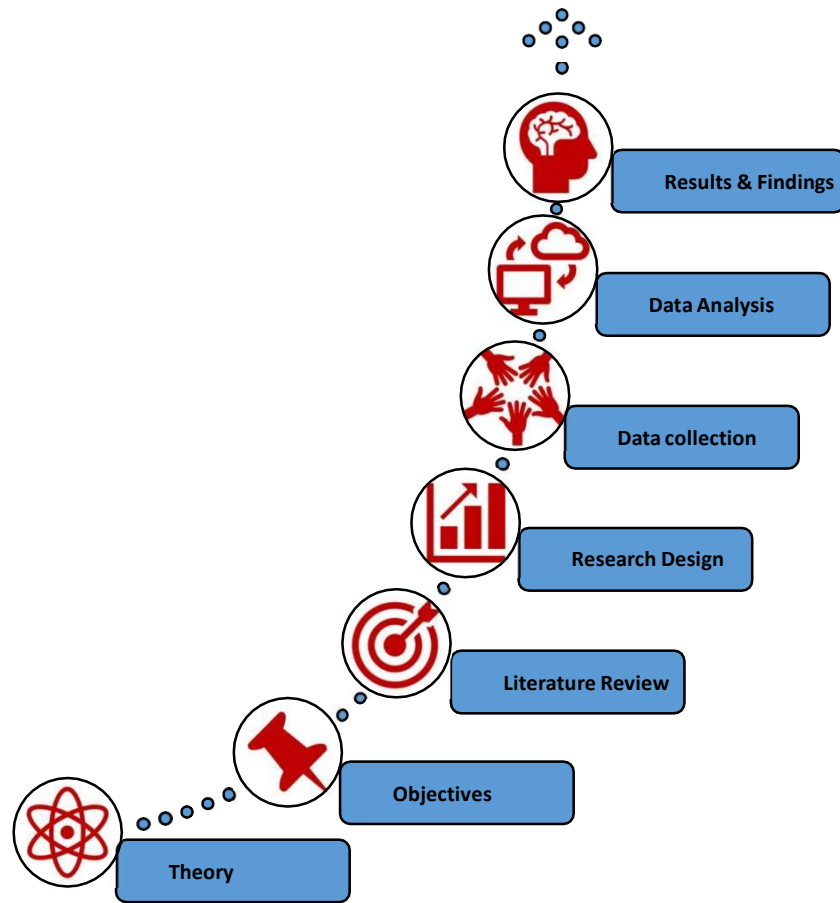
In order to satisfy the objective, the research is designed to be a descriptive as well as exploratory in nature, as the research is supposed to be about finding the facts and drawing the conclusions. Based on the study, it is also about exploring something new to some extent. The larger study in this area uses primarily qualitative methods in that it focuses mostly on content analysis.

### **3.4 RESEARCH DESIGN**

According to the principles of mixed research design, which offered a framework for data collection and analysis, the descriptive design was selected and created for the study.

The current study aims to examine the role of industry in skill development, various features of industrial partnerships, and their effects on the national skill ecosystem. An extensive examination was needed to determine if skill training helps pupils learn new talents. For this reason, information has been gathered from a variety of sources. Therefore, the study fit under the category of mixed-type research design. To choose the samples for the research study, a multi-stage sampling procedure was employed.

The results contain frequencies or percentages as well as quotes from the pre-existing transcripts for each study aim. Finally, the answers to the post-discussion questionnaire are examined using a variety of statistical methods, and the results are then utilised to support the conclusions. This study used a cross-sectional survey and case study-based questions for interpretive structural modelling, combining quantitative and qualitative methodologies. To comprehend the skills needed in India and the role of business, a survey of the literature and interactions with industry executives are necessary. To understand how the sector is contributing to the eco system of skill development, research reports and academic publications pertaining to other nations should be studied. Surveys using questionnaires are being conducted in Delhi and the NCR to better understand student perspectives.



**Figure 3.1 Research Process**

With the aid of computer programmes like SPSS and Jamovi, the collected data has been analysed using statistical techniques like Descriptive Statistics, Factor Analysis, and the appropriate parametric and non-parametric tests. The results will then be presented in the final form of the thesis using MS Office applications. Interpretative Structural Modeling was used to develop a model of the Drivers and Enablers for Developing Skill Centre of Excellence.

It is evident from the survey of literature that a very few studies incorporating all these variables. It is a directed effort to bridge the observed gap in the various literatures. In this chapter we have explored the objective wise research methodology used in the study and is divided into three subsections.

### **3.4.1 Perspective of Trainees**

To understand the trainee’s perspective, study has taken the sample size of 515 trainees or students that has been collected from skill development institutions in NCT of Delhi, India. The questionnaire carries the 37 items to elucidate the factors related to the trainees or students of skill development institution. The collected data is statistically analyzed by applying

exploratory and confirmatory factor analysis by using R Jamovi package 1.0.0. To explore the role of industry in skill development in India and its future potential through the students' perspective, the detailed methodology followed is as given below:

- ❑ Research Design: Exploratory as well as Descriptive
- ❑ Population: Students and trainees of academic bodies involved in skill development & Skill education of India.
- ❑ Sampling Frame: Respondents are from NCR . It includes location from Delhi, Ghaziabad, Gurgaon and Noida.
- ❑ Sample Size: The sample size for the primary data is 515 trainees for gauging the trainee's perspectives which is more than ten times the number of items in the questionnaire.
- ❑ Sampling Technique: The data was taken through Random sampling method
- ❑ Data analysis: Statistical Tools such as descriptive statistics and factor analysis are used to analyze the data using SPSS 20 and Jamovi.
- ❑ Primary Data: Primary data has been collected from both open and close ended questions through primary data survey.

### **3.4.2 Perspective of Trainers, Educators, Employers and Administration**

To understand the perspective of stakeholders other than Trainees, study has taken the sample size of 262 individuals belongs to any of the following categories such as Recruiter/ Industry Executive, Trainer, Member Skill Council, Professor, Policy Planner and Head/Executive of Skill Centre in NCT of Delhi, India. The questionnaire carries the 30 items to elucidate the Role of Strategic Partnership of Industry- Academia in Skill Development.

The collected data is analysed with the help of various statistical techniques like exploratory with confirmatory factor analysis and generalized linear model, these were performed with the help of computer software; R Jamovi package 1.0.0. Similarly, to understand the industry-academia partnership for skill development in India through a survey of trainers/ industry/ administration the design of the study is as given below:

- ❑ Research Design: Exploratory as well as Descriptive

- ❑ Population: Academic bodies, Industry professionals and Government agencies involved in the area of skill development.
- ❑ Sampling Frame: Respondents are from NCR . It includes location from Delhi, Ghaziabad, Gurgaon and Noida.
- ❑ Sample Size: The sample size for the primary data is 262 for understanding the trainers perspective
- ❑ Sampling Technique: The data was taken through random and snow bowling techniques
- ❑ Data analysis: Statistical Tools such as descriptive statistics and factor analysis are used to analyze the data using SPSS 20 and Jamovi.
- ❑ Primary Data: Primary data has been collected from both open and close ended questions through primary data survey.

### **3.4.3 Drivers and Enablers of Developing Skill Centre of Excellence**

To identify the drivers and enablers of skill centers in India and to know the interrelationships among the drivers and enablers, ISM (Interpretive Structural Model) is to classify the enablers based on their driving and driven power. ISM is Proposed by Warfield (1976) to dissect complex socio-economic frameworks. Structural self-interaction matrix (SSIM) shows the contextual relationship among the variables. It reveals that one variable helps to realize another variable or whether one “leads to” another variable. Based on the driving power and Driven Power, the enablers have been arranged into four categories (Mandal and Deshmukh, 1994):

- Autonomous enablers
- Linkage enablers
- Dependent enablers
- Independent enablers.

The collected data is analysed with the help of various statistical techniques like interpretative structural modelling, these were performed with the help of computer software; the same has been segregated in various research design steps:

- ❑ **Identification of Drivers and Enablers:** Based on exploratory research design.
- ❑ **Respondents:** Eight Experts (respondents) were identified from the respondents of academicians, industry and policy makers for the purpose of identifying the drivers and

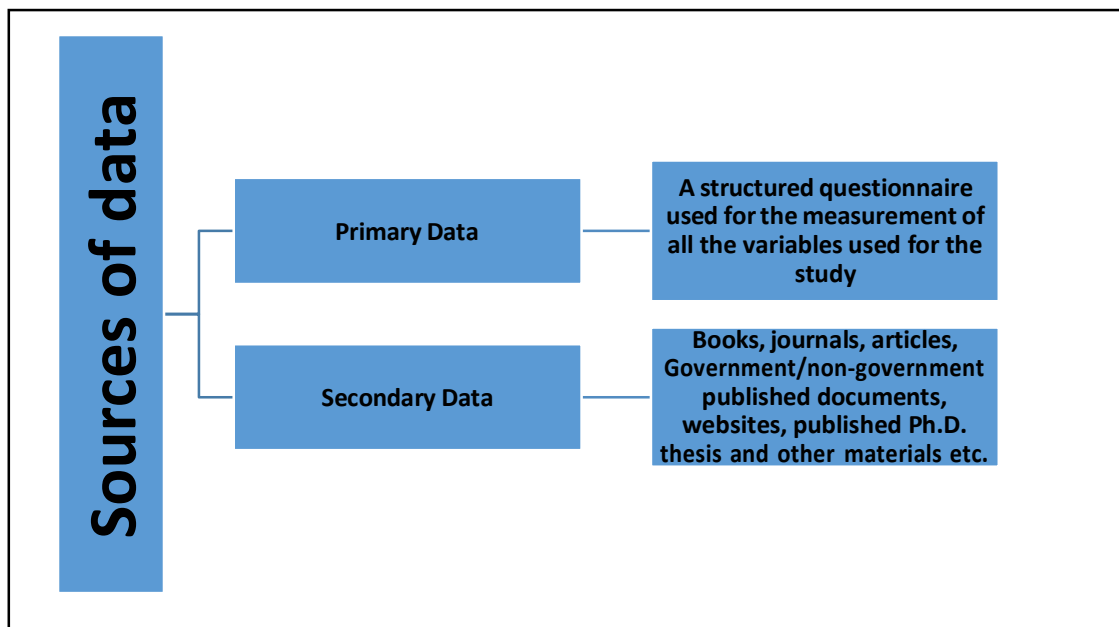
enabler. Four participants were from academia, two participants were from industry and other two were from government agencies with more than ten years of experience.

- ❑ **Data Collection:** Through interviews with the help of structured questionnaire
- ❑ **Data analysis: Interpretive Structural Modelling (ISM)** proposed by Warfield (1976).

### 3.5 RESEARCH DATA & ANALYSIS

A researcher gathers primary data from first-hand sources by employing techniques including surveys, in-person interviews, observation, and telephone interviews. It is gathered from original sources keeping the research process in mind.

The word "primary data" is used in contrast to the term "secondary data." Secondary data is information that has been gathered from earlier studies, polls, articles, books, and theses that have been authored by other persons or for other types of study. In this study, secondary data secondary data. This enables researchers to develop questions and enhance their comprehension of the problems being addressed. Prior to gathering data, the researcher must do this; otherwise, it would be expensive and time-consuming. were heavily utilized. A researcher often starts a study by utilizing



**Figure 3.2 Sources of Data**

Mean, Median, Quartiles, Standard Deviation, Coefficient of Variation, Factor Analysis, Path Analysis, Generalized Linear Model, and Mediation Analysis are the acceptable statistics that

have been employed in this study. These statistical methods should help achieve a number of the study's goals.

### **3.5.1 Descriptive Statistics**

The term "descriptive statistics" refers to the quantitative representation of the qualities of a collection of data in the study of social issues. Frequency analysis is a type of analysis that is included in descriptive statistics. Frequency in statistics is the total number of times an event happens. The study of measures of dispersion, central tendency, percentiles, and other statistics that compact with the quantity of occurrences (frequency) is known as frequency analysis. When data are transformed into groups, frequency analysis is used to investigate data derived from qualitative factors and to analyze data derived from quantitative variables. Depending on the goal of the study, many techniques are used while analysing frequencies.

### **3.5.2 Factor Analysis**

A statistical method called factor analysis is used to find the underlying structure in a big collection of data. It is a data reduction technique designed to reduce the complexity of many different variables to a manageable number of underlying components. Finding the common underlying dimensions, or latent variables, that account for variance in a set of observable variables is the aim of factor analysis. Factor analysis makes the assumption that the observable variables are associated with one another and that fewer underlying components can adequately account for the relationships. The factors are calculated using mathematical procedures like principal component analysis or maximum likelihood estimation and are thought of as linear combinations of the observable data.

The outcomes of a factor analysis can be used to generate predictions or deduce conclusions about the data as well as to discover the major underlying dimensions that explain the connection between the observed variables. In order to locate the underlying structure in big data sets and make sense of complicated interactions between variables, factor analysis is frequently employed in a variety of disciplines, including psychology, sociology, and marketing research.

### **3.5.3 Exploratory Factor Analysis**

To determine the underlying structure of a group of variables in a data set, a kind of factor analysis known as exploratory factor analysis (EFA) is utilised. EFA aims to identify the latent variables, or underlying dimensions, that underlie the intercorrelations between the observable



variables. Because EFA is frequently used to investigate the structure of a data set rather than testing certain hypotheses about the correlations between variables, it is regarded as exploratory research.

EFA starts with a huge collection of observable variables and uses mathematical techniques like principal component analysis or maximum likelihood estimation to condense them into a smaller set of components. Finding the factors that account for the most variance in the data is the objective. The factors are linear combinations of the observed variables. To better comprehend the underlying structure of a data collection, EFA is frequently used in the domains of psychology, sociology, marketing research, and other related disciplines. The outcomes of an EFA may be used to pinpoint the fundamental factors that explain how the observed variables relate to one another and to direct the creation of more precise hypotheses for future studies.

#### **3.5.4 Confirmatory Factor Analysis**

A particular hypothesis on the underlying structure of a group of variables in a data set is tested using confirmatory factor analysis (CFA), a kind of factor analysis. CFA, as opposed to exploratory factor analysis (EFA), begins with a theoretical model that has been predetermined and evaluates how well it fits the data. Instead of only examining the data structure as in EFA, the objective of CFA is to confirm or reject the hypothesis regarding the structure of the variables. In CFA, the researcher specifies a number of factors as well as the connections between the factors and the observed variables. By contrasting the observed covariances and correlations between the variables with the anticipated covariances and correlations produced from the factor model, the factor model is then put to the test.

The factor model is then put to the test by contrasting the actual covariances and correlations between the variables with those predicted by the factor model. To assess how well the model fits the data, goodness-of-fit measures like the chi-square statistic and fit indices are utilized. CFA is frequently used to evaluate hypotheses on the underlying relationships between variables in disciplines including psychology, sociology, and marketing research. The outcomes of a CFA can be used to support or refute the validity of a theoretical model and to direct the creation of more specific hypotheses for subsequent study.

### **3.5.5 Generalized Linear Model (GLM)**

A statistical method for simulating the connection between a response variable and one or more predictor variables is known as a moderated generalized linear model (GLM). The term "moderated" means that one or more additional factors are influencing or moderating the connection between the response and predictor variables. The response variable can have a non-normal distribution, such as a binary, Poisson, or negative binomial distribution, with a GLM, which is an extension of linear regression. In a moderated GLM, the moderating variables are used to change the direction or degree of the link between the response and independent variables. The predictor variables are used to explain the relationship between the response and independent variables.

In real-world situations, moderated GLMs can be helpful for examining complicated interactions between variables, particularly when the effects of the predictor and moderator variables are non-linear or interact in complex ways. These models allow for the testing of hypotheses regarding the existence and kind of interactions and can offer important information regarding the processes behind the relationships between the variables. SPSS (version 20) and Jamovi Advanced Moderated Mediation and Moderation Generalized Linear Models (GLM) were used to analyse the data (Gallucci, 2020). The dependent variable does not have to be regularly distributed and maximum likelihood estimation (MLE) is a parameter estimate because none of the fundamental assumptions for generalised linear models (GLM) were broken, for example, statistical dependency of the  $n$  observations (Breslow, 1996). As a result, the Jamovi Generalized Linear Model was used to construct a moderated mediation multigroup model (GLM). Bias-corrected bootstrap tests, which are effective tests even with small data, were used for mediation studies (Fritz & Mackinnon, 2007).

John Nelder and Robert Wedderburn developed the Generalized Linear Model (GLiM, or GLM), a sophisticated statistical modelling method, in 1972. The response variable  $y$  may have an error distribution other than a normal distribution thanks to this broad phrase that includes a variety of alternative models. Linear regression, logistic regression, and poisson regression are among the models. The response (also known as dependent or target) variable " $y$ " is described in a linear regression model as a function or linear combination of all the predictors " $X$ " (also known as independent, regression, explanatory, or observable variables). The underlying linear connection between the predictors and response (i.e., we can simply visualize

the relationship in the form of a straight line). Additionally, the response variable's error distribution should follow a normal distribution. We are creating a linear model as a result.

Even if the link between the predictors and the answer is not linear, GLM models enable us to construct a linear relationship between the two. Utilizing a link function, which connects the response variable to a linear model, enables this. Contrary to linear regression models, the response variable's error distribution is not required to be regularly distributed. It is presumed that the mistakes in the response variable adhere to an exponential family of distribution (i.e., normal, binomial, Poisson, or gamma distributions).

When there is moderation, a third construct determines the intensity and even the direction of a link between two constructions (i.e., the moderator). In other words, when the levels of the moderator construct fluctuate, so does the strength of the interaction between two constructions. For instance, depending on modifiers like income, age, or switching prices, the link between customer happiness and customer loyalty may not be the same for all consumers. As a result, moderation may (and ought to be) seen as a method of taking data heterogeneity into account.

Mediation analysis is used to quantify the causal chain between an antecedent variable, a mediating variable, and a dependent variable. Although mediation analysis is helpful for observational research, it may be most convincing when used in randomised therapy and preventative programmes to address cause and effect problems. By revealing the essential components of effective programmes, knowledge regarding mediating processes enhances programmes. The idea of mediated or indirect effects was initially used in route models for the inheritance of skin color in guinea pigs by Sewall Wright in the 1920s. Since Herbert Hyman and Paul Lazarsfeld originally formulated concepts about mediation in the social sciences in 1955, methodological advancements and uses of mediation analysis have rapidly risen. In the past forty years, there have been many innovations in mediation studies, and most recently, comprehending the causal underpinnings of mediation analysis has made significant strides.

### **3.5.6 Model Fit**

How well a Confirmatory Factor Analysis (CFA) model fits the data is measured as its fit. A collection of relationships between the observable variables and the underlying latent factors are specified by the model in CFA. The purpose of model fit evaluation is to evaluate how well

the factor model accounts for the observed covariance and correlation structure in the data. A CFA model's fit may be evaluated using a variety of techniques, including:

Chi-square analysis: The covariance and correlation matrix observed and the covariance and correlation matrix predicted by the model are compared using the chi-square statistic. A non-significant chi-square statistic suggests that the model and the data match each other well.

- a) Goodness-of-fit indices: Fit indices that compare the observed covariance and correlation structure to the covariance and correlation structure predicted by the model, such as the Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI), provide information about the fit of the model to the data. A good match between the model and the data is indicated by values that are near to 1.0.
- b) Residuals: Residuals are the variations between the covariance and correlation matrix that was seen and the one that the model predicted. Large residuals show that the model and the data do not fit well together.
- c) Modification indices: Modification indices are indicators of how much better the model fits if a certain parameter could be determined at will. Large modification indices suggest that the model's fit would be significantly enhanced if a single parameter could be estimated at will.

It is crucial to remember that a strong model-data fit does not guarantee that the model accurately captures the underlying connections between the variables. A poor fit between the model and the data may point to an incorrectly stated model, non-normally distributed data, or a limited sample size. When this occurs, the researcher might have to improve or expand the fit of the model to the data.

### **3.6 LIMITATIONS OF THE STUDY**

The present study has found various limitation spread across various chapters; these have been discussed as follow:

- The majority of the participants in the survey were from Delhi and the National Capital Region, and the study's main focus is on institutions that provide technical trades and professional degrees.
- Although a comprehensive case study was not conducted for this research, certain components from the skill development institutes are included in the results and

discussions.

- There were no surveys of alumni conducted to get their opinions on the merits and shortcomings of skill development institutions and programmes.
- The study falls short in defining the necessary future abilities and outlining a plan to deliver them.

### **3.7 SCOPE OF THE STUDY**

The present study presents a limited scope and is applicable to few stakeholders of skill education. Various scope of study has been discussed as follow:

- The study of programmes and courses for skill development that are not technical trades may be conducted along similar lines.
- Other Indian states may be the subject of a comprehensive investigation.
- To discover best practices and problems, case studies of skill development organizations like World Class Skill Centre and other government programmes may be conducted.
- The perspective of alumni may be incorporated in the comprehensive research.
- In the Indian context, research may be done to determine the trades and abilities needed in the next two to three decades.

\*\*\*

## **CHAPTER 4: STUDENTS PERCEPTION OF SKILL DEVELOPMENT PROGRAMS**

### **4. 1 INTRODUCTION**

In recent years, skill education has taken on a tremendous amount of significance in our country. Due to the Indian educational system's failure to prepare students for the workforce, skill-based education is now required. Only if young people in our nation receive skill-based education and develop the necessary capabilities can India's growth accelerate economically. The urgent need for employability skills has been argued as a means of enhancing job results, assisting individuals in adjusting to change, and enhancing their employment prospects (Yusof et al., 2012). Due to technological innovation and the process of globalisation, companies now want different sorts of talents from their employees and workers than they did in the past (Cinaret et al., 2009). To put it another way, modern organisations want workers and employees with highly developed technical abilities coupled with employability skills (Singh & Singh, 2008).

According to the India Skills Report 2017 (Wheebox), many occupations are anticipated to be at danger of automation as a result of the ongoing evolution of business models, as well as forthcoming technological advancements and socio-economic developments. To meet consumer expectations, a completely new set of employment is also emerging. Automation and industrial transformation will have an influence on working skills and other skill sets in India, according to Krishnan et al. (2019). What kind of skills will be necessary for future workplaces? How can we build our youth's resilience and adaptability to these sorts of change by embracing lifelong learning, up-skilling, and re-skilling? These are the main concerns that need to be addressed. Skilling must combine knowledge, aptitude, attitude, and the relevant competences required to carry out diverse job duties in order to create capable, globally skilled labour. The difficulties to global education are presented by the introduction of education for all religions through skill education (Marshall; 2010).

The majority of reputable companies, including LG Electronics, Samsung India Pvt. Ltd., Oriental Insurance Co. Ltd., Honda Motors, Honda Motorcycle and Scooters Pvt. Ltd., and Maruti Suzuki India Ltd., have stepped forward to support training programmes being provided in various industrial training institutes. Positive outcomes have been observed in a number of areas, including improved training, applicants who have received industry-ready training,

better industry absorption, a higher compensation package for trainees, institutional growth, and many more. But it has also been noted that there are a lot of universities where no industry collaborations have occurred.

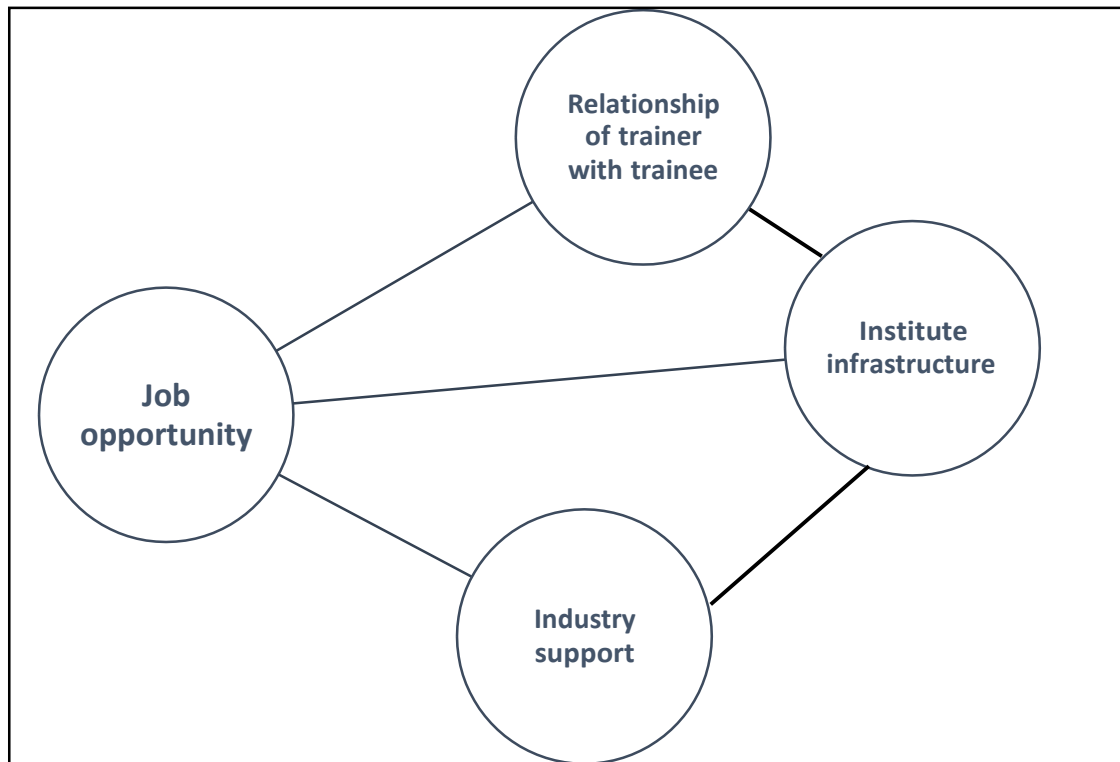
It is crucial to uphold quality assurance of these programmes at this time, when the world is paying attention to Indian skill development programmes and when Indian human resources are required everywhere. Successful industrial partnerships with training institutions may be found in industrialised nations like Germany, Finland, Brazil, and others. Even though skill development is a hot topic in India and all stakeholders are aware of its significance, it is crucial that efforts to promote it are coordinated with a clear knowledge of the responsibilities played by each stakeholder.

It is primarily a significant time to investigate a thorough understanding of causal relationships among all variables related to employability skills, such as Institute infrastructure, job opportunity, relationship of trainer with trainee, and Industry Support. This is true when considering all the industry reports and government of India initiatives. In order to determine the effectiveness of the skill development programme and how students perceive it, research was conducted. The study proposes the theoretical background mentioned in Figure 4.1.

There are six sections in the chapter. The introduction and fundamental study background are covered in the first section. The second portion discusses the literature review, the third section covers the study methods, the fourth section covers the findings, and the fifth section discusses the findings. The chapter's last portion aims to provide the conclusion and its implications for potential future research directions.

## **4.2 STUDENTS' PERCEPTION ON SKILL DEVELOPMENT PROGRAMS**

The section on literature reviews looks at the research that has been done on skill development and skill education. It gives a general overview of a broader study that is further broken into four sections: trainer-trainee relationships and employability, skills development and job opportunities, industry support and employability skills. The variety of parameters that might be studied are used to categorize the literature. The reviews conducted for the study are not just limited to India; we also made an effort to investigate the state of skill education in our economies.



**Figure 4.1 Theoretical Framework**

#### **4.2.1 Skill Education & Economic Infrastructure**

According to Agarwal et al. (2007), there is a long road ahead for developing a fully integrated skill education system in India since the conflict extends beyond the legal framework for higher education and includes other factors. The main problem is that skill education is frequently viewed as being inferior to formal education, which forces individual students to enrol in the formal education system. According to research by Erasmus and Breier (2015), there is often a shortage of professionals and craftsmen across practically all economic sectors; organisations, business units, and the government all agree that there is a severe lack of technicians, artisans, and engineers (Sheppard and Ntenga, 2014).

According to Stahl et al. (2012), the majority of companies have already built world-class training facilities and sizable learning campuses, they have already begun collaborating with the best universities and institutes around the globe, and they are utilising the most recent advancements in leadership for cultivating and utilising tools and technologies to create the best talents. According to recent studies on skill development in technical education, Greenan et al. (1997) from Ireland have investigated how programmes should focus on student needs and be more intuitive in their structure, as well as how to advance the curriculum and use effective teaching strategies that improve learning and foster authority and relational skills.



#### **4.2.2 Skills development & Job Opportunities**

In numerous nations, there exist signs of a skills gap. According to OECD reports published in 2013, young unemployment is a result of a fundamental mismatch between skill sets and job opportunities in the market. Numerous observers have stated that Skill educational training institutes' limited capacity prevents them from meeting the demands of the whole market (Akoojee, Gewer and McGrath, 2005; McGrath and Akoojee, 2009, McGrath, 2003). Employers believe that skill training colleges are not providing the kind of skill-set that the industry needs and that an alarmingly high percentage of young people who have received this training from these institutes or artisan training institutes are not receiving suitable employment after completing their studies.

Employers are said to favor hiring people who are already used to the workplace culture. This goal has been pursued at the collegiate level in several nations. According to Kuczera (2013), workplace training is required in virtually all two-year professional degree programmes in Sweden and typically makes up a quarter of the total programme length. However, in Denmark, on-the-job training is required for at least three months during a two-year professional degree programme and for at least six months for a three-year bachelor degree programme. This training can occur at one or multiple employers (Trede et al., 2012). According to the Flemish Department of Education and Training, the situation in Belgium is that Skill educational programmes are centred on the jobless young and involve the mandatory on-the-job learning inside a firm that is alternated with the periods in training institutions (FDET, 2013). Only 34% of South Africa's 280000 graduate students who pursued technical education in 2000 found a position that was relevant to their field (Erasmus & Breier, 2009). This implies that the appropriate abilities, not simply additional talents, are required.

In line with this, the problem facing the Indian economy is supplying the need for skilled labour with high growth potential. On-the-job training is essential for increasing productivity, but in emerging or informal economies, there is a problem that has to be solved by the leading business. Doing so will enable them to achieve economies of scale and a high level of competence in the field of skill development. This will increase production and efficiency for small and medium-sized businesses as well as make expert labour educated by the top company available according to its requirements.

In order to increase their prospects of finding career success, graduates should concentrate on strengthening their personal and professional abilities suitable for the workplace, according to Raybould and Sheedy (2005) in the United Kingdom (UK). According to Wan (2007), businesses should spend money on establishing an efficient workforce by giving their employees access to knowledge, skills, and competencies. Hadi et al. (2015) Malaysia have suggested that at least six thinking skills, including questioning, imagining, caring observation judging, remembering, and evaluating, are needed at traditional Skill education training (TVET) centres. These thinking skills will help them to complete on-the-job tasks on their professional job duties of the industry.

#### **4.2.3 Industry Support & Employability Skills**

Human capital has always been the source of progress for every business or country, according to Nerdrum & Erikson (2001), who also noted that human resources are seen as powerful economic agents with strong mental, physical, and physical capacities. On-the-job training and industry mentorship, according to Murphy et al. (1999), are acceptable and widely acknowledged strategies for employee development. A list of human resource (HR) practises that are used by successful businesses was proposed by Pfeffer & Jeffrey (1998). Making significant investments in education and skill development is one of the popular methods. Humans may be thought of as the information and abilities that individuals acquire via improved education and high quality training, according to Schultz, T. W. (1961). This type of resource is evaluated as the result of planned investment that provides higher returns for people (Nafukho, 2000).

Robinson (2000) defined employability skills as the fundamental abilities required for successfully completing a task and performing effectively at work. According to DEST (2002), employability factors include self-management, technology developments, teamwork, planning, problem-solving abilities, and enterprise skills. They are also referred to as important skillset, 21st century skillset, core expertise, generic skills, key competencies, critical skills, and key skillset. However, several businesses have adopted the term "employability skill set." Employability abilities are likely to facilitate the progression of various positions both inside and between businesses, according to Morrison & Hall's (2002) research. According to McArdle et al. (2007), employable people and trainees should constantly take a proactive approach to integrating themselves into the domestic market and labour market. Better employability skills might also assist workers in fine-tuning themselves in accordance with the

numerous adjustments necessary to enhance working abilities or talents that are in accordance with the environmental demands of the workplace and market demand (Kazilan et al.; 2009).

Regardless of employment levels or type, employability skills in the marketplace refer to general as well as non-technical competences required for executing practically all occupations in the industry (Ju et al.; 2012). There are several abilities that are applicable to practically all occupations, from entry-level positions to those at the CEO (chief executive officer) level, across a variety of sectors (Sherer & Eadie, 1987). In the modern era, globalisation has reduced the number of jobs on the market, particularly for young people and youth or adults from all countries (Bynner, 2001; Danziger & Ratner, 2010; Gutman & Schoon, 2012). Schools should therefore be required to teach students employability skills in order to ensure successful employment or good jobs (Poole & Zahn, 1993; Cotton et al., 2008). According to Cranmer (2006), there is a significant mismatch between the abilities that are taught at the school level and those that are really desired by employers. Young people or students who are just entering the skilled labour market sectors are therefore more likely to take on whatever that is offered than to choose or decide on the professions that are best suited for them (Hopper, 1977). Additionally, there is a great likelihood that they are mismatched to their occupations (Takase et al.; 2012). Despite the increased accessibility to education and occupations associated to it, people still change careers frequently in the early stages of their careers, which also involves them in exploratory activities and developmental activities that are unrelated to prior work experience (Savickas et al.; 2009). According to industry research (Rasu et al., 2010), employability skills are significantly and favorably correlated with adults' ability to adapt to good career opportunities. This research has shown that employability skills are important for adults in helping them improve their skills with better career opportunities in their respective workplaces.

#### **4.2.4 Trainer & Trainee Relation and Employability**

Numerous research investigations have noted the influence of skill education training and its modifications on the educational practises of any economy (Billett, 1999; Hedberg & Harper 1996; Mulcahy 1996; Mulcahy & James 1999; Robinson 1993; Sanguinetti 1994; Smith, 1997). According to Billett (1999), the implementation of a uniform or single curriculum-based framework throughout the years of training and the subsequent reform have undermined the autonomy of the instructors. In the past, economic administrations of education have had high

expectations of their training institution, which offers skill education and enhances the training systems (Powles & Anderson 1996; Gill et al. 1999; Maurer 2012).

The expansion of the entire global economy and its related social processes have made it possible for knowledge to travel freely across national capital limits (Lingard et al. 1994; Seddon 1999). The development of a "new competitive state" has also been aided by government organisations' support of current market forces, which also serves as the country's "main steering mechanism" (Cerny 1990; Lingard et al. 1994). The growth of corporate managerialism and economic rationalism are two significant tendencies that have emerged in Australia. Both of these developments have altered how states operate and their preexisting connections with educational institutions. The economic and social developments that have taken place within this framework have created significant connections between economic success, the growth of human capital, and global competitiveness. The advancement of human capital and national or international interests are always served by education. An excellent tool for gaining a stronger competitive edge in a global market is human capital. Numerous experts have noted the impact of globalisation and technology on the nature of employment as well as the composition of the current workforce (Attwell 1997; Waterhouse et al. 1999; Young & Guile 1997).

Based on a survey of the literature on the sociology and history of education, Benavot (1983) presented a few points of view on the development of skill education in the economy in the early 20th century. Human attitudes and decisions, which affect a wide variety of economic difficulties, are always strongly influenced by modern society and its characteristics. These ideals are strongly encouraging the trainees to think creatively and to develop new talents through skill education (Eckersley, 1998; Singh, 2013).

### **4.3 RESEARCH METHODOLOGY**

Three basic study methodologies were used to analyse educational effectiveness: a literature review, individual interviews or questionnaires, and focus groups. Since Harris et al. 2005 presented a project on the evolving role of skill education training staff development, the methodology utilised to collect the data for this study is purposefully centred on interviews using questionnaires.

The researchers genuinely think that information has to be acquired from the people to provide a fundamental comprehension of the perception, preference, and personal effect of these alterations because broad group conversation simply creates contextual information. This method closely resembles the difference made by Argyris et al. between hypotheses that have been embraced and those that have been mentioned in the literature (1985). They made the argument that what individuals say may never coincide with what they actually do. The purpose of this study was to explore the hypothesis that what people say in casual conversation or to friends may not always represent what is going on in their own lives.

This study has produced a self-administered, structured questionnaire for graduates, current trainees, and future trainees. It is empirical research based on a review of the literature. The random sampling approach is used to acquire data. With the use of computer software, the acquired data is examined using statistical techniques such exploratory factor analysis and the relevant tests; Jamovi 1.0.0 was used for the final analysis. The population of 2300 students in Delhi, India's national capital, served as the sample, which included 515 trainees or students. The sample size was taken into account using the sample size calculation from Hulley et al (2007). In this study, three industries-electrical, automotive, and refrigeration and air conditioning-have been taken into account since their businesses are proactive in assisting educational institutions for skill development. The effects of partnering with well-known business partners in these fields with government institutions that provide courses in these fields to secondary or senior secondary graduates will be investigated.

Through this study, an effort has been made to create recommendations that might serve as a turning point for industry engagement with educational institutions, especially in the interest of skill development. A thorough research is going to motivate businesses in a favorable way, leading to more businesses partnering with training institutions, which will benefit all parties involved.

#### **4. 3.1. Demographic characteristics**

The respondent's profile has been sub- categorized on the basis of education, income, area of residence, salary expectation and expected sector of employment. Same has been reflected through table 4.1 and figure 4.2 of Demographic Characteristics.

**Table 4.1: Demographic Characteristics of Trainees**

<b>Components</b>	<b>Choice</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Education level at the time of joining skill course</b>	8 <sup>th</sup> class	28	5.44
	10 <sup>th</sup> class	129	25.05
	12 <sup>th</sup> class	241	46.80
	Graduation	107	20.78
	Any Other	10	1.93
<b>Choice of employment</b>	Govt. Sector	265	51.46
	Public Sector	157	30.47
	Private Sector	30	5.83
	To be a part of my family business	28	5.44
	To start my own business	35	6.80
<b>Expect pay package on completion of course</b>	Minimum wages fixed by govt.	31	6.02
	Less than 15,000	52	10.10
	15,000 to 20,000	138	26.80
	20000 – 25000	178	34.56
	More than 25,000	116	22.52
<b>Expected job profile</b>	A shop floor employee	29	5.63
	Executive	165	32.04
	Marketing Executive	103	20.00
	Service Executive	117	22.72
	Liaison officer	91	17.67
	Any Other	10	1.94
<b>First preference on completing school education</b>	Graduation	41	7.96
	Job	116	22.52
	Short skill training	136	26.41
	Diploma	106	20.58
	ITI	116	22.53
<b>Area</b>	Rural	220	42.72
	Urban	295	57.28
<b>Family Annual Income</b>	Less than 3 lakh	71	13.79
	3.1 lakh - 5 lakh	90	17.48

	5.1 lakh - 7.25 lakh	209	40.58
	7.26 lakh - 10 lakh	115	22.33
	More than 10 lakh	30	5.82

Source: Authors Compilation

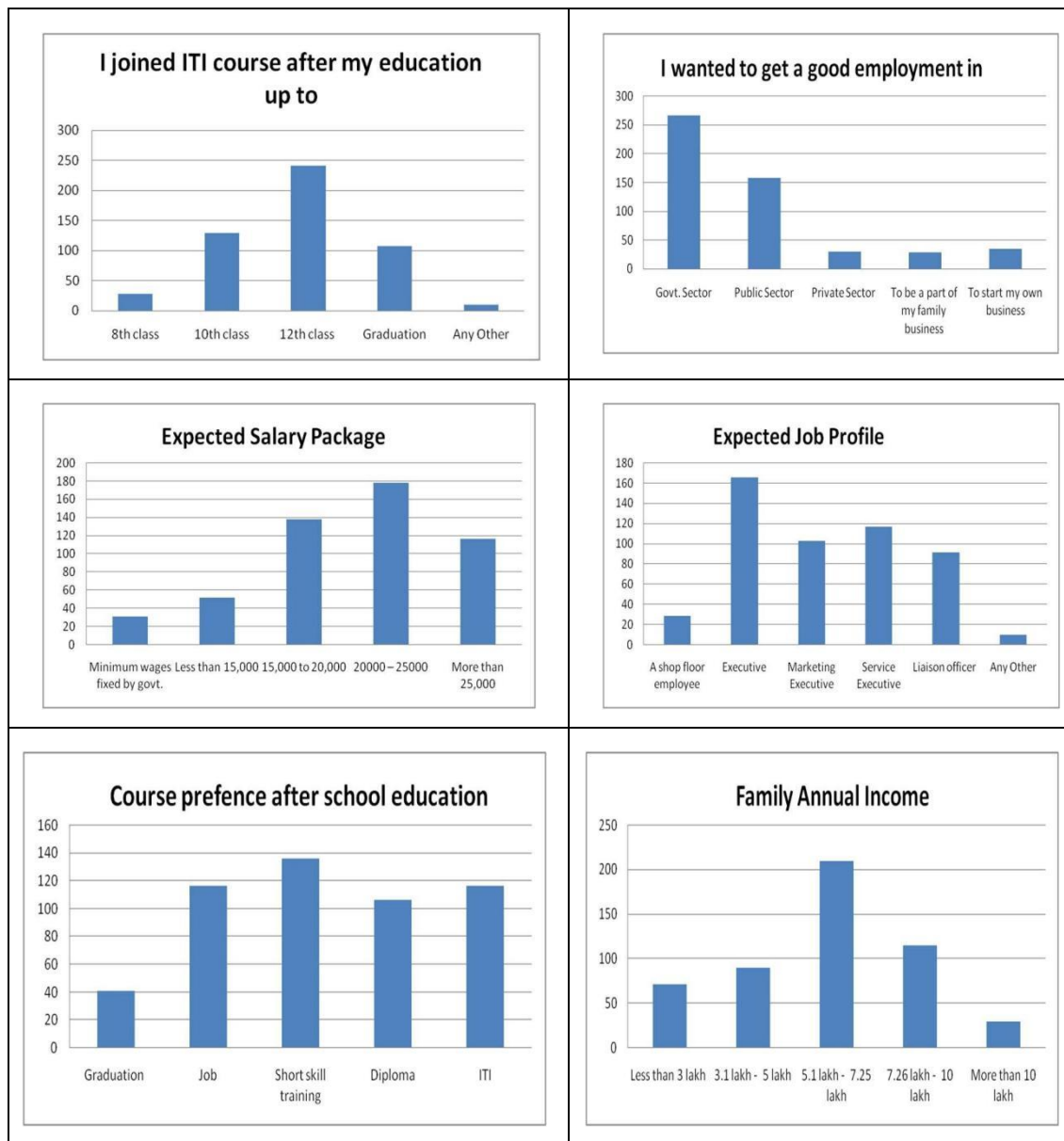
The sample size of 515 represents the total population size of 4155 students undergoing through training, as on 31st December 2017 in the respondent institutions. As suggested by Cochran, W.G. (1977), we have considered the 10 percent of the population size to calculate the sample size (i.e. 415) and oversampling of 2.3 percent of the sample size (i.e. 100 samples) has been done to solve the issue of non-respondents in sampling suggested by Donald (1967), Hagbert (1968) and Johnson (1959). The sample suggests that 42.72 percent of the respondents were from the rural areas and rest are from the urban areas. The family income suggest that 40.58 percent of the respondents are from the income group of five lakhs to seven lakhs of income group and the second highest frequency of 115 respondents are from the income group of 7.26 lakh to 10 lakh, which suggest that the higher the income group the lower the chances of the person to opt for the skill based education. The reason behind this may be is that the high income group prefers to send their wards for professional education as compared to the skill based education. Study has considered the ITI students where the Skill education is being carried out in India.

Approximately 32.04 percent of the trainees are aspiring to become the executives, just after the completion of their skill based education and 51.46 percent of them are aspiring for the government jobs after the completion of the course as they believe that the course has been initiated by the government of India. Hence, Government should accept their candidature in the public sector jobs or the government department jobs. Out of total 515, 46.8 percent of the student joined the ITI just after their 12<sup>th</sup> class and 25.05 percent has joined the ITI course after their 10<sup>th</sup> class. ITI courses are basically the skill based course hence, it loses its importance after the graduation. Soft skill training is the major preference of the students to learn just after the school education. However, second preference has been given to job and ITI training and the subsequent preference is gaining diploma and pursuing other graduation degree.

#### **4.3.2. Students Perception of the Role of Industry in Skill Development**

Students Perception of the Role of Industry in Skill Development is shown in table 4.2. The results suggest that students are perceiving the real industrial trainings, good placements,

industry relevant curriculum and guest lectures. Descriptive statistics' primary objective is to give the data a clear, succinct overview so that patterns and trends can be seen and understood.



**Figure 5.2 Demographic Characteristics of Trainees**

Source: Authors Compilation

**Table 4.2: Students Perception of the Role of Industry in Skill Development**

S. No.	Statement	Mean	Standard Deviation	SE	P- Value
1	In my institute many training programmes and guest lectures are organized in collaboration with industry partners which enhance my knowledge	3.65	1.321	0.0582	< .001



2	My principal has been highly enthusiastic to provide industry relevant skills to the students	4.01	1.124	0.0495	< .001
3	Presence of trainers from the industry in the institute makes learning more useful for suitable employment	4.02	0.992	0.0437	< .001
4	Industrial internship has widened my horizon	3.57	1.341	0.0591	< .001
5	The curriculum followed in my institute is industry relevant	4.24	0.838	0.0369	< .001
6	I find latest technologies are used in my institute's workshops and labs due to industry collaboration	3.90	0.910	0.0401	< .001
7	I got enough opportunities to visit industries of my trade while my training in the institute	3.72	1.124	0.0495	< .001
8	Many industrial trainers visited my institute during training and that provided opportunities for regular interaction with the industry	3.52	1.438	0.0634	< .001
9	I feel industries may fund for up gradation of training institutes	3.97	0.962	0.0424	< .001
10	Providing equipment for training is the responsibility of industry	3.90	1.092	0.0481	< .001
11	Inviting resource persons from industry helps not only in building better relationships but also prepare trainees for future job roles	4.07	1.087	0.0479	< .001
12	I feel trainers should be often trained by the industry in real industrial circumstances	4.14	0.904	0.0399	< .001
13	If industries partner with the institutes capacity building of the institutes may take place	3.83	1.033	0.0455	< .001
14	Industrial partnership with the institute has resulted in very good placements for the students	3.61	1.203	0.0530	< .001
15	Industries should come forward to enroll trainees under apprenticeship scheme	4.03	1.049	0.0462	< .001

The mean, median, and mode are a few commonly used metrics of central trend in descriptive statistics. The dataset's mean is determined by adding up all the numbers and dividing by the overall number of samples. Descriptive statistics also depend on measures of dispersion because they reveal how widely distributed the data are. The range, variance, and standard deviation are frequently used metrics of uncertainty. The range is the discrepancy between the dataset's greatest and lowest numbers. While the standard deviation is the square base of the variance, the variance is the average of the squared deviations between each number and the

mean. Frequency distributions, which indicate how frequently each value occurs in the dataset, and histograms, which visually depict the distribution of the data, are two other significant descriptive statistics.

Two statistical measurements are used to characterize the form of a distribution: skewness and kurtosis. Skewness is a statistic for gauging how skewed a distribution is. If one end of a distribution is lengthier than the other, it is said to be skewed. A distribution with a positive skewness has a lengthier tail on the right side and more values on the left, whereas one with a negative skewness has the reverse trend. A distribution that is exactly symmetrical has zero percentage of skewness. Kurtosis is a metric for how much a distribution's tails deviate from a normal distribution. The kurtosis of a normal distribution is 3. A distribution is referred to as platykurtic if the kurtosis is less than 3 and it has slimmer tails than a normal distribution. Leptokurtic distributions have longer tails than normal distributions and have kurtosis values higher than 3.

In contrast to a normal distribution, a distribution with positive excess kurtosis has more data in the ends than a distribution with negative excess kurtosis. Both skewness and kurtosis are significant in statistical analysis because they have the potential to affect the outcomes of statistical tests. If the data have a high kurtosis, the normality assumptions that underlie many statistical tests may be violated, necessitating the use of robust statistical methods.

#### **4.3.3 : Role on Institutions in Skill Development**

In the previous section, the role of industry in imparting good skill programs was discussed. However, the institutions themselves have a big role in proving skill development programs. The surveys show that the students are very happy with the academic environment and the support provided by the trainers and Principals of the institutions. Institutes have good infrastructure in terms of class room, library and well-maintained workshops. With a score of 4.2 on a 5 point Likert scale the students feel that the future scope of skilled persons in India is highly encouraging.

#### **4.3.4 : Skills Provided in the Training Programs**

In the previous section, the role of industry in imparting good skill programs was discussed. However, the institutions themselves have a big role in proving skill development programs. The surveys show that the students are very happy with the academic environment and the support provided by the trainers and Principals of the institutions. Institutes have good

infrastructure in terms of class room, library and well-maintained workshops. With a score of 4.2 on a 5 po

**Table 4.3: Role on Institutions in Skill Development**

Code	Statement	Mean	Standard Deviation
1.	I find the training offered in the institute to be very practical and relevant	4.33	1.00
2.	I am enjoying my training in the institute	4.47	0.84
3.	Principal in my institute has been a role model for the students	3.98	1.12
4.	My principal has been highly enthusiastic to provide industry relevant skills to the students	4.01	1.12
5.	Partnership with various agencies that provide soft skills training and employability skills is really beneficial for my growth	3.85	1.25
6.	My Institute has very good class rooms which make study more interesting	4.16	0.97
7.	I perform my practical training in very well maintained workshops that have all the latest tools and equipment	4.21	0.90
8.	I find all the staff members in my institute, i.e., C.Is, G.Is and non-technical staff to be very cooperative, skillful and trained	4.16	0.95
9.	There is a very good library in my institute	3.74	1.07
10.	Ambience of my institute is very good that motivates all trainees and we are proud of it	4.11	0.94
11.	The curriculum followed in my institute is industry relevant	4.24	0.84
12.	I find latest technologies are used in my institute's workshops and labs due to industry collaboration	3.90	0.91
13.	I feel at the time of completion of my course I will be having complete set of skills that will make me job ready	3.97	0.90
14.	Training at the institute has up graded me to be an internationally accepted skilled person.	3.69	1.28
15.	If given an opportunity, I would like to accept a global opportunity for employment	4.11	0.86
16.	In my opinion future scope of skilled persons in India is highly encouraging	4.20	0.87

17.	Inviting resource persons from industry helps not only in building better relationships but also prepare trainees for future job roles	4.07	1.09
18.	If industries partners with the institutes capacity building of the institutes may take place	3.83	1.03
19.	I would prefer to join a training programme which open an avenue of earn and learn so that, I may receive stipend to sustain myself and my family	4.06	1.10
20.	Government should offer stipend to the trainees of skill development programmes to keep them motivated and sustain their families	4.38	0.89

**Table 4.4: Skills Provided in the Training Programs**

Code	Statement	Mean	Standard Deviation
1.	I find opportunities of personality development while pursuing the training programme at in their institute as it is a part of the curriculum	3.97	0.88
2.	I get opportunities to enhance my communication skills	3.94	0.89
3.	The training programme I am undergoing in my institute helps me in understanding business environment	3.94	0.92
4.	I have learnt leadership skills while my stay in the institute	3.89	0.88

#### 4.3.5 : Trainer Aspects

The students found that trainers are highly helpful in guiding career path (4.45) and also trainers in the institute are very skill full and knowledgeable (4.27 on a 5 Point Likert Scale). Further the students feel that trainers keep on motivating me to complete my training and to develop myself as an all-round personality possessing not only in core skills but also in soft skills and employability skills (4.21).

**Table 4.5: Trainer Aspects**

Code	Statement	Mean	Standard Deviation
1	Trainers in my institute are very skillful, knowledgeable and well trained as per the present day industrial standards	4.27	0.89
2	My trainers keep on motivating me to complete my training and to develop myself as an all-round personality possessing not only in core skills but also in soft skills and employability skills	4.21	0.91

3	My trainers have been guiding appropriate career path during my training institute	4.45	0.83
4	My trainers have been my role models	4.02	0.94
5	I feel trainers should be often trained by the industry in real industrial circumstances	4.14	0.90

#### 4. 3.5. Exploratory Factor Analysis

The Cronbach alpha test was used in the study to examine the validity of the questionnaire's questions. (1951; Cronbach). Results of various parameters for sample size and reliability are shown in Table 4.4. Scale dependability as determined by the Cronbach's alpha test was reported at 94.5 percent. It shows that the scale used has strong internal consistency. According to Bohrnstedt & Knoke (1994), studies should target Cronbach's alphas of 0.70 or above. It was determined if the data were eligible using KMO and Bartlett's test, which gauges sampling adequacy. The observed value of KMO is  $0.945 > 0.5$ , which denotes multivariate normality among the variables. In light of the fact that the significant value found in the study is less than 0.005, factor analysis was accordingly carried out.

**Table 4.6: KMO Sample Adequacy of Trainees**

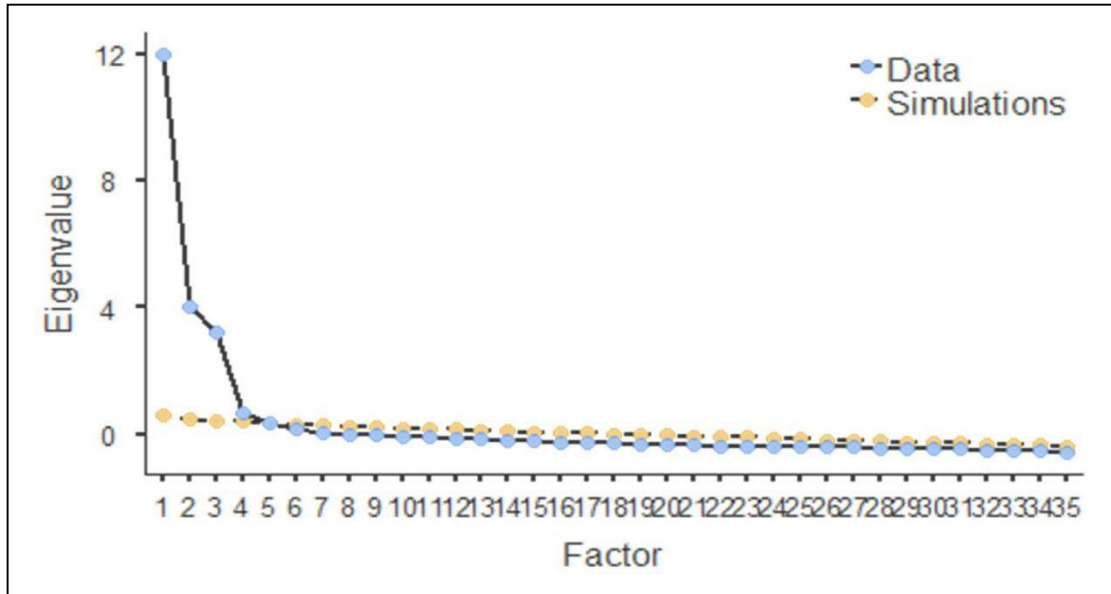
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.945
Bartlett's Test	Chi-square	13384
	Degree of Freedom	595
	Sig.	.001

#### 4. 3.6. Principal Component Analysis

Principal component analysis (PCA) with varimax rotation was applied to each variable in the corresponding construct using Jamovi. 1.0.0. You can get rid of the variables with factor loadings below 0.5. (Hair et al., 2005). However, we have taken out the variables with cross loadings and loadings below 0.35. The findings are reported in Table 4.5 after four factors with a combined 35 variables and eigenvalues of unity or above were eliminated.

Additionally, the uniqueness resulting from the factor analysis was evaluated in order to determine whether the data were appropriate for principal component analysis. The originality score is pretty high, which indicates that the data set is adequate (Stewart, 1981). Scree plot and factor analysis summary (given in Fig. 4.3) and factor analysis summary (mentioned in table 4.5) suggest that only four factor explains the 60.1 percent of cumulative variance. SS

loading suggest the sum of the squared loadings. This is used to determine the value of the particular factor. Table 4.6 also determines the variance explained by individual factor and cumulative factors.



**Figure4.3 Scree Plot**

#### 4.4 FINDINGS

We obtained four components for our investigation using the factor analysis. The varimax rotation implies that these four structures, which are listed in table 4.7, include a number of variables. The confirmatory factor analysis was used to support our findings, and the results are displayed in table 4.8. The findings show that obtaining a successful skill-based education for better positions in industry requires four elements, including job opportunity, industry support, institute infrastructure, and trainer-trainee relationships. A latent variable called "job opportunity" has two statements, while "industry support" and "institute infrastructure" both have eleven, and "trainer-trainee relationship" has ten. Table 4.8 also includes information on the estimates in detail, the Z statistic, and the P value. The estimates and related significance value with covariance suggest that almost all the variables considered in the study are significant as compared to the construct like demographics which are insignificant for confirmatory factor analysis. Hence, in path analysis we had tried to bring the co-varyating impact of one variable on another.

The factor covariance shown in table 4.8 and the path analysis may be used to calculate factor estimates. Fig. 4.4 depicts the path analysis of the constructs. The important study variables are shown in Tables 4.9 and 4.10. As a result, four constructs—Institute infrastructure, Trainer and

Trainee Relationship, Industry Support, and Job Opportunities Available in the Industry—have been developed in the study. The statistical data in Table 4.8 appears to support our decision to take into account all four components.

**Table 4.7: Factor Analysis of Trainees**

<b>Factor Loadings</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Uniqueness</b>
S5	0.888				0.192
S24	0.828				0.231
S25	0.792				0.205
S8	0.759				0.274
S7	0.754				0.284
S10	0.747				0.301
S6	0.735				0.303
S23	0.682				0.499
S17	0.594				0.409
S22	0.555				0.449
S26	0.554				0.444
S14	0.505				0.638
S35		0.861			0.236
S33		0.797			0.285
S31		0.785			0.358
S36		0.772			0.328
S30		0.746			0.385
S9		0.718			0.332
S32		0.617			0.405
S29		0.588			0.539
S18		0.507			0.489
S20		0.496			0.468
S1			0.809		0.319
S2			0.763		0.389
S13			0.727		0.352
S4A			0.716		0.448
S12			0.695		0.396
S4			0.638		0.472
S11			0.61		0.535
S3			0.608		0.49
S16			0.603		0.411
S37			0.449		0.604
S28					0.572
S27				0.555	0.496
S21				0.474	0.443

Note. 'Maximum likelihood' extraction method was used in combination with a 'varimax' Rotation

**Table 4.8: Factor Statistics of Trainees**

Factor	SS Loadings	% of Variance	Cumulative %
1	7.16	20.45	20.5
2	6.48	18.51	39
3	5.73	16.36	55.3
4	1.66	4.74	60.1

**Table 7.9: Factor Loadings of Trainees**

Factor	Indicator	Estimate	SE	Z	P
Institute Infrastructure	S5	1.123	0.0473	23.71	< .001
	S6	0.791	0.0441	17.93	< .001
	S7	0.829	0.0434	19.11	< .001
	S10	1.034	0.0506	20.44	< .001
	S14	0.571	0.0448	12.74	< .001
	S17	0.651	0.0354	18.39	< .001
	S22	0.581	0.0350	16.58	< .001
	S23	0.806	0.0436	18.47	< .001
	S24	1.232	0.0512	24.05	< .001
	S25	1.132	0.0482	23.46	< .001
	S26	0.853	0.0510	16.71	< .001
Trainer Trainee Relation	S1	0.802	0.0377	21.25	< .001
	S2	0.642	0.0322	19.94	< .001
	S3	0.607	0.0357	17.00	< .001
	S4	0.642	0.0362	17.73	< .001
	S4A	0.592	0.0329	18.01	< .001
	S11	0.586	0.0402	14.57	< .001
	S12	0.664	0.0351	18.89	< .001
	S13	0.736	0.0363	20.25	< .001
	S28	0.351	0.0372	9.43	< .001
	S37	0.457	0.0382	11.94	< .001



Industry Support	S9	0.757	0.0376	20.13	< .001
	S18	0.572	0.0353	16.20	< .001
	S20	0.583	0.0372	15.65	< .001
	S28	0.300	0.0363	8.24	< .001
	S29	0.637	0.0384	16.59	< .001
	S30	0.861	0.0408	21.12	< .001
	S31	0.823	0.0414	19.91	< .001
	S32	0.613	0.0359	17.09	< .001
	S33	0.869	0.0373	23.33	< .001
	S35	0.903	0.0403	22.42	< .001
	S36	0.858	0.0384	22.32	< .001
Job Opportunity	S27	0.575	0.0371	15.50	< .001
	S21	0.729	0.0384	18.97	< .001

Covariance refers to how two factors move together, showing that one element cannot function well without the assistance of another factor in the research. Research statistics in the article represents the usage of the institutes infrastructure with the industry support will work only if there will be a better mentor – mentee relationship exist within the institute and constant support of these variables together will lead to better job opportunity of the students who is undergoing through the Skill education training program. Tables 4.8 and 4.9 supports the path diagram and shows the co-variance relationship among the variables.

**Table 4.10: Factor Covariances of Trainees**

Construct	Covariance	Estimate	SE	Z	P
Institute infrastructure	Trainer trainee relation	0.370	0.0430	8.62	< .001
	Industry Support	0.446	0.0388	11.50	< .001
	Job opportunity	0.594	0.0390	15.23	< .001
Trainer trainee relation	Industry Support	0.427	0.0401	10.64	< .001
	Job opportunity	0.483	0.0450	10.75	< .001
Industry Support	Job opportunity	0.746	0.0324	23.02	< .001

The robustness of the model can be judged by the goodness fit indices and badness fit index and it can be obtained through the path analysis. The chi-square by degree of freedom (DF) measures the exact fit and the value of  $\chi^2$  and DF taken together should be significant (Hair et al., 2005), the value revealed in the model is significant at 5 percent confidence level. How well a Confirmatory Factor Analysis (CFA) model fits the data is measured as its fit. A collection of relationships between the observable variables and the underlying latent factors are specified by the model in CFA. The purpose of model fit evaluation is to evaluate how well the factor model accounts for the observed covariance and correlation structure in the data. A CFA model's fit may be evaluated using a variety of techniques, including:

- Chi-square analysis: The covariance and correlation matrix observed and the covariance and correlation matrix predicted by the model are compared using the chi-square statistic. A non-significant chi-square statistic suggests that the model and the data match each other well.
- Goodness-of-fit indices: Fit indices that compare the observed covariance and correlation structure to the covariance and correlation structure predicted by the model, such as the Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI), provide information about the fit of the model to the data. A good match between the model and the data is indicated by values that are near to 1.0.
- Residuals: Residuals are the variations between the covariance and correlation matrix that was seen and the one that the model predicted. Large residuals show that the model and the data do not fit well together.
- Modification indices: Modification indices are indicators of how much better the model fits if a certain parameter could be determined at will. Large modification indices suggest that the model's fit would be significantly enhanced if a single parameter could be estimated at will.

It is crucial to remember that a strong model-data fit does not guarantee that the model accurately captures the underlying connections between the variables. A poor fit between the model and the data may point to an incorrectly stated model, non-normally distributed data, or a limited sample size. When this occurs, the researcher might have to improve or expand the fit of the model to the data.

The below-mentioned path diagram shows following abbreviations:

Ini = Institute infrastructure

Trr = Trainer trainee relation

Ins = Industry Support

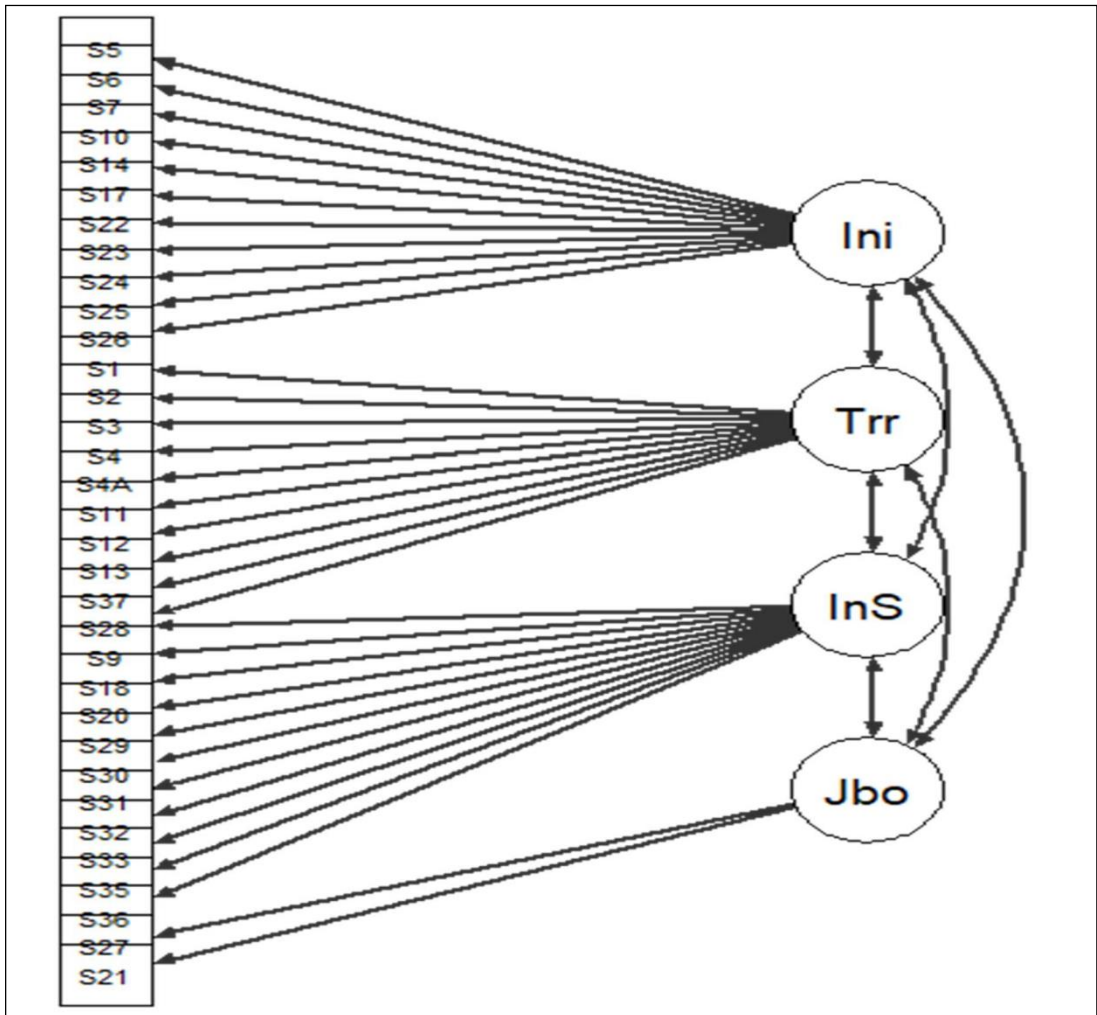
Jbo = Job opportunity

Goodness-of-Fit can be measured by Comparative Fit Index (CFI) and Tucker Lewis Index (TLI). Comparative Fit Index (CFI) measures the Incremental fit, it is 0.765, the prescribed range of 0 to 1 is acceptable, higher values indicating a better fit is good for CFI. Tucker Lewis Index (TLI) also indicates the Goodness-of-fit index, the value of TLI as 0.746 was found on our study and the said values are within the prescribed limit of 0 to 1. Root Mean Square Error of Approximation (RMSEA) measures the Badness-of-Fit index and the value of RMSEA is 0.103 was found to be acceptable, as 0.10 is the well recommended limit for the acceptance of models, with lower RMSEA values is 0.110 which indicates a better fit model.

AIC and BIC were developed by Cudeck and Browne (1983) to do cross-validation; AIC is a bit more liberal than BIC, which is a more conservative version of Bayesian information criterion. According to Homburg (1991), who used AIC and BIC measurements to SEM, both AIC and BIC are functioning well at the indicated level in the model that generates the data. The better the model, the higher its AIC and BIC values must be, and in this case, the findings imply that BIC is superior to AIC. The structural model between the full set of latent variables is revealed by the study's consideration of all of the latent variables, all of which are connected and statistically significant. Table 4.9 displays the standard estimates for each variable taken into consideration in the study.

#### **4. 5 DISCUSSIONS**

The study focuses on the Indian educational system and regards it as a crucial prerequisite for young production and employment. Traditional education and skill education have a definite relationship with education. It aids in enhancing young trainees' employability and ability to produce more money. Trainings and education are regarded as the main forces behind India's economic development. We have derived four factors of student perception for the quality of skill development programmes by component analysis and route analysis. By using GLM mediation analysis on the data, we attempted to discover the factor determining the career chances for the trainees and students. With the use of maximum likelihood estimation, generalized linear model (GLM) mediation analysis approximate the numerous and remove the conditional mediation models with the support of maximum likelihood regression.



**Figure 4.4 Path Analysis**

**Table 4.11: Model Fit of Trainees**

Test for Exact Fit	
$\chi^2$	3317
Df	488
P	<.001
Fit Measures	
CFI	0.765
TLI	0.746
SRMR	0.110

Lower (RMSEA 90% CI)	0.103
Upper (RMSEA 90% CI)	0.110
AIC	39526
BIC	39976

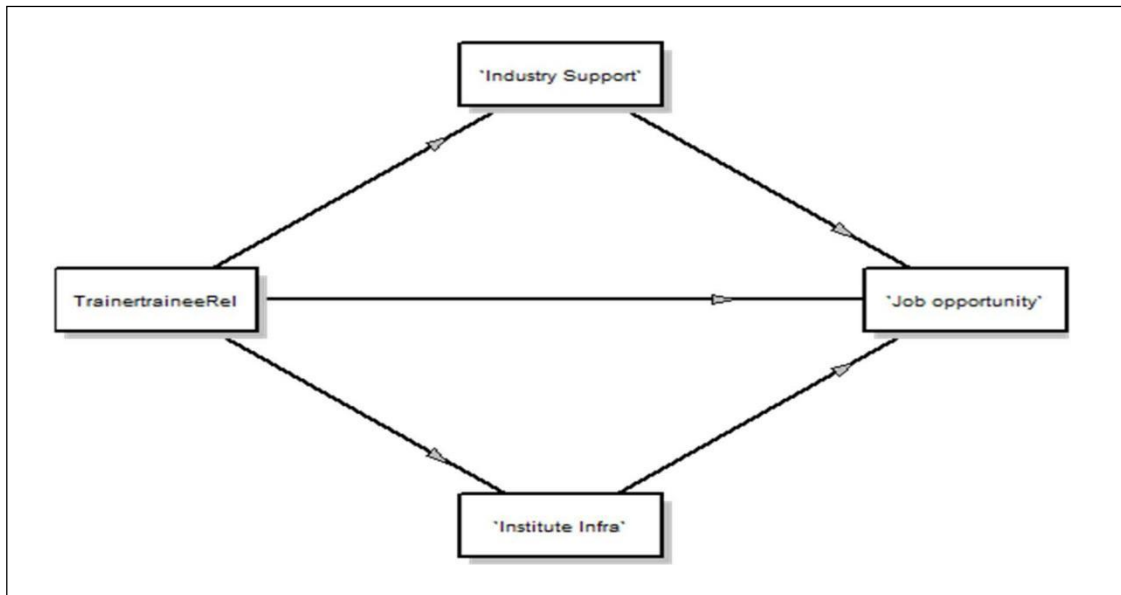
In a single study, the model includes sub-models with both continuous and categorical independent variables. Independent variables might be categorical or continuous (entering Covariates) (going in Factors). If one or more variables operate as moderators, they should first be considered independent variables before being designated as moderators. All of the independent variables are thought to be parallel and independent. All of the mediators are included as parallel mediators in the model. In the study, almost all of the effects of the mediators through the independent variables are evaluated. To put it another way, the module automatically creates several independent variable and mediator models. We made an effort to achieve the typical triangle mediation model. The model suggested by the Mediators models is depicted in the figure 4.5 and table 4.10.

**Table 4.12: Models Information of Trainees**

<b>Mediators Models</b>	<b>m1</b>	Industry Support ~ Trainer trainee Relation
	<b>m2</b>	Institute Infra ~ Trainer trainee Relation
<b>Full Model</b>	<b>m3</b>	Job opportunity ~ Industry Support + Institute Infra + Trainer trainee Relation
<b>Indirect Effects</b>	<b>IE 1</b>	Trainer trainee Relation $\Rightarrow$ Industry Support $\Rightarrow$ Job opportunity
	<b>IE 2</b>	Trainer trainee Relation $\Rightarrow$ Institute Infra $\Rightarrow$ Job opportunity

A table displaying the Indirect effects (mediated), the Direct effects, and the Total effects is generated by jAMM (jamovi) for models without interactions. The unmediated effects are the effects that were calculated while holding the mediator's constant. The effects calculated without mediators, or, alternatively, the sum of the direct and indirect effects, are the total effects. The indirect effects are anticipated to be moderated by moderators. For each mediator in the research, one or more moderators can be defined. Declaring the moderator causes the moderator to be displayed in the model diagram and subsequently simple indirect effects, or indirect effects computed at various levels of the moderators, to be computed. Factor coding

and other Covariates scaling govern the levels employed in the investigation. The basic framework of the study suggests the model mentioned in figure 4.5.



**Figure 4.5 Model Diagram**

The findings suggest that the job opportunities of the Skill education students depend upon the kind of relationship exist between the trainer and trainee, the better the relation will lead to better learning environment and thus it concludes to better understanding of the skills and the concepts. Tables 4.10 and 4.11 reveal the model information and it includes two mediator model, a full mode and two models with indirect effect of trainer trainee relationship with the job opportunity. In the full model, institutes’ infrastructure and industry support. This result may also suggest that the trainer trainee relationship works out well in the situation of better industry support and the institutes’ infrastructure.

**Table 4.13: Mediation Analysis of Trainees**

Indirect and Total Effects						
Type	Effect	Estimate	SE	$\beta$	Z	P
Indirect	Trainer trainee Relation $\Rightarrow$ Industry Support $\Rightarrow$ Job opportunity	0.0521	0.00567	0.2464	9.18	< .001

	Trainer trainee Relation ⇒ Institute Infrastructure ⇒ Job opportunity	0.0199	0.00362	0.0944	5.52	< .001
Component	Trainer trainee Relation ⇒ Industry Support	0.5477	0.04165	0.5014	13.15	< .001
	Industry Support ⇒ Job opportunity	0.0951	0.00741	0.4914	12.82	< .001
	Trainer trainee Relation ⇒ Institute Infrastructure	0.5964	0.06236	0.3884	9.56	< .001
	Institute Infrastructure ⇒ Job opportunity	0.0334	0.00495	0.243	6.75	< .001
Direct	Trainer trainee Relation ⇒ Job opportunity	0.0231	0.00862	0.1094	2.68	0.007
Total	Trainer trainee Relation ⇒ Job opportunity	0.0951	0.00861	0.4379	11.04	< .001
Note- Confidence intervals computed with Standard Delta method						

In addition to emerging nations like India, industry experiences with the implementation of contemporary and thoroughly defined forms of skill training are extensively studied elsewhere. Eichhorst et al. (2012) shown that creating such educational systems requires a number of highly specific institutions, improved socioeconomic conditions, and special assistance from governmental organisations, commercial enterprises, and employer groups. In the United States, a new consensus is forming that a combination of vocational skills and non-academic talents is crucial for the labour market and successful employees (Lerman, 2013).

#### 4. 6 CONCLUSIONS

Fostering skill-oriented training in India might be seen as an important way to improve the working circumstances for young people or individuals as well as to increase the employability of those students whose skill sets are rather weak. The need for trained workers in the sector

necessitates the expansion of skill development institutes. The primary focus of these institutions is on preparing trainees for jobs in the formal industrial sector. With the aid of the software Jamovi 1.0.0, this study collected and analysed student perceptions of the skill development programme through the use of exploratory factor analysis and other statistical tests.

A paradigm for enhancing the abilities and employability of students through industrial engagement has been developed through this study. The trainer-trainee relationship, according to the model, functions best when there is stronger industry backing and institution infrastructure. Therefore, it has been suggested to policymakers that greater industry connections and assistance for industrial training and placement training are essential. Additionally, it is seen that, in the eyes of the students, the institutes' infrastructure is not particularly well-equipped. There will be improved chances for training and skill development as a result of the infrastructural enhancement. Indian ideas and talents are not new to the globe; see, for example, the old Indian sculptures. Therefore, it is advised that skill education institutions improve students' employability abilities by including career trek into the curriculum and providing a variety of industry training lectures (Rahman et al., 2015).

The practitioners should confront the problems of implementing these fundamental reforms within their industries and workplaces, and those students who are active in directing changes in the industry should be introduced to the complex world of skill education.

\*\*\*



## **CHAPTER 5: INDUSTRY ACADEMIA PARTNERSHIP**

### **(Perception of Industry Executives, Trainers & Administration)**

The Indian government has launched a number of initiatives in recent years to increase the employability of Indian students. For instance, the Skill India initiative, which intends to teach more than 400 million people by 2022, concentrates on improving students' skill sets across a range of subjects. Many Indian colleges and institutions are also working to close the skills gap by offering training and skill-development programmes. In addition, a lot of businesses are working with educational institutions to give students internships, apprenticeships, and other kinds of training to improve their employability. Generally, efforts are being made to increase the employability of Indian students, notwithstanding possible differences in attitudes among business leaders.

Only if young people in our nation receive skill-based education and develop the necessary capabilities can India's growth accelerate economically. For improving job results, assisting individuals in adjusting to change, and enhancing their career chances in the workplace, the urgent need for employability skills has been argued (Yusof et al., 2012). The literacy rate in the Indian economy is rising daily, but the number of unemployed literates is becoming a source of concern for the nation. The ministry of education has worked hard to improve the situation and has promoted skill education to help young people's skills. Many obstacles have arisen in the way of Indian educational institutes achieving global or world-class status. Banker & Bhal (2020).

### **5. 1 INTRODUCTION**

Due to technological innovation and the process of globalisation, companies now want different sorts of talents from their employees and workers than they did in the past (Cinaret et al., 2009). To put it another way, modern organisations want workers and employees with highly developed technical abilities coupled with employability skills (Singh & Singh, 2008). Automation and industrial transformation will have an influence on working skills and other skill sets in India, according to Krishnan et al. (2019).

What kind of skills will be necessary for future workplaces? How can we build our youth's resilience and adaptability to these sorts of change by embracing lifelong learning, up-skilling, and re-skilling? These are the main concerns that need to be addressed. Skilling must combine

knowledge, aptitude, attitude, and the relevant competences required to carry out diverse job duties in order to create capable, globally skilled labour. The method of skill education is how education for all religions is provided, and it presents a number of obstacles for global education (Marshall; 2010).

It is crucial to uphold quality assurance of these programmes at this time, when the world is paying attention to Indian skill development programmes and when Indian human resources are required everywhere. Successful industrial partnerships with training institutions may be found in industrialized nations like Germany, Finland, Brazil, and others. Although though skill development is a hot topic in India and all stakeholders are aware of its significance, it is crucial that efforts to promote it are coordinated with a clear knowledge of the responsibilities played by each stakeholder.

The study tries to examine the Perception of Industry Executives, Trainers & Administration for the skill development programme and efficiency of the skill development programme. The entire research chapter is sub-divided into six segments or sections. First section is about the introduction and basic background of study. Second section presents the Literature review, third section is about the research methodology and subsequent two sections are about the findings and discussion. Last section of the study tries to bring out the conclusion and its implication with future research avenues.

## **5. 2 STUDIES ABOUT INDUSTRY ACADEMIA PARTNERSHIP**

In recent research, several academics have emphasized the importance of faculty or trainer devotion and their cordial treatment of trainees or pupils. (2009) Tabbodi; (2010) Hue; and (2019 Tiwari). Several research investigations have noted the influence of skill education training and its modifications on the educational practises of any economy (Billett, 1999; Hedberg &Harper 1996; Mulcahy 1996; Mulcahy & James 1999; Robinson 1993; Sanguinetti 1994; Smith, 1997).

According to Billett (1999), the implementation of a uniform or single curriculum-based framework throughout the years of training and the subsequent reform have undermined the autonomy of the instructors. Economic education administrations typically have high expectations for the training facility that supports the training systems and offers skill education (Powles & Anderson 1996; Gill et al. 1999; Maurer 2012). The expansion of the entire global

economy and the social processes it has spawned have made it possible for knowledge to travel freely across national capital limits (Lingard et al. 1994; Seddon 1999). In the field of education, the value of curricula and the way instructors or professors present the material are also recognized (Bhadwal& Panda, 1991; Hue, 2010).

The development of a "new competitive state" has also been aided by government organizations' support of current market forces, which also serves as the country's "main steering mechanism" (Cerny 1990; Lingard et al. 1994).

The advancement of human capital and national or international interests are always served by education. Several experts have noted the impact of globalisation and technology on the nature of employment as well as the composition of the current workforce (Attwell 1997; Waterhouse et al. 1999; Young & Guile 1997). Based on a survey of the literature on the sociology and history of education, Benavot (1983) presented a few points of view on the development of skill education in the economy in the early 20th century. Human attitudes and decisions, which affect a wide variety of economic difficulties, are always strongly influenced by modern society and its characteristics. These ideals are strongly encouraging trainees to think creatively and to acquire new abilities. (Eckersley, 1998; Singh, 2013).

O'Shea et al. (2007) investigated the influence of corporate partnership on university research performance in another study. According to the report, corporate cooperation can improve research quality, impact, and commercialization possibilities. Additionally, academic-industry collaboration has been found to aid in the creation of novel technologies and products. Etzkowitz et al. (2000) found that university spin-offs and technology transfer had considerably aided in the commercialization of academic research. Partnerships between academia and industry have the potential to improve student employability by offering chances for internships, apprenticeships, and other types of experiential learning. According to research conducted by Perkmann and Walsh (2007), students who engaged in industrial collaborations were more likely to work in the private sector following graduation. Yet, there are also potential drawbacks to academia-industry collaborations, such as competing agendas, intellectual property difficulties, and the possibility of skewed research outputs. These difficulties may be overcome with careful planning, excellent communication, and explicit agreements between academic institutions and industrial partners.

Overall, the literature demonstrates that academia-industry collaborations may benefit both academic institutions and private sector firms, and that they have the potential to greatly contribute to innovation, research, and employment.

### **5. 3 RESEARCH METHODOLOGY**

To analyze educational efficiency in the current literature, three primary study methodologies were used: a literature review; individual interviews or questionnaires; and focus group discussions. As Harris et al. 2005 provided a project on the changing function of Skill education training staff development, the approach to data collection in this study is purposely centered on interviews via questionnaire; a little of support has been taken from their literature. Given that broad group discussions only yield contextual information, the researchers feel that information from individuals is required to enable a fundamental comprehension of the perception, preference, and personal effect of these changes.

This method is analogous to the difference established by Argyris et al. between adopted ideas and hypotheses cited in literature (1985). They proposed that what individuals say may not always be consistent with what they actually do. The objective in this study was to test the hypothesis that what trainees say in general group discussions or to friends may differ from what is happening individually around them. This is empirical research based on a survey of the literature; the study has constructed a self-administered questionnaire for passed out, current, and future trainees. A literature study, individual interviews or questionnaires, and focus group discussions were used to investigate educational efficiency.

As Harris et al. 2005 provided a project on the changing function of Skill education training staff development, the technique of data collection in this study is purposely centered on interviews via questionnaire. Given that broad group discussions only yield contextual information, the researchers feel that information from individuals is required to enable a fundamental comprehension of the perception, preference, and personal effect of these changes. This method is analogous to the difference established by Argyris et al. between adopted ideas and hypotheses cited in literature (1985). They proposed that what individuals say may not always be consistent with what they actually do. The objective in this study was to test the hypothesis that what individuals say in general group discussions or among friends may differ from what is happening individually around them. Based on a review of the literature, the study produced a self-administered and structured questionnaire for Recruiter/

Industry Executive, Trainer, Member Skill Council, Professor, Policy Planner, and Head/Executive of Skill Centre.

To understand the perspective of stakeholders other than Trainees, study has taken the sample size of 262 individuals belongs to any of the following categories such as Recruiter/ Industry Executive, Trainer, Member Skill Council, Professor, Policy Planner and Head/Executive of Skill Centre in NCT of Delhi, India. The questionnaire carries the 30 items to elucidate the Role of Strategic Partnership of Industry- Academia in Skill Development. The collected data is analyzed with the help of various statistical techniques like exploratory with confirmatory factor analysis and generalized linear model, these were performed with the help of computer software; R Jamovi package 1.0.0.

This is empirical research done on the basis of review of literature; the study has formed a self-administered and structured questionnaire which is developed for passed out, existing and potential trainees. Random & Snowball sampling method is adopted for data collection. The data collected is analyzed with the help of statistical techniques like exploratory factor analysis and appropriate tests with the help of computer software; Jamovi 1.0.0 has been applied for the final analysis. The impact of bringing together significant industry partners with government institutes that offer courses in these areas to secondary or senior secondary students will be investigated.

An effort has been made through this study to produce recommendations that may serve as a watershed moment in the direction of industrial partnership in educational institutions, particularly for the goal of skill development. Comprehensive research will have a good motivating impact on industry, and more industries will come forward to collaborate with training institutions, creating a win-win situation for all stakeholders.

If we are to reap the benefits of this democratic dividend, we must first prepare for their meaningful work and then teach them adequately so that they can do so.

### **5. 3.1. Demographic characteristics**

The respondent's profile has been sub- categorized on the basis of education, experience, gender and employment is shown in Table 5.1.

**Table 5.1: Demographic Characteristics of Trainers**

<b>Components</b>	<b>Choice</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age Group</b>	25-34 years	28	10.69%
	35-44 years	102	38.93%
	45-54 years	119	45.42%
	55 and above	13	4.96%
<b>Gender</b>	Male	177	67.56%
	Female	85	32.44%
<b>Education</b>	Graduate	98	37.40%
	Post- Graduate	132	50.38%
	PhD	19	7.25%
	Others	13	4.96%
<b>Experience</b>	0-5 years	27	10.31%
	6-10 years	165	62.98%
	11-20 years	53	20.23%
	20 and above years	17	6.49%
<b>You can be best described as:</b>	Recruiter/ Industry Executive	91	34.73%
	Trainer	109	41.60%
	Member Skill Council	19	7.25%
	Head/Executive of Skill Centre	13	4.96%
	Others	30	11.45%

Source: Authors Compilation

To understand the perspective of stakeholders other than Trainees, study has taken the sample size of 262 individuals belongs to any of the following categories such as Recruiter/ Industry Executive, Trainer, Member Skill Council, Professor, Policy Planner and Head/Executive of Skill Centre in NCT of Delhi, India. The sample suggests that 45.42 percent of the respondents were from age group of 45-54 years, 38.93 percent of the respondents were from age group of 35-44 years. 67.56 percent of total respondents are male and rest are females. The half of the respondents have masters or post-graduate level education, around 19 respondents are doctorates and remaining belongs to the graduate level of education or have been grouped in others category.

Out of total respondents, 62.98 percents have the experience of 6-10 years, 53 respondents which makes it to 20.23 percent of respondents, they have the experience of 11-20 years. Only 6.49 percent of respondents are having 20 and above years of experience. The remaining 27 respondents are under the five years of experience. The study has taken the sample size of 262 individuals belongs to any of the following categories such as Recruiter/ Industry Executive, Trainer, Member Skill Council, Professor, Policy Planner and Head/Executive of Skill Centre in NCT of Delhi, India. The sample suggests that approximately 41.60 percent of the respondents are trainers, 34.73 percent are either Recruiter or Industry Executive. However, the remaining respondents are either principals or government executives.

A subset of statistics called descriptive statistics is concerned with the gathering, examination, and evaluation of data. It entails enumerating and outlining a dataset's key features, such as measures of central tendency, dispersion, and distribution. Descriptive statistics' primary objective is to give the data a clear, succinct overview so that patterns and trends can be seen and understood. The mean, median, and mode are a few commonly used metrics of central trend in descriptive statistics. The dataset's mean is determined by adding up all the numbers and dividing by the overall number of samples. Descriptive statistics also depend on measures of dispersion because they reveal how widely distributed the data are. The range, variance, and standard deviation are frequently used metrics of uncertainty. The range is the discrepancy between the dataset's greatest and lowest numbers. While the standard deviation is the square base of the variance, the variance is the average of the squared deviations between each number and the mean. Frequency distributions, which indicate how frequently each value occurs in the dataset, and histograms, which visually depict the distribution of the data, are two other significant descriptive statistics. Two statistical measurements are used to characterize the form of a distribution: skewness and kurtosis.

Skewness is a statistic for gauging how skewed a distribution is. If one end of a distribution is lengthier than the other, it is said to be skewed. A distribution with a positive skewness has a lengthier tail on the right side and more values on the left, whereas one with a negative skewness has the reverse trend. A distribution that is exactly symmetrical has zero percentage of skewness. Kurtosis is a metric for how much a distribution's tails deviate from a normal distribution. The kurtosis of a normal distribution is 3. A distribution is referred to as platykurtic if the kurtosis is less than 3 and it has slimmer tails than a normal distribution. Leptokurtic distributions have longer tails than normal distributions and have kurtosis values

higher than 3. In contrast to a normal distribution, a distribution with positive excess kurtosis has more data in the ends than a distribution with negative excess kurtosis. Both skewness and kurtosis are significant in statistical analysis because they have the potential to affect the outcomes of statistical tests. If the data have a high kurtosis, the normality assumptions that underlie many statistical tests may be violated, necessitating the use of robust statistical methods.

### 5.3.2 Requirements of Skilled Manpower

The descriptive analysis as given in Table 5.2 reveals that the demand for skilled manpower will increase (4.35 on a 5 point Likert scale) in the coming years due to the economic growth and the focus of the government towards skill development. The respondents also emphasize that every undergraduate academic institute should have at least one skill development centre along with their normal academic activities. The response to the question needs to have an industrial production unit in skill development institute is moderate with a score of 3.21.

**Table 5.2 Requirements of Skilled Manpower**

<b>Code</b>	<b>Statement</b>	<b>Mean</b>	<b>Standard Deviation</b>
1	The demand of skilled manpower will increase in the coming years in India.	4.35	0.94
2	The present efforts of skill development in India are sufficient to meet the future needs of skilled manpower.	3.33	1.01
3	The institutions are sufficiently equipped to train the students for skills desired by the industry.	3.46	1.18
4	Indian centres are in a better position than global institutions in achieving benchmark standards	3.24	1.14
5	Every undergraduate academic institute should have at least one skill development centre along with their normal academic activities.	4.28	0.87
6	Having an industrial production unit in skill development institute will not help much in Indian institutes.	3.21	1.17

### 5.3.3 Industry Institute Partnership

The respondents feels that the industry associations should regularly conduct placement drives to help in placements of graduates of skill centres (4.26) and also trained manpower can effectively improve by collective efforts of industry and skill development institutes (4.30). The effective support from the industry can come only when the institutes create an environment conducive to receive support from the industry (4.12). With a score of 4.13, industry associations may provide information about future job roles and their prospective



demand so that training in the institutes may be planned accordingly. In this way the students feel that Skill Development is a collective responsibility of industry and governments (4.29).

**Table 5.3 Industry Institute Partnership**

Code	Statement	Mean	Standard Deviation
1	Industry is providing the necessary support to the academic institutions in developing the skills relevant to the industry.	3.38	1.08
2	Institutions need to create an environment conducive to receive support from industry.	4.12	0.90
3	Trained manpower may effectively improve by collective efforts of industry and skill development institutes.	4.30	0.90
4	Industry associations may provide information about future job roles and their prospective demand so that training in the institutes may be planned accordingly	4.13	0.96
5	Industry associations should regularly conduct placement drives to help in placements of graduates of skill centres	4.26	0.85
6	Industries may take up the initiative of certifying skilled manpower under RPL (recognition of prior learning)	4.01	0.92
7	There should be regulation for industry to actively participate in skill development	4.11	0.99
8	Pro-activeness of industry association towards budget allocation, corporate strategy will not be suitable in Indian circumstances	3.61	1.18
9	Training centres in the industry should be linked to the skill universities for developing vertical pathways for skilled workers	4.12	0.95
10	Skill Development is a collective responsibility of industry and governments.	4.29	0.94
11	On the job training of trainees in industries will be rather more helpful than institutional training in developing skill proficiency	3.96	1.06

#### **5.3.4 Government Role in Skill Development**

The respondents have a strong opinion with a score of 4.19 that the government must offer scholarships to encourage the bright students to join skill development centres as skill development is a primary responsibility of the government (3.84).

#### **5.3.5 Nature of Skills Required**

Soft skills (like communication, leadership, team work) are the most important skills that make a person employable got a score of 4.34, indicating the industry needs these skills along with the trade skills.

**Table 5.4 Government Role in Skill Development**

Code	Statement	Mean	Standard Deviation
1	Skill Development is primarily a responsibility of Government.	3.84	1.13
2	Offering scholarships will encourage bright students to join skill development programme	4.19	0.87

Also needed are Vocational skills (4.17) to make a person suitably employed at entry level and Professional skills like decision making, problem solving (4.05) are the most important skills for good career path of an employee.

**Table 5.5 Nature of Skills Required**

Code	Statement	Mean	Standard Deviation
1	Soft skills (like communication, leadership, team work) are the most important skills that make a person employable.	4.34	0.91
2	Professional skills (like decision making, problem solving) are the most important skills for good career path of an employee	4.05	1.10
3	Vocational skills are the most important skills that make a person suitably employed at entry level	4.17	1.05
4	Regulating bodies may authorise institutes to certify skilled manpower under RPL (recognition of prior learning)	3.82	1.05
5	Industries, collectively should set up standards for quality job trainings	4.00	0.90
6	Industry may develop assessment standards and help in practical jobs assessment to make the training relevant as per job market	4.06	0.89
7	If the job roles are provided/suggested by the industries, it will lead to highly employable skilled manpower.	3.98	0.91

### 5.3.6 Funds Required for Skill Development

Respondents feel that the allocations of funds for skill development under corporate social responsibility is a good solution, however also have apprehension that it is just a formality.

**Table 5.6 Funds Required for Skill Development**

Code	Statement	Mean	Standard Deviation
1	Allocations of funds for skill development under corporate social responsibility is a good solution	3.90	1.15

2	Allocation of funds for skill development under corporate social responsibility is just a formality	2.72	1.37
3	Allocations of funds for skill development under corporate social responsibility will not be fruitful in long run	2.94	1.36

### 5.3.7 Skill Development Centre with Industrial Association

A properly run skill development centre with industrial association will lead to enhance the employability of skilled manpower got a score of 4.25 on a 5 point Likert scale. The skill centre with industry association will lead to create an atmosphere of excellence (4.21) thereby leading to more motivated candidates available to industry for recruitment (4.13). One of the important issue with skill development is that the students don't consider this as a first choice. A properly run skill development centre with industrial association will lead to encouragement to student to opt skill courses as first choice. The respondents feel that industry collaborated skill centres will develop the human resource which will help in reducing the manufacturing cost.

**Table 5.7 Skill Development Centre With Industrial Association**

Code	Statement	Mean	Standard Deviation
1	A properly run skill development centre with industrial association will lead to encouragement to student to opt skill courses as first choice	4.00	1.04
2	A properly run skill development centre with industrial association will lead to Availability of skilled workforce that can be directly hired through campus placement	3.95	1.04
3	A properly run skill development centre with industrial association will lead to Reduced training cost on the fresh appointees	3.90	1.04
4	A properly run skill development centre with industrial association will lead to more motivated candidates available to industry for recruitment	4.13	1.01
5	A properly run skill development centre with industrial association will lead to Safer work environment	4.03	1.01
6	A properly run skill development centre with industrial association will lead to Reduced cost of manufacturing/services	4.07	1.02
7	A properly run skill development centre with industrial association will lead to better quality of finished products/services	3.79	1.06
8	A properly run skill development centre with industrial association will lead to Reduced wastage	3.79	0.94

9	A properly run skill development centre with industrial association will lead to enhance the employability of skilled manpower	4.25	0.83
10	A properly run skill development centre with industrial association will lead to Help in getting higher pay package by the trainees	3.85	0.99
11	A properly run skill development centre with industrial association will lead to create an atmosphere of excellence	4.21	0.93
12	A properly run skill development centre with industrial association will lead to Any others	3.55	1.25

### 5.3.8 Global Collaboration

Collaboration with globally renowned skill development institutions/accreditation agencies will help Certification by international bodies/institutions (4.34) is the most important benefit of international collaborations. It will also help in the implementation of best practices of training (4.12).

**Table 5.8 Global Collaboration**

Code	Statement	Mean	Standard Deviation
1	Collaboration with globally renowned skill development institutions/accreditation agencies will help in achieving international standards and benchmarks	4.15	1.03
2	Collaboration with globally renowned skill development institutions/accreditation agencies will help in getting the students placed abroad	3.95	0.98
3	Collaboration with globally renowned skill development institutions/accreditation agencies will help Improve credibility of the institutes	4.11	1.01
4	Collaboration with globally renowned skill development institutions/accreditation agencies will help Implementation of best practices of training	4.12	1.05
5	Collaboration with globally renowned skill development institutions/accreditation agencies will help Certification by international bodies/institutes	4.34	0.91

### 5.3.9 Ranking of Skill Development Dimensions

The questionnaire tries to grab the Executives Perception of the Strategic Partnership of Industry and Academia and found positively significant relations on it. Through ranking method, we tried to explore various dimensions of skill development where industry would like to contribute and are shown in below mentioned Table 5.9. It is very interesting to observe that

the recruiters and industry executives have identified the dimension of providing scholarship as the dimension of highest contribution. The trainers gave highest rank to the on the job training, whereas the local administration and government feel that development of instructional material is the most important dimension with highest contribution.

**Table 5.9 Various dimensions of skill development**  
(Rank 1 – 10) Rank 1 for highest contribution and 10 for least contribution

S. No	Statement	Principal or Government	Trainer	Recruiter/ Industry Executive
1	Curriculum development	4.00	7.00	4.00
2	Development of instructional material	1.00	8.00	7.00
3	Training of the trainers	2.00	6.00	9.00
4	Guest Lectures for the trainees	7.00	2.00	3.00
5	On the job training of trainees	9.00	1.00	5.00
6	Training youth with skill proficiency and competency through internship	6.00	3.00	6.00
7	Offering scholarships to the bright and needy students	8.00	5.00	1.00
8	Capacity building of the skill training institute	5.00	4.00	8.00
9	Development of appropriate infrastructure in skill development institutes	3.00	9.00	2.00

The KMO sample adequacy shows the value of around 0.907 which shows that data is appropriate to conduct the research. Principal component analysis (PCA) with varimax rotation and it is based on Eigen value. 'Maximum likelihood' extraction method was used in combination with a 'varimax' Rotation. Skill development model consists of eight constructs comprising of thirty eight items has been shown as the result of GLM Mediation Analysis. Finding the common underlying dimensions, or latent variables, that account for variance in a set of observable variables is the aim of factor analysis.

Factor analysis makes the assumption that the observable variables are associated with one another and that fewer underlying components can adequately account for the relationships. The factors are calculated using mathematical procedures like principal component analysis or

maximum likelihood estimation and are thought of as linear combinations of the observable data.

The outcomes of a factor analysis can be used to generate predictions or deduce conclusions about the data as well as to discover the major underlying dimensions that explain the connection between the observed variables. In order to locate the underlying structure in big data sets and make sense of complicated interactions between variables, factor analysis is frequently employed in a variety of disciplines, including psychology, sociology, and marketing research.

### **5. 3.10. Exploratory Factor Analysis**

To determine the underlying structure of a group of variables in a data set, a kind of factor analysis known as exploratory factor analysis (EFA) is utilised. EFA aims to identify the latent variables, or underlying dimensions, that underlie the intercorrelations between the observable variables. Because EFA is frequently used to investigate the structure of a data set rather than testing certain hypotheses about the correlations between variables, it is regarded as exploratory research. EFA starts with a huge collection of observable variables and uses mathematical techniques like principal component analysis or maximum likelihood estimation to condense them into a smaller set of components. Finding the factors that account for the most variance in the data is the objective. The factors are linear combinations of the observed variables. To better comprehend the underlying structure of a data collection, EFA is frequently used in the domains of psychology, sociology, marketing research, and other related disciplines. The outcomes of an EFA may be used to pinpoint the fundamental factors that explain how the observed variables relate to one another and to direct the creation of more precise hypotheses for future studies.

Cronbach alpha test was performed in the study to check the reliability of questions taken in the questionnaire. (Cronbach; 1951). Table 5.10 display results of different factors for reliability and sample adequacy. The Cronbach's alpha test was resulted in 90.5 percent of scale reliability. It indicates internal consistency of the selected scale is good. Bohrnstedt & Knoke (1994) suggest that research should come across for Cronbach's alphas of 0.70 or higher. KMO and Bartlett's test which measures the sampling adequacy was done to test the eligibility of the data. The value of KMO is  $0.907 > 0.5$ , this value was observed and it indicates multivariate normality amongst variables. As the significance value observed in the

research is less than 0.005, hence, factor analysis was performed consequently.

**Table 5.10: KMO Sample Adequacy of Trainers**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.907
Bartlett's Test	Chi-square	5764
	Degree of Freedom	703
	Sig.	.001

### 5.3.11. Principal Component Analysis

The variable in the respective construct were individually subjected to principal component analysis (PCA) with varimax rotation using Jamovi.1.0.0. Principal Component Analysis (PCA) is a technique for identifying patterns and structure in multivariate data by lowering the dataset's dimensionality. The goal of combining PCA with varimax rotation is to produce a simpler and more interpretable factor structure that explains the variation in the data.

Varimax rotation is a method for simplifying and clarifying the factor structure derived from a PCA. It rotates the factors so that the variance of the squared loadings for each component is maximized, resulting in more distinct and interpretable factors. In other words, varimax rotation aids in determining which variables are most strongly related with each component. The value of applying PCA with varimax rotation is that it can shed light on a dataset's underlying structure and aid in the discovery of highly connected groupings of variables. This can be helpful in a variety of professions where it's crucial to comprehend the links between many factors, such as psychology, the social sciences, and marketing research.

Moreover, the factor structure derived by PCA may be made simpler with the use of varimax rotation, making it simpler to understand and explain the findings to others. When working with complicated datasets or presenting conclusions to non-experts, this might be very crucial. The variables having factor loadings less than 0.5 can be eliminated (Hair et al., 2005). However, we have eliminated the loading less than 0.35 and the variables showing the cross loadings. Finally, eight factors comprising thirty-eight variables, all having eigen values of unity and above were removed and the results are shown in Table 5.11. Further, in order to assess the suitability of the data for principal component analysis, the uniqueness derived from the factor analysis were assessed. The uniqueness score is fairly large; this suggests that the appropriateness of data set (Stewart, 1981).

**Table 5.11: Factor Analysis of Trainers**

Component Loadings	1	2	3	4	5	6	7	8	Uniqueness
T10	0.681								0.370
T8	0.669								0.436
T19	0.643								0.276
T18	0.570								0.382
T7	0.558								0.384
T26	0.487								0.374
T11	0.466								0.431
T5	0.459								0.434
T2		0.788							0.259
T3		0.776							0.295
T4		0.759							0.344
T15		0.757							0.308
T17		0.668							0.326
T9		0.646							0.277
T28_g			0.761						0.273
T14			0.760						0.255
T25			0.681						0.358
T28_h			0.603						0.286
T22			0.594						0.277
T21				0.638					0.312
T20				0.614					0.308
T12				0.584					0.436
T6				0.556					0.443
T23				0.497					0.337
T28_a				0.465					0.452
T29_e					0.721				0.285
T29_c					0.565				0.269
T29_b					0.552				0.430
T16					0.504				0.411
T29_a					0.468				0.345
T28_b						0.612			0.319
T27_a						0.513			0.460
T28_e						0.509			0.330
T28_f									0.416
T28_l							0.705		0.458
T28_j							0.644		0.327
T27_b								0.846	0.227
T27_c								0.821	0.255

Scree plot and factor analysis summary (mentioned in table 5.11) suggest that only eight factors explain the 65.4 percent of cumulative variance. SS loading suggest the sum of the squared loadings. This is used to determine the value of the particular factor. Table 5.12 also determines the variance explained by individual factor and cumulative factors.



**Table 5.12: Factor Statistics of Trainers**

<b>Factors</b>	<b>SS Loadings</b>	<b>% of Variance</b>	<b>Cumulative %</b>
1	12.934	34.038	34.0
2	3.431	9.029	43.1
3	2.226	5.858	48.9
4	1.600	4.211	53.1
5	1.380	3.632	56.8
6	1.148	3.021	59.8
7	1.090	2.869	62.7
8	1.025	2.698	65.4

A particular hypothesis on the underlying structure of a group of variables in a data set is tested using confirmatory factor analysis (CFA), a kind of factor analysis. CFA, as opposed to exploratory factor analysis (EFA), begins with a theoretical model that has been predetermined and evaluates how well it fits the data. Instead of only examining the data structure as in EFA, the objective of CFA is to confirm or reject the hypothesis regarding the structure of the variables.

In CFA, the researcher specifies a number of factors as well as the connections between the factors and the observed variables. By contrasting the observed covariances and correlations between the variables with the anticipated covariances and correlations produced from the factor model, the factor model is then put to the test.

The factor model is then put to the test by contrasting the actual covariances and correlations between the variables with those predicted by the factor model. To assess how well the model fits the data, goodness-of-fit measures like the chi-square statistic and fit indices are utilized.

#### **5. 4 FINDINGS**

Through the factor analysis, we got eight constructs for our study. The varimax rotation suggests that these four constructs include several variables as mentioned in table 5.13. To substantiate our results, the confirmatory factor analysis has been employed and results are shown in table 5.14. The results reveal that there are eight constructs involved in attaining industry support comes with other variable such as global connect, Institutes Infrastructure, financial benefits received by government, Quality of training, Campus Environment, Funds received as CSR and Quality education to bring efficiency to skill development. The detail of the estimates, Z statistic and P value is also mentioned in table 5.13.

The estimates and related significance value with covariance suggest that almost all the variables considered in the study are significant as compared to the construct like demographics which are insignificant for confirmatory factor analysis. Hence, in the process of path analysis, building a theoretical model of the connections between variables, then verifying the model using information from a sample of observations, is the process of path analysis.

**Table 5.13: Factor Loadings of Trainers**

<b>Factor</b>	<b>Indicator</b>	<b>Estimate</b>	<b>SE</b>	<b>Z</b>	<b>P</b>
Industry support	T10	0.646	0.0540	11.96	< .001
	T8	0.536	0.0529	10.13	< .001
	T18	0.692	0.0515	13.44	< .001
	T19	0.702	0.0509	13.80	< .001
	T7	0.668	0.0485	13.78	< .001
	T11	0.602	0.0469	12.85	< .001
	T26	0.573	0.0494	11.61	< .001
	T5	0.602	0.0509	11.82	< .001
Infrastructure	T2	0.750	0.0567	13.21	< .001
	T3	0.903	0.0652	13.84	< .001
	T4	0.781	0.0611	12.79	< .001
	T9	0.742	0.0665	11.16	< .001
	T15	0.789	0.0681	11.58	< .001
	T17	0.832	0.0679	12.25	< .001
Quality	T14	0.789	0.0632	12.49	< .001
	T22	0.679	0.0510	13.30	< .001
	T25	0.664	0.0511	12.98	< .001
	T28_h	0.689	0.0545	12.64	< .001
	T28_g	0.723	0.0621	11.65	< .001
Skill Development	T21	0.619	0.0620	9.98	< .001
	T20	0.777	0.0573	13.56	< .001
	T12	0.618	0.0520	11.88	< .001
	T23	0.722	0.0464	15.56	< .001
	T6	0.564	0.0686	8.23	< .001
	T28_a	0.703	0.0589	11.94	< .001
Global Connect	T29_e	0.648	0.0509	12.73	< .001
	T29_c	0.778	0.0548	14.20	< .001
	T29_b	0.536	0.0588	9.11	< .001
	T29_a	0.787	0.0559	14.08	< .001
	T16	0.720	0.0549	13.12	< .001
Campus Environment	T28_b	0.609	0.0635	9.59	< .001
	T28_e	0.750	0.0570	13.16	< .001
	T27_a	0.697	0.0689	10.11	< .001
	T28_f	0.676	0.0599	11.27	< .001
Financial Benefit by Government	T28_j	0.799	0.0952	8.39	< .001
	T28_l	0.471	0.0884	5.33	< .001
Funds received as CSR	T27_b	1.017	0.1201	8.47	< .001
	T27_c	1.003	0.1192	8.41	< .001

Factor estimates can be determined through the factor covariance as given in table 5.14 and the path analysis. The figure of path analysis is revealed in Figure 5.1. Tables 5.15 and 5.16 reveals the significant factors of the study. Hence in the study eight constructs has been formed, i.e.; global connect, Institutes Infrastructure, financial benefits received by government, Quality of training, Campus Environment, Funds received as CSR and Quality education to bring efficiency to skill development. Somehow the statistical figure of the Table 5.17 supports the consideration of all six instead of eight constructs in our study. Covariance talks about the co-movement of one factor with another factor which represents that one factor cannot work efficiently without the contribution of another factor in the study.

Research statistics in the chapter represents the usage of the global connect, Institutes Infrastructure, financial benefits received by government, Quality of training, and Quality education to bring efficiency to skill development. institutes infrastructure with the industry support will work only if there will be a better mentor – mentee relationship exist within the institute and constant support of these variables together will lead to better job opportunity of the students who is undergoing through the Skill education training program. Table 5.14 shows the co-variance relationship among the variables.

**Table 5.14: Factor Covariances of Trainers**

<b>Factor Covariances</b>	<b>Variables</b>	<b>Estimate</b>	<b>SE</b>	<b>Z</b>	<b>P</b>	<b>Stand. Estimate</b>
Industrysup	Industrysup	1.0000				
	Infrastrt	0.3898	0.0617	6.31	< .001	0.3898
	Quality	0.7538	0.0380	19.86	< .001	0.7538
	SkillDvp	0.8579	0.0274	31.33	< .001	0.8579
	GlobalCnt	0.8638	0.0276	31.26	< .001	0.8638
	CEnvt	0.8602	0.0337	25.56	< .001	0.8602
	Fiancialbenft	0.4933	0.0744	6.63	< .001	0.4933
	FundforCSR	-0.2076	0.0757	-2.74	0.006	-0.2076
Infrastrt	Infrastrt	1.0000				
	Quality	0.2221	0.0701	3.17	0.002	0.2221
	SkillDvp	0.5252	0.0560	9.38	< .001	0.5252
	GlobalCnt	0.4627	0.0597	7.75	< .001	0.4627

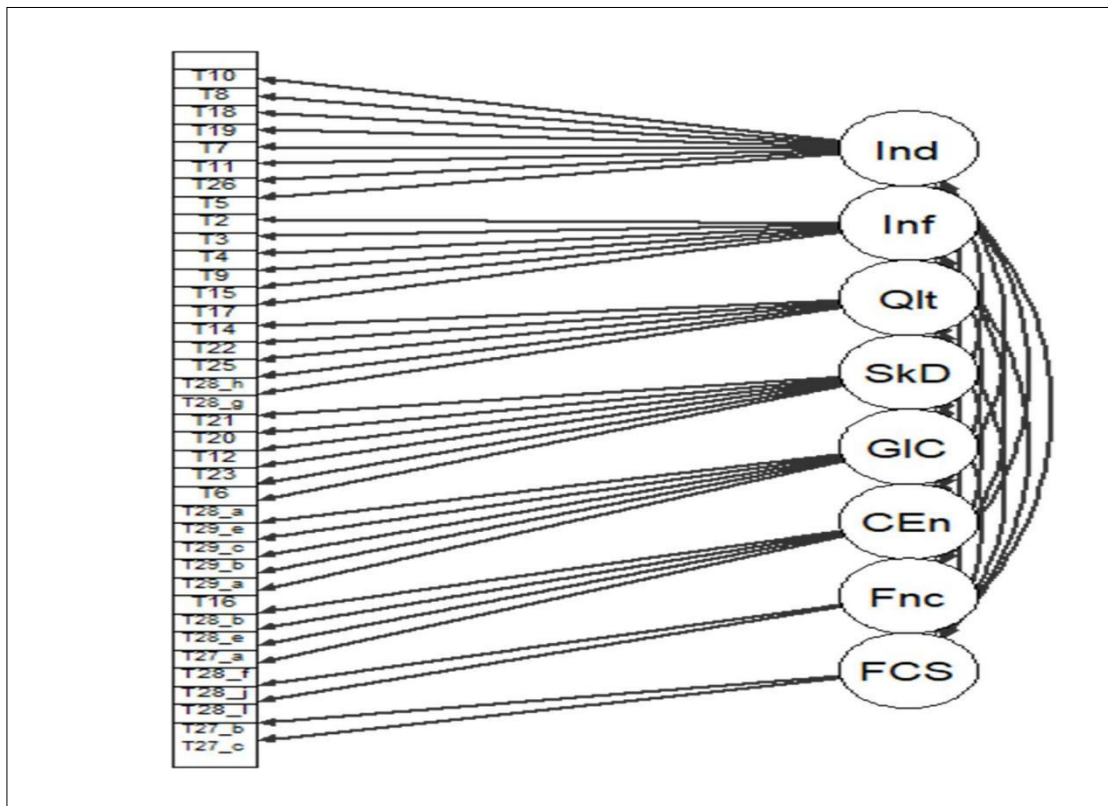
	CEnvt	0.4633	0.0648	7.15	< .001	0.4633
	Fiancialbenft	0.1923	0.0797	2.41	0.016	0.1923
	FundforCSR	0.0867	0.0801	1.08	0.279	0.0867
Quality	Quality	1.0000				
	SkillDvp	0.7482	0.0418	17.90	< .001	0.7482
	GlobalCnt	0.6777	0.0469	14.45	< .001	0.6777
	CEnvt	0.7393	0.0462	16.00	< .001	0.7393
	Fiancialbenft	0.5841	0.0800	7.30	< .001	0.5841
	FundforCSR	-0.1933	0.0876	-2.21	0.027	-0.1933
SkillDvp	SkillDvp	1.0000				
	GlobalCnt	0.8489	0.0305	27.85	< .001	0.8489
	CEnvt	0.8011	0.0402	19.92	< .001	0.8011
	Fiancialbenft	0.3490	0.0771	4.53	< .001	0.3490
	FundforCSR	-0.2443	0.0775	-3.15	0.002	-0.2443
GlobalCnt	GlobalCnt	1.0000				
	CEnvt	0.8553	0.0359	23.82	< .001	0.8553
	Fiancialbenft	0.5784	0.0770	7.51	< .001	0.5784
	FundforCSR	-0.2520	0.0767	-3.29	0.001	-0.2520
CEnvt	CEnvt	1.0000				
	Fiancialbenft	0.5202	0.0801	6.50	< .001	0.5202
	FundforCSR	-0.3473	0.0783	-4.44	< .001	-0.3473
Fiancialbenft	Fiancialbenft	1.0000				
	FundforCSR	0.1888	0.0919	2.05	0.040	0.1888
FundforCSR	FundforCSR	1.0000				

- SkillDvp = Skill Development
- Globalcnt = Global connect of Institutes
- Infrastrt = Infrastructure of Institutes
- Fiancialbenft = Financial Benefit by Government
- Quality = Quality of training
- Industrysup = Industry Support
- CEnvt =
- FundforCSR = Funds received as CSR

Researchers can estimate the proportion to which each variable contributes to the model by using the model, which describes the direction and intensity of the correlations between the variables. Path analysis is a tool used in statistical models to assess the fit of a theoretical model

to empirical data and test hypotheses about the connections between variables. It is frequently employed in psychology, social sciences, and other disciplines to analyse intricate interactions between variables and establish the degree to which one variable may impact another.

Building a theoretical model of the connections between variables, then verifying the model using information from a sample of observations, is the process of path analysis. Researchers can estimate the proportion to which each variable contributes to the model by using the model, which describes the direction and intensity of the correlations between the variables.



**Figure 5.1 Path Analysis for Trainers**

The robustness of the model can be judged by the goodness fit indices and badness fit index and it can be obtained through the path analysis. The chi-square by degree of freedom (DF) measures the exact fit and the value of  $\chi^2$  and DF taken together should be significant (Hair et al., 2005), the value revealed in the model is significant at 5 percent confidence level. How well a Confirmatory Factor Analysis (CFA) model fits the data is measured as its fit. A collection of relationships between the observable variables and the underlying latent factors are specified by the model in CFA. The purpose of model fit evaluation is to evaluate how well

the factor model accounts for the observed covariance and correlation structure in the data. A CFA model's fit may be evaluated using a variety of techniques, including:

**Chi-square analysis:** The covariance and correlation matrix observed and the covariance and correlation matrix predicted by the model are compared using the chi-square statistic. A non-significant chi-square statistic suggests that the model and the data match each other well.

**Goodness-of-fit indices:** Fit indices that compare the observed covariance and correlation structure to the covariance and correlation structure predicted by the model, such as the Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI), provide information about the fit of the model to the data. A good match between the model and the data is indicated by values that are near to 1.0.

**Residuals:** Residuals are the variations between the covariance and correlation matrix that was seen and the one that the model predicted. Large residuals show that the model and the data do not fit well together.

**Modification indices:** Modification indices are indicators of how much better the model fits if a certain parameter could be determined at will. Large modification indices suggest that the model's fit would be significantly enhanced if a single parameter could be estimated at will.

It is crucial to remember that a strong model-data fit does not guarantee that the model accurately captures the underlying connections between the variables. A poor fit between the model and the data may point to an incorrectly stated model, non-normally distributed data, or a limited sample size. When this occurs, the researcher might have to improve or expand the fit of the model to the data.

**Table 5.15: Model Fit of Trainers**

Test for Exact Fit	
$\chi^2$	1817
Df	637
P	<.001
Fit Measures	
CFI	0.781
TLI	0.759
SRMR	0.071

Lower (RMSEA 90% CI)	0.0796
Upper (RMSEA 90% CI)	0.0887
AIC	24666
BIC	25173

Goodness-of-Fit can be measured by Comparative Fit Index (CFI) and Tucker Lewis Index (TLI). Comparative Fit Index (CFI) measures the Incremental fit, it is 0.781, the prescribed range of 0 to 1 is acceptable, higher values indicating a better fit is good for CFI. Tucker Lewis Index (TLI) also indicates the Goodness-of-fit index, the value of TLI as 0.759 was found on our study and the said values are within the prescribed limit of 0 to 1. Root Mean Square Error of Approximation (RMSEA) measures the Badness-of-Fit index and the value of RMSEA is 0.0887 was found to be acceptable, as 0.10 is the well recommended limit for the acceptance of models, with lower RMSEA values is 0.0796 which indicates a better fit model. Cudeck and Browne (1983) established AIC and BIC to perform a cross-validation, with Akaike information criteria (AIC) it is slightly liberal and Bayesian information criterion (BIC) it is more conservative than AIC. Homburg (1991) applied AIC and BIC measures to SEM and suggested that both AIC and BIC are performing well at identified level in the data-generating model. The higher the values of AIC and BIC the better the model is and here the results suggest that the value of BIC is better than AIC. All the latent variables considered in the study are interrelated and the structural model is revealed between the entire latent variable and are statistically significant. The standard estimates of all the variables considered in the study are shown in table 2 with their respective p-values.

## 5. 5 DISCUSSIONS

The study focuses on the Indian education system and also considers it as an essential precondition for the employability and productivity of youth. Education clearly relates with traditional education and Skill education. It helps in making young students or trainees employable at higher level of productivity and income. Educations along with trainings are considered as core drivers for Indian economic progress.

Through factor analysis and path analysis we have extracted four variables of student perception for the excellence of skill development programmes. Through the data, we tried to understand the factor affecting skill development by employing GLM mediation analysis. Generalized linear model (GLM) mediation analyses does approximation of the multiple and

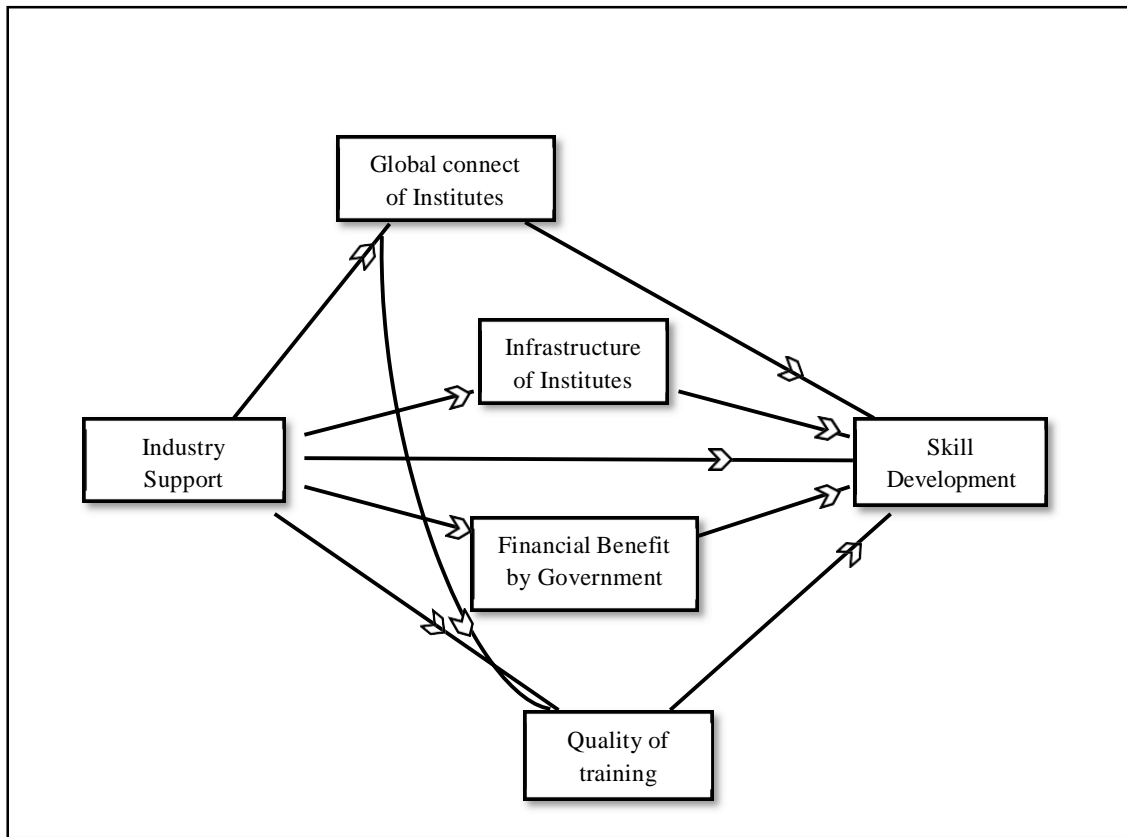
pull-out the conditional mediation models with the support of maximum likelihood regression. The model encompasses sub-models with continuous as well as categorical independent variables in a single analysis. Independent variables can be continuous (going in Covariates) or categorical (going in Factors). In case one or more variable acts a moderator, it should initially be included in the independent variables and then it is defined as moderator. The independent variables are all considered parallel & independent variables. The mediators are all inserted in the model as parallel mediators. Almost each effect from the independent variables through the mediators are estimated in the study. In other words, by default the module builds a multiple independent variables and multiple mediator models. We have attempted to obtain the standard mediation triangular model. The table 5.16 shows the model implied by the Mediators models and the Full model terms.

**Table 5.16: Models Information of Trainers**

<b>Model Types</b>		<b>Mediators Models</b>
	m1	Global Connect ~ Industry Support
	m2	Infrastructure ~ Industry Support
	m3	Financial Benefit ~ Industry Support
	m4	Quality ~ Industry Support
Full Model		
	m5	Skill Development ~ Global Connect + Infrastructure + Financial Benefits + Quality + Industry Support
Indirect Effects		
	IE 1	Industry Support ⇒ Global Connect ⇒ Skill Development
	IE 2	Industry Support ⇒ Infrastructure ⇒ Skill Development
	IE 3	Industry Support ⇒ Financial Benefits ⇒ Skill Development
	IE 4	Industry Support ⇒ Quality ⇒ Skill Development
	IE 5	Industry Support ⇒ Global Connect ⇒ Quality ⇒ Skill Development

For models without interactions, jAMM (jamovi) produces a table showing the Indirect effects (mediated), the Direct effects, and the Total effects. The direct effects are the effects computed keeping the mediators constant, thus the un-mediated effects. The total effects are the effects computed without the mediators, or, equivalently, the sum of the indirect and the direct effects. Moderators are variables expected to moderate the indirect effects. In the study, one can define one or more moderators for each mediator. Declaring the moderator triggers jAMM to display the moderator in the model diagram and then to compute simple indirect effects, that is, indirect effects computed at different levels of the moderators. The levels used in the study are ruled by Factor coding and other Covariates scaling options. The basic framework of the study suggests the model mentioned in figure 5.2.





**Figure 5.2 Model Diagram for trainers**

The findings suggest that the skill development depends upon following variables such as; global connect, Institutes Infrastructure, financial benefits received by government, Quality education and Industry support. The predicting models are as following are mentioned below: Table 5.17 reveals the model information and it includes two mediator model, a full mode and two models with indirect effect of trainer trainee relationship with the job opportunity. In the full model, institutes’ infrastructure and industry support. This result may also suggest that the trainer trainee relationship works out well in the situation of better industry support and the institutes’ infrastructure.

**Table 5.17: Mediation Analysis of Trainers**

Type	Effect	Estimate	SE	Z	P
Indirect	Industry support ⇒ Global Connect ⇒ Skill Development	0.16	0.0352	4.55	< .001
	Industry support ⇒ Infrastructure ⇒ Skill Development	0.0681	0.0159	4.28	< .001

	Industry support ⇒ Financial benefits ⇒ Skill Development	-0.0302	0.0109	-2.77	0.006
	Industry support ⇒ Quality ⇒ Skill Development	0.0918	0.0233	3.93	< .001
	Industry Support ⇒ Global Connect ⇒ Quality ⇒ Skill Development	0.0295	0.0118	2.5	0.012
Component	Industry Support ⇒ Global Connect	0.5284	0.0293	18.04	< .001
	Global Connect ⇒ Skill Development	0.3029	0.0645	4.7	< .001
	Industry support ⇒ Infrastructure	0.3368	0.0559	6.02	< .001
	Infrastructure ⇒ Skill Development	0.2021	0.0332	6.09	< .001
	Industry Support ⇒ Financial Benefits	0.0959	0.0201	4.77	< .001
	Financial Benefits ⇒ Skill Development	-0.3153	0.0925	-3.41	< .001
	Industry Support ⇒ Quality	0.349	0.0506	6.89	< .001
	Quality ⇒ Skill Development	0.2631	0.0549	4.79	< .001
	Global Connect ⇒ Quality	0.212	0.0713	2.97	0.003
Direct	Industry Support ⇒ Skill Development	0.2765	0.051	5.43	< .001
Total	Industry Support ⇒ Skill Development	0.5957	0.0353	16.86	< .001

In addition to emerging nations like India, industry experiences with the implementation of contemporary and thoroughly defined forms of skill training are extensively studied elsewhere. Eichhorst et al. (2012) shown that creating such educational systems requires a number of highly specific institutions, improved socioeconomic conditions, and special assistance from governmental organisations, commercial enterprises, and employer groups. In the United States, a new consensus is forming that a combination of vocational skills and non-academic talents is crucial for the labour market and successful employees (Lerman, 2013).

## 5. 6 CONCLUSIONS

The urgent need for employability skills has been argued as a means of enhancing job results, assisting individuals in adjusting to change, and enhancing their employment prospects (Yusof et al., 2012). Due to technological innovation and the process of globalisation, companies now want different sorts of talents from their employees and workers than they did in the past (Cinaret et al., 2009). To put it another way, modern organisations want workers and employees

with highly developed technical abilities coupled with employability skills (Singh & Singh, 2008).

In this study, to understand the perspective of stakeholders other than Trainees, study has taken the sample size of 262 individuals belongs to any of the following categories such as Recruiter/ Industry Executive, Trainer, Member Skill Council, Professor, Policy Planner and Head/Executive of Skill Centre in NCT of Delhi, India. The questionnaire carries the 38 items to elucidate the Role of Strategic Partnership of Industry- Academia in Skill Development. The collected data is analysed with the help of various statistical techniques like exploratory with confirmatory factor analysis and generalized linear model, these were performed with the help of computer software; R Jamovi package 1.0.0. Skill development is dependent on several variables, including global connectivity, institutes infrastructure, financial benefits received by the government, quality education, and industry support. Along with this the Industry support is supposed to play a prominent role in Skill development. From an Indirect model we got to know that global connectivity of Skill education institutes will further leads to Quality education.

The research results shows that Industry support to educational institutes can results in better Global connectivity, receiving financial benefits from government, better institute Infrastructure and Quality education. All of these variables further lead to enhanced Skill Development of the students, the elaborate discussion on each of these variables are as follow: Global Connectivity: The capacity of people and organisations to access and exchange information, resources, and opportunities with the rest of the world is referred to as global connection. Global connectivity may assist people and organisations keep up with the most recent technological developments and trends in the business, resulting in more effective and efficient skill development initiatives.

Infrastructure of Training Institutes: The infrastructure of training institutions is crucial to the development of skills. With the right infrastructure, people may receive high-quality training and acquire the skills they need for the workforce, including current tools and technology, well-stocked labs, and skilled instructors.

Financial benefits received by government agencies: By offering financial incentives to people and organisations who take part in skill development initiatives, the government may play a

crucial role in fostering skill development. These financial advantages may assist increase the accessibility and allure of skill development programmes for both people and corporations.

**High Quality Education:** High-quality education is necessary for efficient skill development. Programs for skill development should provide content that is current, relevant, and tailored to the needs of the labour market. A high-quality education must also include actual hands-on experience and qualified trainers and teachers.

**Industry Support:** For skill development initiatives to be successful, industry cooperation is essential. Companies may assist in preparing people with the relevant information and practical skills required for the job market by collaborating with training institutions and offering chances for on-the-job training. Support from the industry may also guarantee that skill-development programmes are pertinent to and in line with the needs of the labour market. In conclusion, the interaction of these factors can have a big impact on how well skill development programmes work. Individuals, groups, and governments may collaborate to encourage and support skill development in their communities by addressing each of these factors.

Deepali Wankhade and Pravin Dhokane (2012) suggested that there should be regular interaction between industry and academia to know the changing trends in technology required in terms of IT processes in order to improve the employability of students and enhance the quality of manpower needed in the industry. Industry experts should instruct the faculty on the newest trends and technology.

According to Sekar and S. Sathya Narayanan's (2006) analysis, an institution's work culture has a significant impact on the intrinsic motivation of its faculty, which raises the aspirations of the institution. However, the study also showed that the work culture of the college had no bearing on students' academic performance. Instead of choosing one specific model, technical institutions should investigate many types of collaboration and adhere to a pattern where the institution feels at ease cooperating with the industry, according to Bhusari, R.T. (2010). Additionally, he emphasised the need to pinpoint the locations where the best chance of collaboration exists.

In research, Dwivedi and Mahara (2013) placed focus on the creation of a Quality Model for Management Education. The model will contribute to increased productivity and employability. Additionally, they emphasized the need for educational institutions to nurture

students' ethical, creative, and disciplined minds.

The research review and research results gained from the chapter suggest that in order to ensure that its workforce is prepared to meet the needs of the contemporary labour market, India must prioritise developing skill-oriented training. This may lead to better employment opportunities and greater salaries, which in turn may promote general economic expansion and prosperity. The link between education and skill development must be strengthened by business, policymakers, and governments. A major effort is being made by the education ministry and business to raise the calibre of skill development centres all throughout India. India is reaching new heights of development every day. To maintain the economy's economic pace, improvements in the ecosystem of skill development institutions are needed with better ecosystem of skill development institutes such as enhanced pedagogy, better infrastructure and trainers' development programmes are key precedence. Hence, addressing these emerging issues becomes imperative in the current scenario.

\*\*\*

## **CHAPTER 6: ISM OF DRIVERS AND ENABLERS FOR EXCELLENCE IN SKILL DEVELOPMENT**

Higher levels of stakeholder participation in education can be referred to as quality in terms of increased effectiveness, higher standards, student-centered systems, etc. An essential component of high-quality education is skill development. India's skill development institutions are having trouble raising the bar for academic excellence and student employability. Thakkar et al. (2006) introduced the idea of quality function deployment (QFD), and their study prioritised technical requirements and their relationship to students' needs in the Indian setting.

### **6.1 INTRODUCTION**

The two halves of the quality improvement coin are quality assurance and quality enhancement. An unwavering effort has been made to pinpoint the major obstacles to raising educational standards and fostering a variety of skills and learning capacities in students at various levels of government. To design the strategies for future education, drivers and enablers of growing skill excellence institute are equally relevant and important. There is a huge need for qualified, competent, highly trained, and technically sound workers, and by 2025, demand for higher education is expected to reach 160 million people worldwide (Glakas, 2003). To fulfil the forthcoming and current needs of the business, several technical colleges in India are working hard to develop new programmes or skill excellence centres. Education along with skill among students is considered as real development, which leads to the effective and complete growth of any society. It is imperative that industry, policy makers and governments should glue up the relationship of education with skill development. In educational industry and academia, education ministry with corporate are radically working upon improving the standards of skill development centres across the Pan India. India is embarking on the new heights of growth every day, in order to uphold the growth momentum of the economy, innovations in ecosystem of skill development institutes such as, pedagogy, infrastructure and trainers development are key precedence. Hence, addressing these issues is imperative in the current scenario.

Planning Commission of India has identified twenty sectors of the economy to prepare students for better employment. The skills development and Skill education set-ups in India consist of the following organizations; Public & Private Polytechnics, Industrial Training Institutes (ITIs) and Private Skill Training Providers etc. (Ministry of Skill Development and Entrepreneurship

(MoSDE) and National Skill Development Corporation (NSDC) and other Central Ministries in coordination with each other has curretted various schemes of Skill Development, it caters around 3.5 million people.) May be changed as - (Various skill development schemes have been implemented by Government of India as well as state governments to cater the needs of around 3.5 million people). One of the prominent schemes of Govt. Of India, Pradhan Mantri Kaushal Vikas Yojana aims to skill around 402 million workers by 2022 through National Skill Development Mission and State Skill Development Missions. The above discussion shows that there is a requirement to identify the various enablers and drivers towards developing the Skill Development Excellence Centres in an effective manner. By knowing the driving power of these excellence centres, the resources and efforts of the government can be channelized in the right directions.

The intention of the study is to investigate the enablers and the drivers from the perspective of development of skill centres in India. This is an empirical analysis of skill development institutes in India to identify the major drivers and enablers within the system. This research proposes an evolutionary way to develop a progressive skill centres and skill development institutions with the output of highly skilled trainees or students in the emerging economy like India. The study will also help to map out a course of action with suggestions that would help the skill development and educational institutions to achieve the competitive advantage across the globe.

In this research, a total of fifteen drivers and enablers have been shortlisted for analysing the development of skill centres across India. These drivers and enablers were taken from the literature and with expert's opinion of skills development and Skill education institutes. To help experts of the study in developing reachability matrix, a questionnaire was offered, which was further used to establish relationship among the drivers and enablers through the ISM model. The key objectives of this research is

- to know the drivers and enablers of skill centres in India
- to understand the interrelationships among the drivers and enablers
- to classify the enablers into driving and driven in skill centres using ISM
- to discuss the strategic decisions and practical implications of the research in the education sector.

## 6.2 LITERATURE REVIEW

Gambhir, V., Wadhwa, N.C. also, Grover, S. (2013) ISM philosophy and poll overview has been performed to comprehend the mediating impact of these empowering agents with one another. It is discovered that the two empowering agents in particular 'stakeholder' and 'financial status' have high driving power and hence it merit extraordinary consideration. To give specialized training, Mahapatra and Khan (2007) have built up an estimating instrument known as EduQUAL. Khan et al. (2008) have applied DEA strategy for estimating the administration nature of specialized foundational education in India. The outcomes got from DEA technique were contrasted with conventional method of education. Parmod et al. (2010) built up a model by the combination of TPM and QFD for improving the quality in designing training. Bilen (2010) examined the difficulties of TQM execution in advanced education and gave bearings to defeat these difficulties. Mazumdar et al. (2010) have applied COPRAS-technique to figure a general quality gauge showing the presentation level of individual educators. Application possibility just as the proficiency of this technique and rules in settling a multi-quality dynamic issue has been well portrayed in this study. Zolfani and Ghadikolaei (2012) have applied a joined methodology of DEMATEL and ANP to diminish the risk alongside a short-term planning for colleges to improve their situations in this competitive world. The utilization of ISM to the dynamic cycle is the remarkable element in the field of specialized training in India. Debnath and Shankar (2012). Doherty (2008) had the focus on "quality", "TQM" and "Autonomy" in the training or education. The study included a conversation among the academicians of the significance of the three ideas that are involved in training. Mergen et al. (2000) and Grant et al. (2002) gave a model three segments: quality of conformance, quality of design and quality of execution as a structure to identify the areas for development in education. Shank et al. (1995) examined the attributes of education and considered it as a service because of its features such as: it is impalpable, heterogeneous, intangible and indistinguishable from the individual trainer conveying it.

Kanji (1998) considered and proposed a great model for education, which focused on four standards viz client delight, fact management, individuals-based administration and persistent improvement. Telford and Masson (2005) explored the connection between the compatibility of the qualities and the degree of student satisfaction. This study includes students, staff, stakeholders and the senior administration. Mustafa and Chiang (2006), Peat et al. (2005), Srdoc et al. (2005), Alashloo et al. (2005), Sahney et al. (2004), Bath et al. (2004), Koch and Fisher (1998) examined and recorded the view that TQM covers all basic areas of education



regarding workforce, staff and infrastructure, the executives' strategy, curriculum design, educational plan, instructional method, non-academic processes, admission processes and so on. Viswanadhan and Rao (2005) contemplated nine parameters, which were influenced by privatization viz top administration and initiative, students focus, course conveyance, correspondence, campus facilities, friendly learning condition and constant evaluation and improvement with regards to India. Sakthivel et al. (2005) examined five parameters viz responsibility of top administration, course curriculum, campus facilities, courtesy to stakeholders and student's feedback, student's satisfaction and improvement. They have built up a TQM model of scholastic greatness for specialized educational institutions of India. Dotchin and Oakland (1994) and Asubonteng et al. (1996) thought that a large portion of the studies are students focused. Notwithstanding, it is additionally important to distinguish the prerequisites of the students (Parasuraman et al., 1988 and Babakus and Boller, 1992). Consequently, characterizing quality in education implies including quality of process with quality of input and quality of output as proposed by different scholars (Sallis, 1993; Green, 1994; Cheng and Tam, 1997; Kanji et al., 1999). Education & training includes vocation readiness as well as intellectual development of individual, which ought to lifelongly affect individual as cited by Norris (1978).

In 1994 The American Society for Engineering Education proposed that designing training should be relevant, appealing and associated with the lives and Skill career of students. As per Powar (2001), the Indian educational frameworks have not improved the nature of training for financial advantage and exploit the opportunities for students. In spite of the fact that the opportunities are accessible to the adolescent, it is advantageous to feature and highlight them. Just as infrastructure facilities, uniformity in participation and cooperation with trainers having sufficient control and it has been identified with quality and monetary opportunities as a principal condition for quality education, these are main conditions suggested by the author. Natarajan (2007) referenced some empowering agents of technical education like developing business opportunities in the IT division and fanning IT tool devices for Technology-Enhanced Learning in the field of education. Distant learning Education prospects, particularly for Continuing Education is additionally one of the huge empowering agents in education and training. Good administration with R&D labs and industry connect and the updated Technology and Engineering Education are broadly recognized as a catalyst for national development and prosperity of nation.

Wani et al. (2007) proposed creating enterprise and inculcating the habit of entrepreneurship in the education and training curriculum, as it would empower students to view themselves as self-employed and that will act as a lifelong choice. Webster (2000) and Sanghi (1996) considered the function of technical entrepreneurship as an empowering influencer or enabler during the progression of training and education. Nanda and Ahuja (2003) talked about a portion of the hindrances in the Indian educational framework. Various prerequisites of society might be viewed as a significant hindrance in the field of education. Quick changes in necessities of ventures and their requirements are a genuine hindrance in the field of education and training in India. The requirement for gifted labor and skilled manpower to grow new technical projects is likewise a significant concern or barrier. The studies additionally underscored different barriers like quick development of technologies and mechanical advancements, the need to update infrastructure routinely to stay up with consistently evolving advancement. Natarajan (2000) presumed that developing worldwide rivalry and advancement of data and correspondences innovation has challenged the trend in training and education. Rhodes (2002) introduced a relative report among US and Indian higher education institutions and centers. One of the difficulties referenced by the author is the student's expectation that is related to educational assets, counselling services, better administrations, lodging facilities, and so forth. Sohail and Shaikh (2004) investigated students' desires for quality in advanced education and distinguished six components, specifically contact with staff, physical condition of infrastructure, responsiveness, institutional reputation, access to resources and educational program.

### **6.3 IDENTIFICATION OF DRIVERS AND ENABLERS OF SKILL CENTRE OF EXCELLENCE**

This section deals into the Identification of Drivers and Enablers of Skill Centre of Excellence in India. It has taken into the consideration almost all of the aspects which have been revealed in the previous literature. The drivers and enablers with their brief descriptions are mentioned below:

#### **1) Industry support in curriculum development and delivery.**

The adequate curriculum of skill centres should take cognizance of the specific skills required to execute at the workplace. There is disconnect between academia and industry in Indian educational institutions (Upadhyaya and Vrat; 2016). Debnath and Shankar (2012) considered curriculum development as an important aspect for quality improvement of education. A focus

on curriculum planning has been made by many scholars in the past (Madigan, 2019; Boahin and Hofman, 2013). Hence the first variable taken into the consideration is Industry support in curriculum development and delivery.

## **2) Integration of soft skills with trade skills.**

In the traditional system, like Industrial Training Institutes (ITIs) and Skill Training Institutes (VTIs) the educational plan has centre for skill enhancement. The projects are known as Turner Training, Carpenter training and so forth. The research done by Laar et al. (2017) shows the soft skill is considered as 21st-century skills are more extensive than normal trade skills. Soft skills should include skills like collaboration, creativity, information management, communication, critical thinking, problem solving and design thinking. As characterized by Perreault (2004), the “soft skills” is intended to highlight an individual’s characteristics, qualities, and communicational abilities which empower that individual to illuminate and shape profitably the ideas into transparent, straightforward and logical situations. As indicated by Meenu and Kumar (2009) the technical requirements of a job includes “soft skills” and “hard skills” of a job, “soft skills” can be called as “transferable skills” and “hard skills” can be called as “academic skills”. to enhance the individual’s performance, soft skill should be included with technical trade skills in the new curriculum (Hayes 2002; Perreault 2004). From this new educational plan point of view, it gets conceivable to upgrade the performance of people or groups through soft skills (Whetten, Cameron, and Woods 2000). Numerous researches has been done on the understanding importance of soft skills training in the workplace and organizations (Klaus, 2010; Maes, Weldy, & Icenogel, 1997; Mitchell et al., 2010; Nealy, 2005; Smith, 2007). Considering the importance of soft skill with trade skill it has also been considered as an important parameter to study.

## **3) Knowledge of futuristic requirement of skills.**

In the current quick changing unique business condition, the advancements and subsequently the aptitudes are getting old quick and new necessities totally obscure prior are being requested because of new innovations, frameworks and change in demography. It is significant that policy creators and organizations must have a system set up to know these prerequisites skills. the high degree of capability among trainees and graduates isn't new and has been noted in a few investigations and studies (Feast, 2001; Knemeyer and Murphy, 2002; Mey, 2003; Azam and Brauchle, 2003; Razak, Latifah, Jaafar, Hassan Mi, and Ab Murat, 2008; Singh and Singh, 2008; Saunders and Zuzel, 2010). For this they can build up the processes around the different

ways of getting the data about the advanced abilities and skills required in future. Knowledge of futuristic requirement of skills can help to upgrade skill centers.

#### **4) Placement drive by industry**

One of significant sparks for a trainee or student to join a program is its capability of finding an important line of job on the fulfilment of the course. By policy makers, the motivation behind expertise improvement centres is to begin industry ready projects and courses. The estimation by Guerrero (2020) shows a positive relationship between work of graduates and industry-college cooperation. This relationship is more prominent in provincial locales or rural areas than metropolitan area. In Modern days, Industrial training has been demonstrated to be basic in giving trainees an open door for an extensive work-based performance to an expansive scope of operation within an organization (Crossley, Jamieson, and Brayley, 2007). Industrial training can likewise be considered as a measure of performance and as such is believed to be more legitimate than conventional study and pencil tests (Allen, 2004). Moreover, it tends to be a successful appraisal vehicle in assessing the scholarly item of a trainee. Normally, if businesses are happy with students or trainees' performance, it is commonly expected that the college's educational plan has addressed or even outperformed the businesses' needs and requirements (Verney, Holoviak, and Winter, 2009). Understanding the significance of these discoveries, placement drive by industry has been formed an important aspect to study.

#### **5) Real size production and service facility attached to skill centre**

The best ability advancement training centers can be granted in a genuine size production and service facilities. World level Skill Center in Delhi, India is having Real size production and service facility. Such kind of centre gives a complete specialized ability and training, design thinking, interpersonal skills, decision making skills, technical skills, analytical skills and so on. The use of these learning exercises underpins the requests of the businesses to fit the specific jobs in the company. Managers invest the majority of their efforts in managing their representatives, for which amazing abilities communication are basic (Zaharim, et al, 2012). Therefore, Real size production and service facility can act as an enabler for skill centers.

#### **6) Development of training and assessment standards.**

To accomplish a decent quality, the presence of value affirmation framework and the guiding principle is one of the significant empowering influencers. In the new skill advancement strategy of the legislature of India, The National Skills Qualifications Framework (NSQF) has been created which attempts to normalized and standard the expertise improvement and skill

development centres. It leads to progression of levels of information, aptitudes and knowledge of individuals. These levels are characterized as learning outcome which the student must have whether or not they were obtained through formal, non-formal or casual learning.

### **7) Training of trainers and Administration**

Mentors and the administration are the infantry of the skill development and skill improvement programs. A legitimate training can give the more extensive perspective on the modern aspects and the minute skill development training is basic to grow great mentors and trainers of skill centres. Strong trainers has been well linked to trainees productivity and career advancement; it is also considered as an important predictor in training and development (Palepu et al., 1998; Garman et al., 2001; Ramanan et al., 2002; Steiner et al., 2004; Sambunjak et al., 2006; McGee and Keller, 2007; Raggins and Kram, 2007; Bland et al., 2009; Feldman et al., 2010; Cho et al., 2011; Shea et al., 2011; Fleming et al., 2012)

### **8) Scholarships to trainees**

In numerous nations, particularly which have well accepted skill development and skill advancement as a public strategy gives grants to the students. This way the school pass outs are pulled in for skill training, which thus goes about as a significant asset in industry for the service and administration role of various ventures. The scholarship can shape the knowledge of trainees effectively and scholarship is considered as an important factor in training by numerous studies in literature (Gumport, 2001; Silverman, 1987; Townsend, Donaldson, & Wilson, 2005).

### **9) International collaboration**

There are a few examples of overcoming adversity where by worldwide International collaboration regarding skill improvement, the instructional method, mentors training and corporate internship has got new place in the educational program. This not just improves the opportunities of the passing out students, yet additionally gives certainty to the business about their skills and calibre. This additionally, this will improve the confident and morale of the students. International collaboration and International partnership initiatives are considered to hold high potential for skill development and research ability among the students, it also has played active role in the area of education and skill development (Crossley and Holmes 2001; King 1990; Crossley and Watson 2003; Stephens 2009; Chisholm and Steiner-Khamsi 2009; Pryor et al. 2009)

## **10) Industry support and partnership**

The business units and industries are one of the significant partners of the ability improvement and skill development centres. At present, in most of the cases their role is only limited to providing jobs and to some extent internship. However, to be effective skill program, the industry should provide support in several ways. Ursache and Mares (2013) in their case study developed on an engineering program in which experts from industry educate future engineering specialists in order to address the industry standards and codes of practice. The student learning experience and employability was enhanced through the application of the theory in a practical module assessed according to industry requirements (Glenn, 2008; James & James, 2004; Mitchell et al., 2010; Perreault, 2004; Wilhelm, 2004). Coupling of education with training to the respective occupations or jobs can be done through the apprenticeship systems (Müller and Shavit 1998).

## **11) Government Policy and Financial support.**

In the last two decades, several policy initiatives have been taken by the Government of India and various state governments. A separate ministry of skill development was also established. Through state level departments of technical education and state technical boards, internships are being offered in different domains of skills. However, still the support is very less, keeping in view the size of the country and especially demographic profile of the population where 30 percent of the population is in the age bracket of 17-30 years. Fischer (1990), Hansen and Weisbrod (1969), Hearn and Longanecker (1985), Hoenack (1971), and Windham (1976) asserted that financial assistance to the students will improve the learning ability of individual. Conversely, other studies of Griswold and Marine (1996), Lenth (1993), Lopez (1996), and St. John (1994) have opposed the high tuition fee and supported high aid model in educational sector.

## **12) Development of core competency required for the job.**

It has been observed that in traditional training centres, the focus is on providing trade skills rather than developing holistic core competency among the students. By providing additional professional skills like decision making skills, analytical skills, communication skills and so on, the students will be able to perform his/her job at a next level of competency which will not only improve the quality and productivity of the job but will also enhance the salary and professional growth. Work-related competencies play an important role in economics of education and the same has been advocated by various studies (Arnold and Lipsmeier 1995;

Tessaring 1998; Psacharopoulos 1987a; Carnoy 1994; Grao and Mora 2000). developing competency models in education is regarded as the problems in many developing nations and the same has been identified by Esque and Gilbert, (1995); Marrelli, (1998); Thomas, (2000); Langdon and Marrelli, (2002).

### **13) Incorporation of technology used in practice**

In most of the skill development centres, the technology, equipment, processes used have wide gap from the technology actually being used in the industry. May be due to financial constraints the training institutions are not able to update their infrastructure in line with the progress in real size industrial units. This phenomenon adversely affects the quality of training and the placement opportunities. Industry support is a must to keep these training institutes abreast with the latest technology. The implementation of technology is encouraged in almost all the domains of education, whether its special education or its Skill one without technology all seems incomplete. The role of technology is well accepted by the numerous literatures (Sheridan, 1993; Maglitta, 1994; NRC, 1987; Solow, 1988; Porter, Ž 1996; AACSB, 1997; Ž Badawy, 1995, 1998; Kocaoglu, 1994; Burgunder, 1995).

### **14) Management of change in the world of works**

The technology and business environment are changing very fast and thus the need for training institutions to change and updates at the same pace. Many a times despite having the financial and administrative support of the government and hand holding by the industry and the local administration is not able to change. Changes in current workplace is common, hence, it should be well woven in curriculum design, it can increase the employability of students of skill centres (Martin & Hughes, 2009; Dean, Sykes & Turbill, 2012; Smith et al., 2010; Storey, 1992).

### **15) Select Skill Development as first choice by the students**

In India, as well as in many other countries, skill related jobs and courses are taken in low esteem may be due to poor training infrastructure and thereby low salaries and growth avenues. The ultimate goal of the various government policies should be to bring skill development at par with the other knowledge based programs. Requirement of Skill trained students has been increasing day by day and the same has been highlighted across many studies (Dunne & Rawlins, 2000; Hesketh, 2000; Lee, 2003; Wilhelm, 2004). Hence, the trainees should also have willingness to mark upto the expectation of industry choice of skill development and

finally consider it as their first choice. The choice of the student also acts as an enabler for skill excellence centre.

#### **6.4 RESEARCH METHODOLOGY**

ISM offers a philosophy for organizing complex issues and it is a blend of three displaying dialects: words, digraphs and discrete mathematics. It contrasts fundamentally from numerous conventional displaying approaches, which utilize quantifiable factors. ISM joins components estimated on ordinal sizes of estimation and gives a displaying approach, which licenses subjective variables to be held as a fundamental aspect of the model. Then again, ISM has preferences over different techniques. It was proposed by Warfield (1976) to dissect complex socioeconomic frameworks. From that point forward ISM has regularly being utilized to help comprehend complex circumstances and to empower a system for taking care of issue and resolving them. Sage (1977) expressed that ISM is utilized for recognizing the connection between different components, which characterize a particular issue or problem. It is an intuitive cycle, which additionally utilizes the thought of diagram hypothesis to clarify the perplexing example of logical connections among factors. ISM goes about as a tool for forcing relationship among the variable and takes in consideration the predictability of connections among the factors as examined by Sage (1977); Singh et al. (2003); Jharkharia and Shankar (2004). In this study ISM has been utilized with regards to develop a skill excellence centre. ISM has been utilized to demonstrate the empowering agents and barriers to develop a skill excellence centre. ISM can clarify the connection between factors that can be used as framework to develop skill centers. ISM approach of model frameworks helpful for many purposes due to its into unambiguous nature (Sage, 1977; Jharkharia and Shankar, 2005). Hence, in this study, enablers and drivers of skill centres have been investigated with ISM to comprehend the perplexing interrelationships among them.

The ideation development exercise was done with a group of experts, trainers and professionals working in the field of skill development in various government organizations and academia. Four participants were from academia, two participants were from industry and other two were from government agencies. The study has considered only those participants, who had more than ten years of experience in the area of skill development. The data was taken through a workshop mode in which adequate time was assigned on collecting the views and then appropriate time was invested in arriving at common consensus for different type's scores given in the model. The ideation exercise generated various parameters which are as follow:



Industry support in curriculum development and delivery, Integration of soft skills with trade skills, Knowledge of futuristic requirement of skills, Placement drive by industry, Real size production and service facility attached to skill centre, Development of training and assessment standards, Training of trainers and Administration, Scholarships to trainees, International collaboration, Industry support and partnership, Government Policy and Financial support, Development of core competency required for the job, Incorporation of technology used in practice, Management of change in the world of works and Selection of Skill Development as first choice by the students.

Structural self-interaction matrix (SSIM) shows the contextual relationship among the variables. It reveals that one variable helps to realize another variable or whether one “leads to” another variable. Based on contextual relationship and the associated direction or relation between any two different parameters (i & j) are recognized. Four different symbols are used in the study to indicate the relationship and its direction between the parameters (i & j) as given below:

- Symbol V mentions that the parameter i will facilitate to attain parameter j.
- Symbol A mentions that the parameter i will be achieved by parameter j.
- Symbol X mentions that the parameters i and j will assist to achieve each other.
- Symbol O mentions that the parameters i and j are totally unrelated.

Based on the opinion of experts, Table 6.21 of SSIM is developed. The SSIM format is further altered into the reachability matrix by transforming the information in each entry/cell of the SSIM into 1's and 0's in the reachability matrix. The four situations that can occur are as following:

- if the SSIM (i, j) entry is a symbol V, the (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry becomes 0
- if the SSIM (i, j) entry is a symbol A, the (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry become 1
- if the SSIM (i, j) entry is a symbol X, both the (i, j) entry and the (j, i) entry of the reachability matrix become 1
- if the SSIM (i, j) entry is a symbol 0, then both the (i, j) and (j, i) entries of the reachability matrix become 0.

Following these rules, the initial and final reachability matrix for each element is arranged. The reachability framework has additionally been apportioned based on the reachability and

antecedent set (Warfield, 1976). From the final reachability grid, the reachability and antecedent set for each factor are found. The reachability matrix comprises of the component itself and different components which it might help accomplish, while the antecedent set comprises of the component itself and different components which may help in accomplishing it. At that point the convergence of these sets is inferred for all components. The component for which the reachability and crossing point sets are same is the high level component in the ISM pecking order. The high level component of the pecking order or hierarchy would not help accomplish some other component of over their own. When the high level component is distinguished, it is isolated out from different components. At that point by a similar cycle, the following degree of components is found. The enablers for which the reachability also, the intersection sets are the equivalent, are put at the high level in the ISM chain of importance. In light of the driving force and reliance elements, these enablers have been arranged into four classifications (Mandal and Deshmukh, 1994):

- Autonomous enablers
- Linkage enablers
- Dependent enablers
- Independent enablers.

## **6.5 FINDINGS & DISCUSSIONS**

The enablers and driving forces of skill excellence centre can easily be determined through ISM chain of importance. ISM goes about as a tool for forcing relationship among the variable and takes in consideration the predictability of connections among the factors as examined by Sage (1977); Singh et al. (2003); Jharkharia and Shankar (2004). SSIM is considered as the primary step to reach at the ISM of skill centre of excellence (Warfield, 1976).

Group of experts concerned with the study were questioned and as per the response received the pair-wise interaction has been drawn between the elements. These experts are working in the field of skill development in various government organizations and academia.

The group includes; four participants from academia, two participants from industry and other two from government agencies. With the viewpoint of the contextual relationships in each element of enabler of skill centre of excellence, the existence of a relationship between any two elements have been captured in Table 6.1.

**Table 6.1: Structural self-interaction matrix (SSIM)**

Structural self-interaction matrix (SSIM)																
	Parameters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Industry support in curriculum development and delivery.		A	A	O	A	A	X	O	O	X	V	A	X	V	A
2	Integration of soft skills with trade skills.			V	V	V	V	V	O	V	V	V	A	V	V	V
3	Knowledge of futuristic requirement of skills.				V	A	A	A	O	V	V	O	A	A	A	O
4	Placement drive by industry.					O	O	O	O	O	V	V	X	X	V	A
5	Real size production and service facility attached to skill centre						O	A	O	V	V	V	A	A	V	A
6	Development of training and assessment standards.							O	O	V	V	V	A	A	V	O
7	Training of trainers and Administration.								O	V	V	V	A	V	V	O
8	Scholarships to trainees.									O	V	V	O	O	O	A
9	International collaboration.										O	V	A	A	V	A
10	Industry support and partnership											V	A	A	A	A
11	Government Policy and Financial support.												A	A	A	A
12	Development of core competency required for the job.													V	V	A
13	Incorporation of technology used in practice														V	O
14	Management of change in the world of works															A
15	Select Skill Development as first choice by the students															

In table 6.1, Symbol V mentions that the parameter i will facilitate to attain parameter j. Industry support in curriculum development and delivery as an element can facilitate to attain element 11 and 14, which is related to government policy and management of change. Similarly, the second element of soft skill helps to attain almost all the other element of the study. This signifies the contextual relationship of soft skill with all other elements. In table it is clearly mentioned that enabler 2 is having “A” symbol representation with enabler 12; i.e, core competency. This suggests that soft skill can be achieved by core competencies of the individuals. The same logic has been used for all other relations mentioned in the table. For enabler 1, i.e; Industry support in curriculum development and delivery the symbol “X” is being noticed for enabler 7, 10 and 13. Symbol “X” in SSIM, suggest that Curriculum development with get assistance with Training of trainers (enabler 7), Industry support (enabler 10) and Incorporation of technology (enabler 13). Finally, Symbol “O” mentions that the parameters i and j are totally unrelated, this relation has been noticed in enabler 4; i.e, Placement drive by industry. The findings suggest that Placement drive by industry has no relation with the following: Real size production and service facility attached to skill centre, Development of training and assessment standards, Training of trainers & Administration, International collaboration and Scholarships to trainees.

Reachability Matrix in tables 6.2 shows the “driving power” and the “dependence” of the enablers of skill centre of excellence respectively. The prominent and higher the driving power of an element leads to the higher the rank of the element. The driving power of a particular element is the total number of element and it includes itself, which it may help to attain or achieve while the dependence value is the total number of elements, which may help achieving it. The values of Reachability matrix is drawn by taking SSIM into the consideration. One the basis of driving power we may rank the elements as per their importance. As per the results the first rank can be assigned to element 2 and 15 because it has highest driving power. The lowest driving power is of element 11 (Government policy and Financial support) and hence will receive the lowest rank in the hierarchy.

**Table 6.2: Reachability Matrix**

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Driving Power
1	Industry support in curriculum development and delivery.	1	0	I	I	I	I	1	0	I	1	1	0	1	1	0	11
2	Integration of	1	1	1	1	1	1	1	I	1	1	1	I	1	1	1	15

	soft skills with trade skills.																
3	Knowledge of futuristic requirement of skills.	1	0	1	1	0	0	0	0	1	1	1	1	1	1	0	<b>9</b>
4	Placement drive by industry.	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	<b>13</b>
5	Real size production and service facility attached to skill centre	1	0	1	1	1	0	1	0	1	1	1	1	1	1	0	<b>11</b>
6	Development of training and assessment standards.	1	0	1	1	0	1	0	0	1	1	1	1	1	1	0	<b>10</b>
7	Training of trainers and Administration.	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	<b>12</b>
8	Scholarships to trainees.	1	0	0	1	0	0	0	1	0	1	1	1	1	1	0	<b>8</b>
9	International collaboration.	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	<b>8</b>
10	Industry support and partnership	1	0	0	0	0	0	1	0	0	1	1	0	1	1	0	<b>6</b>
11	Government Policy and Financial support.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	<b>1</b>
12	Development of core competency required for the job.	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	<b>14</b>
13	Incorporation of technology used in practice	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	<b>12</b>
14	Management of change in the world of works	1	0	1	1	0	0	0	0	1	1	1	0	0	1	0	<b>7</b>
15	Select Skill Development as first choice by the students	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	<b>15</b>
Dependence		<b>13</b>	<b>4</b>	<b>12</b>	<b>13</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>3</b>	<b>12</b>	<b>14</b>	<b>15</b>	<b>11</b>	<b>13</b>	<b>14</b>	<b>3</b>	

Similar justification is given for dependence of Reachability Matrix, Enabler 11 namely, “Government Policy and Financial support” has received the highest dependency score. Hence

it will get the first rank. Enabler 8 and 15 namely, “Select Skill Development as first choice by the students” and “Scholarships to trainees” respectively have the least dependence and hence are given the least rank in the list of enablers of skill centre of excellence.

**Table 6.3: Partitions of reachability matrix**

Enablers	Reachability sets	Antecedent sets	Intersection sets	Level
E1	1,3,4,5,6,7,9,10,11,13,14	1,2,3,4,5,6,7,8,10,12,13,14,15	1,3,4,5,6,7,10,13,14	IV
E2	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	2,4,12,15	2,4,12,15	VII
E3	1,3,4,9,10,11,12,13,14	1,2,3,4,5,6,7,9,12,13,14,15	1,3,4,9,12,13,14	III
E4	1,2,3,4,5,6,7,9,10,11,12,13,14	1,2,3,4,5,6,7,8,9,12,13,14,15	1,2,3,4,5,6,7,9,12,13,14	III
E5	1,3,4,5,7,9,10,11,12,13,14	1,2,4,5,7,12,13,15	1,4,5,7,12,13	IV
E6	1,3,4,6,9,10,11,12,13,14	1,2,4,6,7,12,13,15	1,4,6,12,13	IV
E7	1,3,4,5,6,7,9,10,11,12,13,14	1,2,4,5,7,10,12,13,15	1,4,5,7,10,13	VI
E8	1,4,8,10,11,12,13,14	2,8,15	8	VI
E9	3,4,9,10,11,12,13,14	1,2,3,4,5,6,7,9,12,13,14,15	3,4,9,12,13,14	III
E10	1,7,10,11,13,14	1,2,3,4,5,6,7,8,9,10,12,13,14,15	1,7,10,13,14	II
E11	11	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	11	I
E12	1,2,3,4,5,6,7,9,10,11,12,13,14,15	2,3,4,5,6,7,8,9,12,13,15	2,3,4,5,6,7,9,12,13,15	V
E13	1,3,4,5,6,7,9,10,11,12,13,14	1,2,3,4,5,6,7,8,9,10,12,13,15	1,3,4,5,6,7,9,10,12,13	III
E14	1,3,4,9,10,11,14	1,2,3,4,5,6,7,8,9,10,12,13,14,15	1,3,4,9,10,14	II
E15	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	2,12,15	2,12,15	VII

The reachability matrix has been segregated on the basis of the reachability, antecedent set and Intersection set (Warfield, 1976). Final reachability matrix gives the reachability, interaction and antecedent set for each factors are found in table 6.3. In the matrix, reachability set consists of the initial elements and other elements of the study, which it possibly will help to achieve, whereas the antecedent set consists of the element itself and the other elements which might help in achieving it. Then the intersection set of these elements are discussing about elements which are intersecting in both reachability set and antecedent set. The reachability and intersection sets are showing few common elements, the enablers which has reachability and intersection sets are same is always on the top-level in the ISM hierarchy. Tables 6.3 shows the level of drivers and enablers respectively. The enablers are grouped in various levels such as level 1, 2, 3 [ . . .]. The levels identified helps in building the final model of ISM. The top-level element in the ISM hierarchy would not help to succeed any other element above them. Once

the top-level element is identified in the ISM hierarchy, it is separated out from the other elements in the hierarchy. The same process goes in the determination of the next level of elements in the ISM hierarchy. These identified levels in the ISM hierarchy help in building the diagraph and proposes the final model.

**Table 6.4: MICMAC Analysis**

Driving Power	15			15	2												
	14										12						
	13												4				
	12								7				13				
	11								5				1				
	10		DRIVERS– IV Quadrant						6		LINKAGE– III Quadrant						
	9												3				
	8			8									9				
	7														14		
	6														10		
	5																
	4		AUTONOMOUS – I Quadrant								DEPENDENT– II Quadrant						
	3																
	2																
	1															11	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
	Dependence																

MICMAC Analysis classifies the enablers into four different categories and sub divided into driving power and the dependence. The aim behind this MICMAC classification is to analyse the dependency and driving power of elements on each other. The driver power and dependence of each of the enablers has been plotted in the diagrammatic representation in table 6.4. The table 6.4 exhibits the categories of the various drivers and enablers of skill excellence centres. The dependence power is shown on X-axis and the driving power is shown on Y-axis. There are four quadrants in table 6.4, the first quadrant is showing autonomous enablers, second quadrant is showing dependent enablers, third quadrant is showing linkage enablers and fourth quadrant is showing independent enablers. The values on X axis and Y axis showing the values starting from 1 to 15 and it signifies low to high. As an illustration, enabler three has dependence power of twelve and the driving power of nine.

The first cluster in table 6.4, includes “autonomous” enablers that have very low driving power and very weak dependence. In the table 6.4, the second cluster consists of the “dependent” enablers that have strong dependence and weak driving power. enablers 10, 11 and 14 are in

the second cluster. The third cluster includes “linkage” enablers that have strong dependence and strong driving power. Any stroke on these linkage enablers will affect others enablers and there will be an impact and effect on them. Linkage enablers includes 1,3,4,5,6,7,9,12,13, this makes them keep changing in the system. Finally, the fourth cluster in table 6.4 includes “independent” enablers with low dependence power and high driving power. It has been found that enablers 2,8,15 are having low dependence power and high driving power. The “independent” enablers are key drivers in the systems. The finding suggests that there is no autonomous enabler and all the other enablers are either linkage or dependent enablers and impacting the drivers on one way or the others.

Interpretive structural modelling (ISM) is a methodology used for identifying the relationships among explicit items or variables. The exercise of segregating the elements and an extraction of the structural model is called as ISM. It is a commonly used methodology for understanding the quality framework and model of higher education and other educational institution. This technique prioritizes the strategic issues into the various level and then proposes a significant model qualitatively. The diagrammatic representation of Enablers is shown in Figures 6.1 for the enablers of the skill excellence centre’s in India. Selection of skill development education as first choice is the Key component in the study and it is getting influenced by the enabler 12. Scholarship to the trainees and Integration of soft skill with trade skills are the three key drivers in the study and it is getting impacted by Government policy and incorporation of technology (i.e; enabler 11 and 13) respectively. Enabler 10,11,14 are dependent on the various linkage enablers and key drivers. Linkage enablers includes 1,3,4,5,6,7,9,12,13 and they are impacting the key drivers and acting as a connecting link between drivers and dependent enablers. The figure suggests that placement drive and international collaboration would not be possible without the industry support and partnership. Similarly, Enabler 10 (i.e; Industry support and partnership) leads to enabler 1 (i.e. Industry support in curriculum).



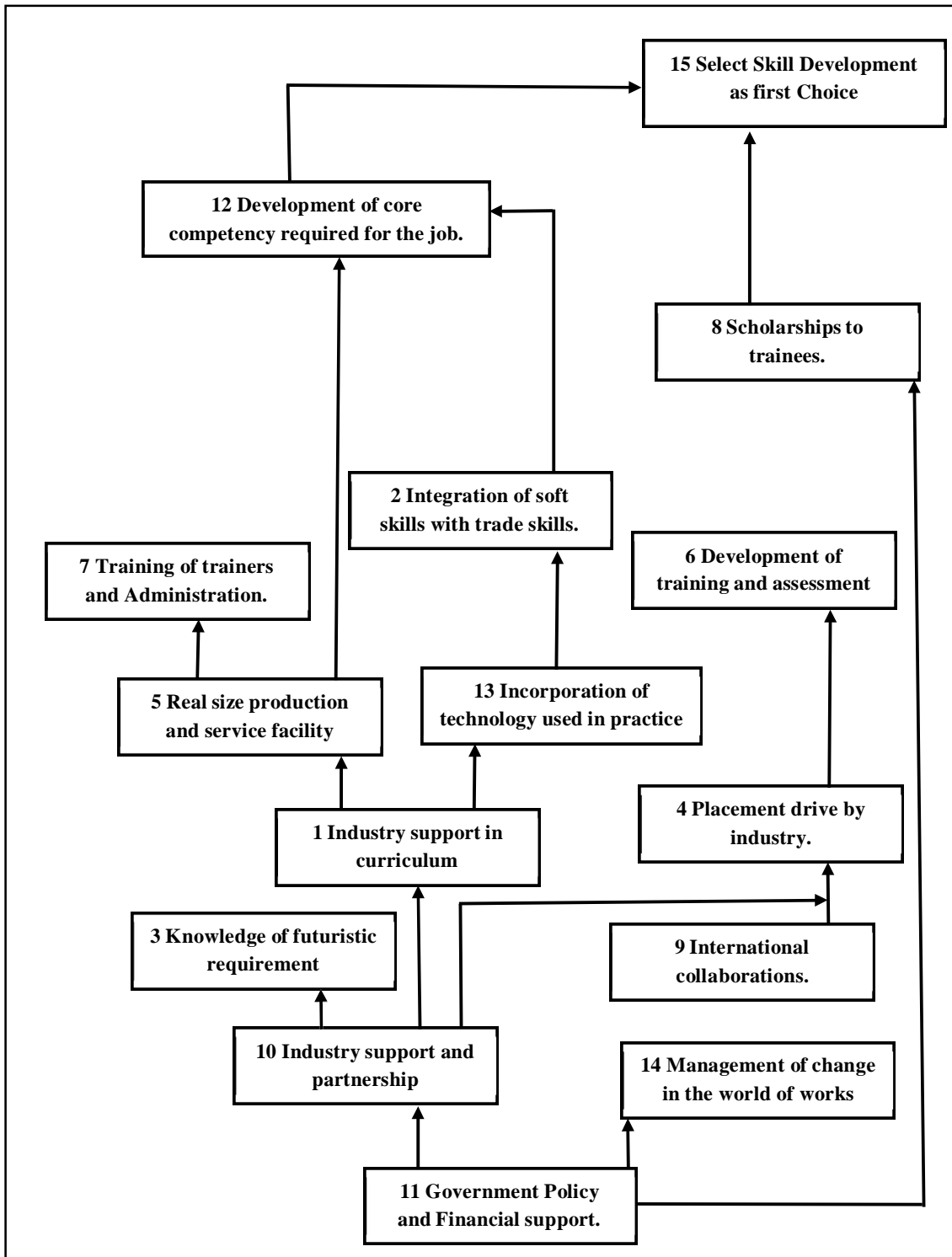


Figure 6.1 Diagrammatic representation of Enablers through ISM model

## 6.6 ROBUSTNESS TESTING

Robustness is a characteristic of versatility that gauges the conduct of the framework or model under standard and non-standard conditions. Robustness is characterized as how much a framework works accurately within the sight of extraordinary information sources or abnormal natural conditions. This part of the study presents the robustness testing by summing up the advancement of essential strength in testing proposed model presented in figure 6.1. To check the robustness of the study, the proposed framework was tested in several of the skill development institutes of Department of Training and Technical Education, Government of National Capital Territory of Delhi. After the suggestion and adoption of the given framework as mentioned in figure 6.1, few of the following achievements have been noticed for these institutes:

- Establishment of Skill Enhancement Centres in collaboration with 10 Industries viz. Maruti Suzuki, Daikin, Tata Motors, Samsung, Hyundai, IGL, Siemens, LG, Toyota and Oriental India Insurance
- Formation of Skill Enhancement Centres coming up soon in collaboration with Havells, Mercedes Benz, TVS Motors and Mahindra & Mahindra
- Successful German Model of Dual Skill educational training (VET) launched in collaboration with Siemens & Tata Strive in all ITIs in electrical stream, and with Spark Minda in ITI AKS in Tool & Die
- MOUs with NTPC, Sheela Foam, Crown Plaza, Indraprastha Power for Institute Management/Internships/Training of Trainers etc.
- ETASHA, Teach India, Wadhvani Foundation and UNDP in partnership with various organizations roped in for enhancement of employability skills
- 179 Trainees placed with Maruti Suzuki Authorised dealers, 304 Trainees placed with TataChannel Partners
- Government of Delhi has engaged with Government of Singapore through an MOU to collaborate on this project. The setting up of a World Class Skill Centre at Delhi is conceived as a pioneering effort of national interest, and will set a benchmark for Skill training in the country.
- The International partner, ITEES, a wholly-owned subsidiary of the Institute of Technical Education (ITE), Singapore, was established in 2003 with the objective of sharing the ITE's experience and expertise in Technical and Skill Education and

Training (TVET) with the international community.

- Of the last five batches, all the students have been selected in prominent industries/organizations in country and overseas (New Zealand & Singapore).
- Two additional trades namely Information Technology Enabled Services and Accounting Banking & Finance were started later on.

## **6.7 CONCLUSION**

The skill-based education sector, requires a lot of changes and scrutiny to resolve the issue of unemployable youths in Indian economy. It is a time of call for action to address various issues of skill-based education. The determination of enablers to establish an effective skill excellence center can help us to cope up with the issue of increased unemployable youths. The enablers identified by industry professionals and academic fraternity need to be taken seriously by policy makers to facilitate necessary actions to be taken to expand the quality of skill-based education. Knowing the enablers becomes important when we seek to introduce world class skill development centers in India. This study could be insightful for the policy makers of skill education and necessary actions can be taken to improve the same.

These cases of achievement reveal and validate the findings of the ISM model presented in figure 6.1. Government support in the form of policy and finances is the most important driving force in establishing the skill development activities. In this case both the Govt of NCT and Govt of India provided the much-desired leadership and patronage to the project. The process of change management was crucial due to the inertia and the culture of maintaining status quo is integral part of government institutions. With consistent meeting counselling, brainstorming sessions, presentations at higher level helped in bringing all the stakeholders on board and a good institution framework has been created. It is the commitment of both the governments at center and state level that they planned for international collaboration and selected Institute of Technical Education (ITE)Singapore as a partner in imparting job centric skill training.

\*\*\*

## **CHAPTER 7: CONCLUSIONS**

In any skill development eco system, industry academia partnership plays a very important role for imparting need-based skills in the most effective manners. However, in many cases, especially in India, very limited association is visible. The industry do provide apprenticeship and industrial training at their own sites under the various schemes of the government and many policies of the industries. The present study is comprehensive in nature to determine the needs of skills, role of government, industry, skill institutions and trainers of the institutions. The study also tried to determine the role of foreign collaborations, scholarship by the government and many other related aspects. The study was carried out with the help of two set of questionnaires, one for students and other for a combined group of trainers, industry executives, government officials and institute administration.

### **7.1 KEY FINDING FROM THE RESEARCH**

The following are the major finding from the research study of industry institutions partnership for skill development:

- a) Nurturing skill oriented training in India is a significant channel for improvising the working conditions of youth or individuals, as well as it can boost the employability of those trainee who are quite vulnerable in terms of skill set.
- b) Expansion of the skill development institutions is essential because of industry requirements of skilled manpower. These institutions mainly prepare the trainees for employment in the formal sector of industry.
- c) The surveys show that the students are very happy with the academic environment and the support provided by the trainers and Principals of the institutions. Institutes have good infrastructure in terms of class room, library and well-maintained workshops. With a score of 4.2 on a 5 point Likert scale the students feel that the future scope of skilled persons in India is highly encouraging.
- d) The students found that trainers are highly helpful in guiding career path (4.45) and also trainers in the institute are very skill full and knowledgeable (4.27 on a 5 Point Likert Scale). Further the students feel that trainers keep on motivating me to complete my training and to develop myself as an all-round personality possessing not only in core skills but also in soft skills and employability skills (4.21).
- e) A model is developed for improving the skills and employability of the students with industrial collaboration. The model suggests that the trainer trainee relationship works out well in the situation of better industry support and the institutes' infrastructure.

Hence the suggestion has been given to the policy makers that industry support with better industry connect in terms of industrial training and placement training is the need of the hours.

- f) It is also noticed that the institutes' infrastructure is not very well equipped as per students' perception. The improvement in infrastructure will lead to better training and skill development opportunities. Indian skills and innovations are not new to the world, glimpse of ancient Indian sculptures; carpentry, weaving, foundry and other crafts are quite evident from the archaeological remains of Ancient Indian history. Therefore, it is recommended that vocational education institutions should enhance the employability skills of students through the career trek implementation in the curriculum and various industrial training lecturers.
- g) Those students who are involved in shaping the future and management of changes in the industry should be introduced to the multifaceted world of vocational education and the practitioners should face the challenges in implementing these basic reforms within their industries and the work place.
- h) Selection of skill development education as first choice should be the key goal of the skill development institutions in India. This goal is influenced by the providing the scholarship to the trainees and Integration of soft skill with trade skills. For this Government policy and incorporation of technology play an important role. The study suggests that placement drive and international collaboration would not be possible without the Industry support and partnership. Similarly, Industry support and partnership) also leads to Industry support in curriculum development, delivery, internship and placements.
- i) The research found four components for our investigation using the factor analysis. The varimax rotation implies that these four structures include a number of variables. The confirmatory factor analysis was used to support our findings, and the results show that obtaining a successful skill-based education for better positions in industry requires four elements, including job opportunity, industry support, institute infrastructure, and trainer-trainee relationships. A latent variable called "job opportunity" has two statements, while "industry support" and "institute infrastructure" both have eleven, and "trainer-trainee relationship" has ten.
- j) A total of 262 valid responses received from trainers, industry executives, government officials and institution administration were analyzed. Out of this 67 percent were male and 33 percent female. Further, the respondents include about 35 % from industry/

- recruiters; 7% from skill councils; 42% trainers and others are from administration etc.
- k) The demand for skilled manpower will increase (4.35 on a 5 point Likert scale) in the coming years due to the economic growth and the focus of the government towards skill development. The respondents also emphasize (4.28) that every undergraduate academic institute should have at least one skill development centre along with their normal academic activities. The response to the question needs to have an industrial production unit in skill development institute is moderate with a score of 3.21.
  - l) Soft skills (like communication, leadership, team work) are the most important skills that make a person employable got a score of 4.34, indicating the industry needs these skills along with the trade skills. Also needed are Vocational skills (4.17) to make a person suitably employed at entry level and Professional skills like decision making, problem solving (4.05) are the most important skills for good career path of an employee.
  - m) A properly run skill development centre with industrial association will lead to enhance the employability of skilled manpower got a score of 4.25 on a 5 point Likert scale. The skill centre with industry association will lead to create an atmosphere of excellence (4.21) thereby leading to more motivated candidates available to industry for recruitment (4.13). One of the important issue with skill development is that the students don't consider this as a first choice. A properly run skill development centre with industrial association will lead to encouragement to student to opt skill courses as first choice. The respondents feel that industry collaborated skill centres will develop the human resource which will help in reducing the manufacturing cost.
  - n) Collaboration with globally renowned skill development institutions/accreditation agencies will help Certification by international bodies/institutions (4.34) is the most important benefit of international collaborations. It will also help in the implementation of best practices of training (4.12).
  - o) Through ranking method, the study tried to explore various dimensions of skill development where industry would like to contribute. It is very interesting to observe that the recruiters and industry executives have identified the dimension of providing scholarship as the dimension of highest contribution. The trainers gave highest rank to the on-the-job training, whereas the local administration and government feel that development of instructional material is the most important dimension with highest contribution.
  - p) Through the factor analysis of the industry executive responses, eight constructs for the

study are identified. The results reveal that to develop excellent skill centres, alongwith industry support, variable such as global connect, Institutes Infrastructure, financial benefits received by government, Quality of training, Campus Environment, Funds received as CSR and Quality education to bring efficiency to skill development are also very important.

- q) MICMAC Analysis classifies the enablers into four different categories based on the driving power and the dependence. The finding suggests that there is no autonomous enabler and all the other enablers are either linkage or dependent enablers and impacting the drivers on one way or the others.

## **7.2 Practical Implications of the study**

- The study identifies the perspective of the students which will help the institutions to make necessary improvements in their curriculum and training so as to make them employment ready.
- The study also found that the industry academia partnership act a mediating factor in developing good skill development institutions. In NCT Delhi as well as Government of India has worked in this direction to partner with the industry and the results are quite impressive.
- Research results can act as a base document in the direction of industrial collaboration in educational institutions particularly for the purpose of skill development.
- A systematic study have positive motivational effect on industries and more industries will come forward to join hands with the training institutions

## **7.3 Limitations of the Study**

- The main focus of the study is on the institutions providing professional courses and technical trades.
- In the study, most of the participants were from the Delhi and NCR.
- Some aspects from the skill development institutions are included in results and discussions, however, a full case study was not carried out in this research.
- Alumni srveys were not carried out to findout their perspective about the strength and weaknesses of the quality of skill development programs and institutions.

- The study also lacks in identifying the futuristic skills required and the roadmap to provide that.

#### **7.4 Scope for Future Work**

- The research may be carried out on similar lines about the courses other than technical trades/programs of skill development.
- A broad based study, covering other states of India may be carried out.
- Case studies of the skill development institutions like World Class Skill Centre and other Government Schemes may be carried out to identify the good practices and the challenges.
- In the broad based study, the perspective of alumni may be included.
- In Indian context, study may be conducted to identify the trades and skills requirements for the next 2-3 decades.

#### **7.5 CONCLUSIONS**

To study the role of industry academia partnership, the research is designed to be a descriptive as well as exploratory in nature. The study has applied good effort in enumerating the key objective of the research through the perspective of faculty and students. The research has made a first of its own kind of effort to draw the understanding of the Role of Strategic Partnership done between Industry and Academia in Skill development with the involvement of all key stakeholders in this domain. The study has gained the perception from the Trainers or Educators; Administrators; Industry Experts; Students or Trainees and Government agencies.

The ISM model developed for enablers and drivers of excellent skill development centres reveals that the Government support in the form of policy and finances is the most important driving force in establishing the skill development activities. In this case both the Govt of NCT and Govt of India provided the much-desired leadership and patronage to the project. The process of change management was crucial due to the inertia and the culture of maintaining status quo is integral part of government institutions. With consistent meeting counselling, brainstorming sessions, presentations at higher level helped in bringing all the stakeholders on board and a good institution framework has been created. It is the commitment of both the governments at center and state level that they planned for international collaboration and selected Institute of Technical Education (ITE) Singapore as a partner in imparting job centric skill training.



The requirements of business and the objectives of academia appear to differ greatly from one another. There is a strong belief, at least among academic circles, that the interaction between academia and industry will likely remain confined to developmental activities with little exploratory or research-based content unless technology-driven initiatives find significant support in this nation's industrial sector. The relationship between academia and industry does not seem to be resting on particularly solid basis, as evidenced by the sector's little or nonexistent awareness of demands for research-intensive needs and the academic community's minimal interest in solely development-related activities. Furthermore, it appears that the two have fundamentally different perspectives on how technological development should be accomplished.

Technology development in academia consists of idea, execution, and laboratory validation. This stage of technological development, when laboratory prototypes are scaled up and transformed into commercially viable products/processes, should truly be the emphasis of industrial R & D in the nation. The academic community does not seem to be properly prepared towards this type of effort, at least not at this time, to transform a laboratory-proven notion into a workable technology.

In conclusion, fostering skill-oriented training in India necessitates a partnership between the public and commercial sectors, as well as academic institutions and people. India can make sure its workforce is prepared to meet the needs of the modern job market and contribute to the progress and prosperity of the entire nation by encouraging and offering chances for skill development.

\*\*\*

# Bibliography

- AACSB, 1997. A Report of The AACSB Faculty Leadership Task Force. American Assembly of Collegiate School of Business, St. Louis, MO
- Agarwal, P. (2007). Higher education in India: Growth, concerns and change agenda. *Higher Education Quarterly*, 61(2), 197-207.
- Ahmad, S. Z., & Buchanan, F. R. (2016). Choices of destination for transnational higher education: “pull” factors in an Asia Pacific market. *Educational Studies*, 42(2), 163-180.
- Akoojee, S., Gewer, A., & McGrath, S. A. (Eds.). (2005). *Skill education and training in Southern Africa: A comparative study*. HSRC Press.
- Alashloo, F. R., Castka, P., & Sharp, J. M. (2005). Towards understanding the impeder of strategy implementation in higher education (HE): A case of HE institutes in Iran. *Quality assurance in education*.
- Ali, Z. (2008). Interaction between industry and higher education institutions, Engineering Universities in Particular. In 2nd Conference on Planning and Development of Education and Scientific Research in the Arab States, 2, 1003-1010.
- Allen Consulting Group 2004, Development of a strategy to support the universal recognition and recording of employability skills: a skills portfolio approach, Department of Education, Science and Training, Canberra.
- Allen, M., Mabry, E., Mattrey, M., Bourhis, J., Titsworth, S., & Burrell, N. (2004). Evaluating the effectiveness of distance learning: A comparison using meta-analysis. *Journal of communication*, 54(3), 402-420.
- Alves, H., & Raposo, M. (2007). Conceptual model of student satisfaction in higher education. *Total Quality Management*, 18(5), 571-588.
- Argyris, C., Putman, R., & Smith, D. M. (1985). *Action science* (Vol. 13). Jossey-bass.
- Arnold, R. and Lipsmeier, A. (eds.) (1995). *Handbuch der Berufsbildung*. Opladen: Leske + Budrich
- Arnot, M., Jeffery, R., Casely-Hayford, L., & Noronha, C. (2012). *Schooling and domestic*

transitions: shifting gender relations and female agency in rural Ghana and India. *Comparative education*, 48(2), 181-194.

- Arvasi, Z., & Porter, T. (1996). Simplicial and crossed resolutions of commutative algebras. *Journal of Algebra*, 181(2), 426-448.
- Attwell, G. (1997). New roles for Skill education and training teachers and trainers in Europe: a new framework for their education. *Journal of European Industrial Training*.
- Azam, M., & Brauchle, P. (2003). A study of supervisor and employee perceptions of work attitudes in information age manufacturing industries. *Journal of Skill Education Research*, 28(3), 185-215.
- Badawy, M. K. (1995). *Developing managerial skills in engineers and scientists: Succeeding as a technical manager*. John Wiley & Sons.
- Banker, D. V., & Bhal, K. T. (2020). Creating world class universities: Roles and responsibilities for academic leaders in India. *Educational Management Administration & Leadership*, 48(3), 570-590.
- Bath, D., Smith\*, C., Stein, S., & Swann, R. (2004). Beyond mapping and embedding graduate attributes: bringing together quality assurance and action learning to create a validated and living curriculum. *Higher Education Research & Development*, 23(3), 313-328.
- Benavot, A. (1983). The rise and decline of Skill education. *Sociology of education*, 63-76.
- Beverly, S. G., & Clancy, M. (2001). *Financial Education in a Children and Youth Savings Account Policy Demonstration: Issues and Options*.
- Bhadwal, S. C., & Panda, P. K. (1991). The effect of a package of some curricular strategies on the study habits of rural primary school students: a year long study. *Educational Studies*, 17(3), 261-271.
- Bilen, C. (2010). Total quality management in higher education institutions: challenges and future directions. *International Journal of Productivity and Quality Management*, 5(4), 473-492.

- Billett, S. (1999). Guided Learning at Work. *Understanding Learning at Work*, Boud D., Garrick J.
- Bland, C. J., Taylor, A. L., Shollen, S. L., Weber-Main, A. M., & Mulcahy, P. A. (2009). Faculty success through mentoring: A guide for mentors, mentees, and leaders. *R&L Education*.
- Boahin, P., & Hofman, A. (2013). A disciplinary perspective of competency-based training on the acquisition of employability skills. *Journal of Skill Education & Training*, 65(3), 385-401.
- Breier, M., & Erasmus, J. (2009). Skills shortages in South Africa. Case study of key professions. HSRC. Cape Town: South Africa.
- Burgunder, L.B., 1995. *Legal Aspects of Managing Technology*. South-Western Publishing, Cincinnati, OH. Business Week, 1988. B-schools are failing U.S. Business Week, 1988 November 28, 90.
- Bynner, J. (2001). Childhood risks and protective factors in social exclusion. *Children & Society*, 15(5), 285-301.
- Carnoy, M. (ed.) (1994). *Economics of Education: Research and Studies*. Oxford: Pergamon Press.
- Cerny, P. G. (1990). *The changing architecture of politics: Structure, agency and the future of the state*. Sage.
- Cheng, Y. C., & Tam, W. M. (1997). Multi-models of quality in education. *Quality assurance in Education*.
- Chisholm, L., & Steiner-Khamsi, G. (2009). *South-south cooperation in education and development*. HSRC Press.
- Çınar, H., Döngel, N., & Söğütü, C. (2009). A case study of technical and Skill education in Turkey. *Procedia-Social and Behavioral Sciences*, 1(1), 160-167.
- Cochran, W. G. (1977). The estimation of sample size. *Sampling techniques*, 3, 72-90.
- Cotton, J. L., O'neill, B. S., & Griffin, A. (2008). The “name game”: Affective and hiring

reactions to first names. *Journal of Managerial Psychology*.

- Cranmer, S. (2006). Enhancing graduate employability: best intentions and mixed outcomes. *Studies in Higher Education*, 31(2), 169-184.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, 16(3), 297-334.
- Crossley, J. C., Jamieson, L. M., & Brayley, R. E. (2007). *Introduction to commercial recreation and tourism: An entrepreneurial approach* (5th ed.). Champaign, IL: Sagamore.
- Crossley, M., & Holmes, K. (2001). Challenges for educational research: International development, partnerships and capacity building in small states. *Oxford Review of Education*, 27(3), 395-409.
- Crossley, M., & Watson, K. (2003). *Comparative and international research in education: Globalisation, context and difference*. Routledge.
- Cudeck, R., & Browne, M. W. (1983). Cross-validation of covariance structures. *Multivariate Behavioral Research*, 18(2), 147-167.
- Danziger, S., & Ratner, D. (2010). Labor market outcomes and the transition to adulthood. *The Future of Children*, 133-158.
- Dean, B., Sykes, C., & Turbill, J. (2012). 'So, what did you do?' A performative, practice-based approach to examining informal learning in WIL. In *Proceedings of 9th International Conference on Cooperative and Work-Integrated Education* (pp. 1-13). Istanbul, Turkey: World Association for Cooperative Education, Bahcesehir University.
- Debnath, R. M., & Shankar, R. (2012). Improving service quality in technical education: use of interpretive structural modeling. *Quality Assurance in Education*.
- DEST. (2002). *Employability skills for the future*. Retrieved 30 August, 2011 from [http://www.dest.gov.au/archive/ty/publications/employability\\_skills/final\\_report.pdf](http://www.dest.gov.au/archive/ty/publications/employability_skills/final_report.pdf)
- Doherty, G. D. (2008). On quality in education. *Quality assurance in Education*.
- Donald, M. N. (1960). Implications of nonresponse for the interpretation of mail questionnaire data. *Public Opinion Quarterly*, 24(1), 99-114.

- Dunne, E., & Rawlins, M. (2000). Bridging the gap between industry and higher education: Training academics to promote student teamwork. *Innovations in Education and Training international*, 37(4), 361-371.
- Eckersley, R. (1998). Redefining progress: Shaping the future to human needs. *Family Matters*, 51(6).
- Eichhorst, W., Rodríguez-Planas, N., Schmidl, R., & Zimmermann, K. F. (2012). A roadmap to Skill education and training systems around the world.
- Epskamp, S. (2017). *semPlot: Path Diagrams and Visual Analysis of Various SEM Packages' Output*. [R package]. Retrieved from <https://cran.r-project.org/package=semPlot>.
- Erasmus, J., & Breier, M. (2015). Skills shortages in South Africa: Case studies of key professions.
- Erling, E. J., Adinolfi, L., Hultgren, A. K., Buckler, A., & Mukorera, M. (2016). Medium of instruction policies in Ghanaian and Indian primary schools: an overview of key issues and recommendations. *Comparative Education*, 52(3), 294-310.
- Esque, T. J., & Gilbert, T. F. (1995). Making Competencies Pay Off. *Training*, 32(1), 44.
- Feast, V. (2001). Student perceptions of the importance and value of a Graduate Quality framework in a tertiary environment (Doctoral dissertation, Flinders University).
- Feldman, A., & Weiss, T. (2010). Understanding change in teachers' ways of being through collaborative action research: A cultural-historical activity theory analysis. *Educational action research*, 18(1), 29-55.
- Fischer, F. (1990). State financing of higher education. A new look at an old problem. *Change*, 22, 42-56
- Fleming, I. E., & Steen, L. E. (2012). *Supervision and clinical psychology: Theory, practice and perspectives*. Routledge/Taylor & Francis Group.
- Gallucci, M. (2020). *jAMM: jamovi Advanced Mediation Models*. [jamovi module]. Retrieved from <https://jamovi-amm.github.io/>.
- Gambhir, V., Wadhwa, N. C., & Grover, S. (2013). Interpretive structural modelling of

enablers of quality technical education: an Indian perspective. *International Journal of Productivity and Quality Management*, 12(4), 393-409.

- Gersie, A., & King, N. (1990). *Storymaking in education and therapy*. Stockholm Institute of Education Press.
- Gill, I. S., Dar, A., & Fluitman, F. (1999). Constraints and innovation in reforming national training systems—Cross-country comparisons. *International Journal of Manpower*.
- Glakas, N. J. (2003). *Trends Policies and Issues*, National Council of Higher Education Loan Programmes, Sarasota.
- Glenn, M. (2008). The future of higher education: How technology will shape learning (pp. 1-27). The New Media Consortium.
- Grant, D., Mergen, E., & Widrick, S. (2002). Quality management in US higher education. *Total Quality Management*, 13(2), 207-215.
- Grao, J. and Mora, J.-G. (eds.) (2000). “Education: Recent Points of View of the Economists.” *European Journal of Education*, Vol. 35, No. 1
- Green, D. (1994). *What Is Quality in Higher Education?*. Taylor & Francis, 1900 Frost Road, Bristol, PA 19007-1598.
- Greenan, K., Humphreys, P., & McIlveen, H. (1997). Developing Work-based Transferable Skills for Mature Students. *Journal of Further and Higher Education*, 21(2), 193-204.
- Griswold, C., & Marine, G. (1996). Political influence on state tuition-aid policy: Higher tuition/higher aid and the real world. *Review of Higher Education*, 19, 361-389.
- Gumport, P. J. (2001). Restructuring: Imperatives and opportunities for academic leaders. *Innovative Higher Education*, 25(4), 239-251.
- Gutman, L. M., & Schoon, I. (2012). Correlates and consequences of uncertainty in career aspirations: Gender differences among adolescents in England. *Journal of Skill behavior*, 80(3), 608-618.
- Hadi, M. Y. A., Hassan, R., Razzaq, A. R. A., & Mustafa, M. Z. (2015). Application of thinking skills in career: A Survey on Technical and Skill Education Training (TVET)

qualification semi-professional job duties. *Procedia-Social and Behavioral Sciences*, 211, 1163-1170.

- Hagburg, E. C. (1968). Validity of questionnaire data: Reported and observed attendance in an adult education program. *The Public Opinion Quarterly*, 32(3), 453-456.
- Hair Jr, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2005). *Multivariate Data Analysis*, Second Indian Reprint.
- Hannum, E., Liu, R., & Alvarado-Urbina, A. (2017). Evolving approaches to the study of childhood poverty and education. *Comparative Education*, 53(1), 81-114.
- Hansen, W., & Weisbrod, B. (1969). The distribution of costs and direct benefits of public higher education: the case of California. *Journal of Human Resources*, 4, 176-191
- Harms, N. C., & Yager, R. E. (1980). *What Research Says to the Science Teacher*, Volume 3. Science Education Information Report.
- Harris, R., Simons, M., Hill, D., Smith, E., Pearce, R., Blakeley, J., ... & Snewin, D. (2001). *The changing role of staff development for teachers and trainers in Skill education and training*. National Centre for Skill Education Research.
- Harris, R., Sumner, R., & Rainey, L. (2005). *Student Traffic: Two-Way Movement between Skill Education and Training and Higher Education*. National Centre for Skill Education Research Ltd. PO Box 8288, Stational Arcade, Adelaide, SA 5000, Australia.
- Harvey, L. (2003). Student feedback [1]. *Quality in higher education*, 9(1), 3-20.
- Hayes, J. 2002. *Interpersonal Skills at Work*. Hove, UK: Routledge Publishers.
- Hearn, J., & Longanecker, D. (1985). Enrollment effects of alternative postsecondary pricing policies. *Journal of Higher Education*, 56, 485-508
- Hedberg, J., & Harper, B. (1996, January). Interactive educational technologies: Effective design and application in the classroom. In 3rd International Interactive Multimedia Symposium (pp. 160-168).
- Hesketh, B. (2000). *Prevention and development in the workplace*.



- Hoenack, S. (1971). The efficient allocation of subsidies to college students. *The American Economic Review*, 61, 302-311
- Hopper, R. (1977). Language attitudes in the employment interview.
- Hue, M. T. (2010). The challenges of making school guidance culturally responsive: Narratives of pastoral needs of ethnic minority students in Hong Kong secondary schools. *Educational Studies*, 36(4), 357-369.
- Hulley, S. B., Newman, T. B., & Cummings, S. R. (2007). Choosing the study subjects: specification, sampling, and recruitment. *Designing clinical research*, 3, 27-36.
- Irfan.G, Ghori.A.A, and Soma.V.Chetty (2008), TQM Approach in Planning and restructuring of Technical Institutions by way of Corporate Co-operation—The Quality Lever-3.
- James, R.F., & James, M.L. (2004). Teaching career and technical skills in a “mini” business world. *Business Education Forum*, 59(2), 39-41.
- Jarrín, O. F., Pouladi, F. A., & Madigan, E. A. (2019). International priorities for home care education, research, practice, and management: Qualitative content analysis. *Nurse education today*, 73, 83-87.
- Jharkharia, S., & Shankar, R. (2004). IT enablement of supply chains: modeling the enablers. *International Journal of Productivity and Performance Management*.
- Jharkharia, S., & Shankar, R. (2005). IT-enablement of supply chains: understanding the barriers. *Journal of Enterprise Information Management*.
- Johnson, P. O. (1959). Development of the sample survey as a scientific methodology. *The Journal of Experimental Education*, 27(3), 167-176.
- Joseph, M., & Joseph, B. (1997). Service quality in education: a student perspective. *Quality assurance in education*.
- Ju, S., Zhang, D., & Pacha, J. (2012). Employability skills valued by employers as important for entry-level employees with and without disabilities. *Career Development and Transition for Exceptional Individuals*, 35(1), 29-38.

- Kanji, G. K., & Tambi, A. M. A. (1998). Total quality management and higher education in Malaysia.
- Kanji, G. K., Malek, A., & Tambi, B. A. (1999). Total quality management in UK higher education institutions. *Total Quality Management*, 10(1), 129-153.
- Kazilan, F., Hamzah, R., & Bakar, A. R. (2009). Employability skills among the students of technical and Skill training centers in Malaysia. *European Journal of Social Sciences*, 9(1), 147-160.
- Khan, M., Hossain, S., Hasan, M., & Clement, C. K. (2012). Barriers to the introduction of ICT into education in developing countries: The example of Bangladesh. *Online Submission*, 5(2), 61-80.
- Khunyakari, R., Mehrotra, S., Chunawala, S., & Natarajan, C. (2007). Design and technology productions among middle school students: an Indian experience. *International Journal of Technology and Design Education*, 17(1), 5-22.
- Kim, J., Kwon, Y., & Cho, D. (2011). Investigating factors that influence social presence and learning outcomes in distance higher education. *Computers & Education*, 57(2), 1512-1520.
- Klaus, P. 2010. "Communication Breakdown." *California Job Journal* 28:1-9.
- Knemeyer, A. M., & Murphy, P. R. (2002). Logistics internships. *International Journal of Physical Distribution & Logistics Management*.
- Knocke, D., Bohrnstedt, G. W., & Mee, A. P. (1994). *Statistics for social data analysis*.
- Knocke, D., Bohrnstedt, G. W., & Mee, A. P. (1994). *Statistics for social data analysis*.
- Kocaoglu, D.F., 1994. Technology management: educational trends. *IEEE Transactions on Engineering Management* 41 4 , 347–349, November 1994
- Koch, J. V., & Fisher, J. L. (1998). Higher education and total quality management. *Total Quality Management*, 9(8), 659-668.
- Krishnan, I. A., Jan, J. M., & Zainuddin, S. Z. (2019). Investigating the use of stressed words in job interviews amongst Malaysian fresh graduates. *Journal of Language and*

Communication (JLC), 6(2).

- Kuczera, M. (2013). A skills beyond school commentary on Sweden. OECD Reviews of Skill Education and Training. Paris: OECD Publishing. [www.oecd.org/dataoecd/1/1/49709312.pdf](http://www.oecd.org/dataoecd/1/1/49709312.pdf).
- Langdon, D. G., & Marrelli, A. F. (2002). A new model for systematic competency identification. *Performance Improvement*, 41(4), 16-23.
- Lenth, C. (1993). *The tuition dilemma: State policies and practices in pricing public higher education*. Denver, CO: State Higher Education Executive Officers.
- Lerman, R. I. (2013). Are employability skills learned in US youth education and training programs?. *IZA Journal of Labor Policy*, 2(1), 6.
- Lingard, B. V., Knight, J., & Porter, P. (1994). Restructuring Australian schooling: Changing conceptions of top-down and bottom-up reforms. In *School and community relations: Participation, policy, practices* (pp. 81-99). Harcourt Brace & Co.
- Lopez, M. (1996). Tuition vouchers are no guarantee of a good education. *The Chronicle of Higher Education*, September 20. Retrieved on December 2, 2008 from <http://chronicle.com/>
- Maes, J. D., Weldy, T. G., & Icenogle, M. L. (1997). A managerial perspective: Oral communication competency is most important for business students in the workplace. *Journal of Business Communication*, 34, 67-80.
- Maglitta, J. (1994). One on one: Michael Hammer. *Computerworld*, 28(4), 84-86.
- Mahapatra, S. S., & Khan, M. S. (2007). A neural network approach for assessing quality in technical education: an empirical study. *International Journal of Productivity and Quality Management*, 2(3), 287-306.
- Mandal, A., & Deshmukh, S. G. (1994). Vendor selection using interpretive structural modelling (ISM). *International journal of operations & production management*.
- Marrelli, A. F. (1998). An introduction to competency analysis and modeling. *Performance*

Improvement, 37(5), 8-17.

- Marshall, K. (2010). Education for All: where does religion come in?. *Comparative Education*, 46(3), 273-287.
- Martin, J., & Hughes, M. L. (2009). U.S. Patent No. 7,476,217. Washington, DC: U.S. Patent and Trademark Office.
- Maurer, M. (2012). Structural elaboration of technical and Skill education and training systems in developing countries: the cases of Sri Lanka and Bangladesh. *Comparative education*, 48(4), 487-503.
- Mazumdar, A., Datta, S., & Mahapatra, S. S. (2010). Multicriteria decision-making models for the evaluation and appraisal of teachers' performance. *International Journal of Productivity and Quality Management*, 6(2), 213-230.
- McArdle, S., Waters, L., Briscoe, J. P., & Hall, D. T. T. (2007). Employability during unemployment: Adaptability, career identity and human and social capital. *Journal of Skill behavior*, 71(2), 247-264.
- McGee, R., & Keller, J. L. (2007). Identifying future scientists: predicting persistence into research training. *CBE—Life Sciences Education*, 6(4), 316-331.
- McGrath, J. (2003). Abstinence-Only Adolescent Education: Ineffective, Unpopular, and Unconstitutional. *USFL Rev.*, 38, 665.
- McGrath, S., & Akoojee, S. (2009). Skill education and training for sustainability in South Africa: The role of public and private provision. *International Journal of Educational Development*, 29(2), 149-156.
- Meenu, W. and R. W. Kumar. 2009. "Developing Soft Skill in Students." *The International Journal of Learning* 15(12):200.
- Mergen, E., Grant, D., & Widrick, S. M. (2000). Quality management applied to higher education. *Total Quality Management*, 11(3), 345-352.
- Mitchell, G., Skinner, B., & White, J. (2010). Essential soft skills for success in the twenty first century workforce as perceived by business educators. *Delta Pi Epsilon Journal*, 11(1),

43-53.

- Morrison, R. F., & Hall, D. T. (2002). Career adaptability. In D. T. Hall (Ed.), (pp. 205-233). Thousand Oaks, CA: Sage.
- Mulcahy, D. (1996). Performing competencies: Of training protocols and Skill education practices. *Australian and New Zealand Journal of Skill Education Research*, 4(1), 35.
- Mulcahy, D., & James, P. (1999). Evaluating the Contribution of Competency-Based Training. National Centre for Skill Education Research, 252 Kensington Road, Leabrook, South Australia 5068, Australia.
- Müller, W., & Shavit, Y. (1998). The institutional embeddedness of the stratification process: A comparative study of qualifications and occupations in thirteen countries.
- Murphy, D., Campbell, C., & Garavan, T. N. (1999). The Pygmalion effect reconsidered: its implications for education, training and workplace learning. *Journal of European Industrial Training*.
- Mustafa, S. T., & Chiang, D. (2006). Dimensions of quality in higher education: How academic performance affects university students' teacher evaluations. *Journal of American Academy of Business, Cambridge*, 8(1), 294-303.
- Nadiri, H., Kandampully, J., & Hussain, K. (2009). Students' perceptions of service quality in higher education. *Total Quality Management*, 20(5), 523-535.
- Nafukho, F. M. (2004). The market model of financing state universities in Kenya: Some innovative lessons. *African universities in the twenty-first century*, 1, 126-139.
- Nanda, T., & Ahuja, I. P. S. (2003). An insight into low growth of technical education in India. *The Indian Journal of Technical Education*, 26(3), 29-37.
- Natarajan, R. (2000). The role of accreditation in promoting quality assurance of technical education. *International Journal of Engineering Education*, 16(2), 85-96.
- Nealy, C. 2005. "Integrating Soft Skills Through Active Learning in the Management Classroom." *Journal of College Teaching & Learning* 2(4):1-6.
- Nerdrum, L., & Erikson, T. (2001). Intellectual capital: a human capital

perspective. *Journal of intellectual capital*.

- Owlia, M. S., & Aspinwall, E. M. (1996). A framework for the dimensions of quality in higher education. *Quality Assurance in Education*.
- Palepu, A., Carr, P. L., Friedman, R. H., Amos, H., Ash, A. S., & Moskowitz, M. A. (1998). Minority faculty and academic rank in medicine. *Jama*, 280(9), 767-771.
- Peat, M., Taylor, C. E., & Franklin, S. (2005). Re-engineering of undergraduate science curricula to emphasise development of lifelong learning skills. *Innovations in Education and Teaching International*, 42(2), 135-146.
- Perreault, H. 2004. "Business Educators Can Take a Leadership Role in Character Education." *Business Education Forum* 59(1):23-24.
- Perreault, H. E. I. D. I. (2004). Basic business-business educators can take a leadership role in character education. In *Business Education Forum* (Vol. 59, pp. 23-25). National Business Education Association.
- Pfeffer, J., & Jeffrey, P. (1998). *The human equation: Building profits by putting people first*. Harvard Business Press.
- Podsakoff, P. M., MacKenzie, S. B., Bachrach, D. G., & Podsakoff, N. P. (2005). The influence of management journals in the 1980s and 1990s. *Strategic management journal*, 26(5), 473-488.
- Poole, V. A., & Zahn, D. K. (1993). Define and teach employability skills to guarantee student success. *The Clearing House*, 67(1), 55-59.
- Powar, K. B. (2001). *Higher Education for Human Development in the 21 st Century*. Association of Indian Universities, New Delhi.
- Powles, M., & Anderson, D. (1996). Participation and access in TAFE: Social service or economic utility?. *Australian and New Zealand Journal of Skill Education Research*, 4(1), 97.
- Pramod, V. R., Devadasan, S. R., & Raj, V. J. (2010). Quality improvement in engineering education through the synergy of TPM and QFD. *International Journal of Management in*

Education, 4(1), 1-24.

- Prasad, S. (2017). Report of the Committee for Rationalization & Optimization of the Functioning of the Sector Skill Councils. New Delhi: MSDE.
- Pryor, J., Akyeampong, K., Westbrook, J., & Lussier, K. (2012). Rethinking teacher preparation and professional development in Africa: An analysis of the curriculum of teacher education in the teaching of early reading and mathematics. *Curriculum Journal*, 23(4), 409-502.
- Psacharopoulos, G. (ed.) (1987a). *Economics of Education: Research and Studies*. Oxford: Pergamon Press.
- R Core Team (2021). *R: A Language and environment for statistical computing*. (Version 4.1) [Computer software]. Retrieved from <https://cran.r-project.org>. (R packages retrieved from MRAN snapshot 2022-01-01).
- Ragins, B. R., & Kram, K. E. (2007). *The handbook of mentoring at work: Theory, research, and practice*. Sage Publications.
- Rahman, N. A. A., Hussein, N., & Aluwi, A. H. (2015). Satisfaction on blended learning in a public higher education institution: What factors matter?. *Procedia-social and behavioral sciences*, 211, 768-775.
- Ramanan, R. A., Phillips, R. S., Davis, R. B., Silen, W., & Reede, J. Y. (2002). Mentoring in medicine: keys to satisfaction. *The American journal of medicine*, 112(4), 336-341.
- Rasu, M. S., Ismail, M. Y., Ismail, N., Rajuddin, M. R., & Rauf, R. A. A. (2010). Development of employability skills assessment tool for manufacturing industry. *JurnalMekanikal*, 30(1).
- Raybould, J., & Sheedy, V. (2005). Are graduates equipped with the right skills in the employability stakes?. *Industrial and commercial training*.
- Razak, I. A., Latifah Rj, R., Jaafar, N., Hassan Mi, A., & Ab Murat, N. (2008). Assessing the competency of University of Malaya dental graduates: employers' and graduates' perceptions. *Journal of Dental Education*, 72(3), 364-369.

- Reedy, A. K., Fariás, M. L. G., Reyes, L. H., & Pradilla, D. (2020). Improving employability skills through non-placement work-integrated learning in chemical and food engineering: A case study. *Education for Chemical Engineers*, 33, 91-101.
- Revelle, W. (2019). psych: Procedures for Psychological, Psychometric, and Personality Research. [R package]. Retrieved from <https://cran.r-project.org/package=psych>.
- Rhodes, C., & Beneicke, S. (2002). Coaching, mentoring and peer-networking: Challenges for the management of teacher professional development in schools. *Journal of in-service education*, 28(2), 297-310.
- Robinson, J. P. (2000). What are employability skills. *The workplace*, 1(3), 1-3.
- Robinson, V. M., & Robinson, V. M. (1993). Problem-based methodology: Research for the improvement of practice (p. 19). Oxford: Pergamon Press.
- Rosseel, Y. (2019). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, 48(2), 1-36. link.
- Rosseel, Y., et al. (2018). lavaan: Latent Variable Analysis. [R package]. Retrieved from <https://cran.r-project.org/package=lavaan>.
- Sage, A. P. (1977). Methodology for large-scale systems.
- Sahney, S., Banwet, D. K., & Karunes, S. (2004). Conceptualizing total quality management in higher education. *The TQM magazine*.
- Sakthivel, P. B., Rajendran, G., & Raju, R. (2005). TQM implementation and students' satisfaction of academic performance. *The TQM magazine*.
- Sallis, J. F., McKENZIE, T. L., Alcaraz, J. E., Kolody, B., Hovell, M. F., & Nader, P. R. (1993). Project SPARK: Effects of Physical Education on Adiposity in Children a. *Annals of the New York Academy of Sciences*, 699(1), 127-136.
- Sambunjak, D., Straus, S. E., & Marušić, A. (2006). Mentoring in academic medicine: a systematic review. *Jama*, 296(9), 1103-1115.
- Sanghi, A.N. (1996), Promotion of technical entrepreneurship through technical education. *Indian J. of Technical Educ.*, 19, 2, 42-44



- Sanguinetti, J. (1994). Exploring the discourses of our own practice: a case study. *Open Letter: Australian journal for adult literacy research and practice*, 5(1), 31.
- Sapre, P. (2002). Realizing the Potential of Education Management in India. *Educational Management & Administration*, 30(1), 101-108.
- Saunders, V., & Zuzel, K. (2010). Evaluating employability skills: Employer and student perceptions. *Bioscience education*, 15(1), 1-15.
- Savickas, M. L., Nota, L., Rossier, J., Dauwalder, J. P., Duarte, M. E., Guichard, J., ... & Van Vianen, A. E. (2009). Life designing: A paradigm for career construction in the 21st century. *Journal of Skill behavior*, 75(3), 239-250.
- Schaap, H., & de Bruijn, E. (2018). Elements affecting the development of professional learning communities in schools. *Learning environments research*, 21, 109-134.
- Schultz, T. W. (1961). Investment in human capital: reply. *The American Economic Review*, 51(5), 1035-1039.
- SEDDON, T. 1999. A self-managing teaching profession for the learning society. *Unicom*, 25(1): 15–29.
- Sheppard, C., & Ntenga, L. (2014). Funding of the South African Further Education and Training sector for an equitable sharing of national revenue.
- Sherer, M., & Eadie, R. (1987). Employability skills: Key to success. *Thrust*, 17(2), 16-17.
- Sheridan, T. B. (1993). Space teleoperation through time delay: Review and prognosis. *IEEE Transactions on Robotics and Automation*, 9(5), 592-606.
- Silverman, R. J. (1987). How we know what we know: A study of higher education journal articles. *The Review of Higher Education*, 11(1), 39-59.
- Singh, A., Tsai, A. P., Nakamura, M., Watanabe, M., & Kato, A. (2003). Nanoprecipitates of icosahedral phase in quasicrystal-strengthened Mg-Zn-Y alloys. *Philosophical Magazine Letters*, 83(9), 543-551.
- Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal*, 4(1), 15-45.

- Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal*, 4(1), 15-45.
- Singh, M. (2013). Educational practice in India and its foundations in Indian heritage: a synthesis of the East and West?. *Comparative Education*, 49(1), 88-106.
- Smith, A. (2010). *The theory of moral sentiments*. Penguin.
- Smith, G. A. (2007). Place-based education: Breaking through the constraining regularities of public school. *Environmental Education Research*, 13(2), 189-207.
- Smith, L. A. (1997). "Open Education" Revisited: Promise and Problems in American Educational Reform (1967-1976). *Teachers College Record*, 99(2), 371-415.
- Soetaert, K. (2019). *diagram: Functions for Visualising Simple Graphs (Networks), Plotting Flow Diagrams*. [R package]. Retrieved from <https://cran.r-project.org/package=diagram>.
- Sohail, M. S., & Shaikh, N. M. (2004). Quest for excellence in business education: a study of student impressions of service quality. *International Journal of Educational Management*.
- Solow, R. M. (1988). Growth theory and after. *The American Economic Review*, 78(3), 307-317.
- St John, E. P. (1994). *Prices, Productivity, and Investment: Assessing Financial Strategies in Higher Education*. ASHE-ERIC Higher Education Reports. ASHE-ERIC Higher Education Reports, The George Washington University, 1 Dupont Circle, Suite 630, NW, Washington, DC 20036-1183.
- Stahl, G., Björkman, I., Farndale, E., Morris, S. S., Paauwe, J., Stiles, P., ... & Wright, P. (2012). Six principles of effective global talent management. *Sloan Management Review*, 53(2), 25-42.
- Steiner-Khamsi, G. (Ed.). (2004). *The global politics of educational borrowing and lending*. Teachers College Press.
- Stephens, D. (2009). *Qualitative research in international settings: A practical guide*.

Routledge.

- Stewart, D. W. (1981). The application and misapplication of factor analysis in marketing research. *Journal of marketing research*, 18(1), 51-62.
- Storey, J. (1992). *Developments in the management of human resources: an analytical review*. Blackwell.
- Tabbodi, M. L. (2009). Effects of leadership behaviour on the faculty commitment of humanities departments in the University of Mysore, India: Regarding factors of age group, educational qualifications and gender. *Educational Studies*, 35(1), 21-26.
- Takase, M., Nakayoshi, Y., & Teraoka, S. (2012). Graduate nurses' perceptions of mismatches between themselves and their jobs and association with intent to leave employment: A longitudinal survey. *International Journal of Nursing Studies*, 49, 1521-1530.
- Telford, R., & Masson, R. (2005). The congruence of quality values in higher education. *Quality assurance in education*.
- Tessaring, M. (1998). *Training for a Changing Europe: A Report on the Current Skill and Training Research in Europe*. Tessaloniki: CEDEFOP
- Thakkar, J., Deshmukh, S. G., & Shastree, A. (2006). Total quality management (TQM) in self-financed technical institutions. *Quality Assurance in Education*.
- The jamovi project (2022). jamovi. (Version 2.3) [Computer Software]. Retrieved from <https://www.jamovi.org>.
- Thomas, C. (2000). *Global governance, development and human security: the challenge of poverty and inequality*. Pluto.
- Tiwari, A. (2019). The corporal punishment ban in schools: Teachers' attitudes and classroom practices. *Educational Studies*, 45(3), 271-284.
- Tooley, J. (2005). Management of private-aided higher education in Karnataka, India: Lessons from an enduring public-private partnership. *Educational Management Administration & Leadership*, 33(4), 465-486.

- Townsend, B. K., Donaldson, J., & Wilson, T. (2005). Marginal or monumental? Visibility of community colleges in selected higher-education journals. *Community College Journal of Research & Practice*, 29(2), 123-135.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British journal of management*, 14(3), 207-222.
- Trede, F., Macklin, R., & Bridges, D. (2012). Professional identity development: a review of the higher education literature. *Studies in Higher Education*, 37(3), 365-384.
- Trivellas, P., & Dargenidou, D. (2009). Organisational culture, job satisfaction and higher education service quality: The case of Technological Educational Institute of Larissa. *The TQM Journal*, 21(4), 382-399.
- Upadhyay, P., & Paul, M. (2019). The linkage between knowledge management practices and organization based projects for better learning outcome. *International Journal of Educational Management*.
- Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in human behavior*, 72, 577-588.
- Venkataram, P., & Giridharan, A. (2007). Quality assurance and assessment in technical education system: a web based approach. In *International Conference on Engineering Education*.
- Verney, T. P., Holoviak, S. J., & Winter, A. S. (2009). Enhancing the reliability of internship evaluations. *The Journal of Applied Business and Economics*, 9(1), 22.
- Viswanadhan, K. G., Rao, N. J., & Mukhopadhyay, C. (2005). Impact Of Privatization On Engineering Education--A Study Through The Analysis Of Performance Of Self-Financing Engineering Programmes In India. *Journal of Services Research*.
- Lai Wan, H. (2007). Human capital development policies: enhancing employees' satisfaction. *Journal of European industrial training*, 31(4), 297-322.
- Wankhade, D., & Dhokane, P. (2012). Need of Mapping Industry Requirements with the

Academia.

- Wani, S. A., Ahmad, F., Zargar, S. A., Ahmad, Z., Ahmad, P., & Tak, H. (2007). Prevalence of intestinal parasites and associated risk factors among schoolchildren in Srinagar City, Kashmir, India. *Journal of Parasitology*, 93(6), 1541-1543.
- Warfield, J. N. (1976). Implication structures for system interconnection matrices. *IEEE Transactions on Systems, Man, and Cybernetics*, (1), 18-24.
- Waterhouse, P., Wilson, B., & Ewer, P. (1999). The changing nature and patterns of work and implications for VET: Review of research. National Centre for Skill Education Research.
- Webster, F., Pepper, D., & Jenkins, A. (2000). Assessing the undergraduate dissertation. *Assessment & Evaluation in Higher Education*, 25(1), 71-80.
- Whetten, D., K. Cameron, and M. Woods. 2000. *Developing Management Skills for Europe*. Harlow: Pearson Education Limited.
- Wilhelm, W. J. (2004). Determinants of moral reasoning: Academic factors, gender, richness of life experiences, and religious preferences. *Delta Pi Epsilon Journal*, 46(2), 105-123.
- Windham, D. (1976). Social benefits and the subsidization of higher education: A critique. *Higher Education*, 5, 237-252
- World Bank. 2007a. World development indicators 2021 Available online at: <http://www.worldbank.org/data/> (accessed on 1 July 2021)
- Wragg, M. (1969). Recent developments in higher education in India. *Comparative Education*, 5(2), 167-175.
- Young, M., & Guile, D. (1997). New possibilities for the professionalization of UK VET professionals. *Journal of European industrial training*, 21(6/7), 203-212.
- Yusof, H. M., Mustapha, R., Mohamad, S. A. M. S., & Bunian, M. S. (2012). Measurement model of employability skills using confirmatory factor analysis. *Procedia-Social and Behavioral Sciences*, 56, 348-356.

- Zaharim, A., Ahmad, I., Yusoff, Y. M., Omar, M. Z., & Basri, H. (2012). Evaluating the soft skills performed by applicants of Malaysian engineers. *Procedia-social and behavioral sciences*, 60, 522-528.
- Zhang, G., Zeller, N., Griffith, R., Metcalf, D., Williams, J., Shea, C., & Misulis, K. (2011). Using the context, input, process, and product evaluation model (CIPP) as a comprehensive framework to guide the planning, implementation, and assessment of service-learning programs. *Journal of Higher Education Outreach and Engagement*, 15(4), 57-84.

\*\*\*

# Annexure 1

<b>Abbreviations used for statements in Chapter 4</b>	
<b>No.</b>	<b>Statement</b>
S1.	I find the training offered in the institute to be very practical and relevant
S2.	I am enjoying my training in the institute
S3.	Trainers in my institute are very skilful, knowledgeable and well trained as per the present day industrial standards
S4.	My trainers keep on motivating me to complete my training and to develop myself as an all round personality possessing not only in core skills but also in soft skills and employability skills
	S4a. My trainers have been guiding appropriate career path during my training institute
	S4b. My trainers have been my role models
S5.	In my institute many training programmes and guest lectures are organised in collaboration with industry partners which enhance my knowledge
S6.	Principal in my institute has been a role model for the students
S7.	My principal has been highly enthusiastic to provide industry relevant skills to the students
S8.	Partnership with various agencies that provide soft skills training and employability skills is really beneficial for my growth
S9.	Presence of trainers from the industry in the institute makes learning more useful for suitable employment
S10.	Industrial internship has widened my horizon
S11.	My Institute has very good class rooms which make study more interesting
S12.	I perform my practical training in very well maintained workshops that have all the latest tools and equipment
S13.	I find all the staff members in my institute, i.e., C.Is, G.Is and non technical staff to be very cooperative, skilful and trained
S14.	There is a very good library in my institute
S15.	Ambience of my institute is very good that motivates all trainees and we are proud of it
S16.	The curriculum followed in my institute is industry relevant
S17.	I find latest technologies are used in my institute's workshops and labs due to industry collaboration
S18.	I find opportunities of personality development while pursuing the training programme at in their institute as it is a part of the curriculum
S19.	I get opportunities to enhance my communication skills
S20.	The training programme I am undergoing in my institute helps me in understanding business environment
S21.	I feel at the time of completion of my course I will be having complete set of skills that will make me job ready
S22.	I have learnt leadership skills while my stay in the institute
S23.	I got enough opportunities to visit industries of my trade while my training in the institute
S24.	Many industrial trainers visited my institute during training and that provided opportunities for regular interaction with the industry
S25.	Internship offered unique opportunity to learn in real world circumstances
S26.	Training at the institute has up graded me to be an internationally accepted skilled

	person.
S27.	If given an opportunity, I would like to accept a global opportunity for employment
S28.	In my opinion future scope of skilled persons in India is highly encouraging
S29.	I feel industries may fund for up gradation of training institutes
S30.	Providing equipment for training is the responsibility of industry
S31.	Inviting resource persons from industry helps not only in building better relationships but also prepare trainees for future job roles
S32.	I feel trainers should be often trained by the industry in real industrial circumstances
S33.	If industries partners with the institutes capacity building of the institutes may take place
S34.	Industrial partnership with the institute has resulted in very good placements for the students
S35.	I would prefer to join a training programme which open an avenue of earn and learn so that, I may receive stipend to sustain myself and my family
S36.	Industries should come forward to enrol trainees under apprenticeship scheme
S37.	Government should offer stipend to the trainees of skill development programmes to keep them motivated and sustain their families



## Annexure 2

<b>Abbreviations used for statements in Chapter 5</b>	
<b>S. No</b>	<b>Statements for Trainer</b>
T1	The demand of skilled manpower will increase in the coming years in India.
T2	The present efforts of skill development in India are sufficient to meet the future needs of skilled manpower.
T3	The institutions are sufficiently equipped to train the students for skills desired by the industry.
T4	Industry is providing the necessary support to the academic institutions in developing the skills relevant to the industry.
T5	Institutions need to create an environment conducive to receive support from industry.
T6	Skill Development is primarily a responsibility of Government.
T7	Trained manpower may effectively improve by collective efforts of industry and skill development institutes.
T8	Soft skills (like communication, leadership, team work) are the most important skills that make a person employable.
T9	Indian centres are in a better position than global institutions in achieving benchmark standards
T10	Industry associations may provide information about future job roles and their prospective demand so that training in the institutes may be planned accordingly
T11	Industry associations should regularly conduct placement drives to help in placements of graduates of skill centres
T12	Industries may take up the initiative of certifying skilled manpower under RPL (recognition of prior learning)
T13	Every undergraduate academic institute should have at least one skill development centre along with their normal academic activities.
T14	Professional skills (like decision making, problem solving) are the most important skills for good career path of an employee
T15	Having an industrial production unit in skill development institute will not help much in Indian institutes.
T16	There should be regulation for industry to actively participate in skill development
T17	Pro-activeness of industry association towards budget allocation, corporate strategy will not be suitable in Indian circumstances
T18	Training centres in the industry should be linked to the skill universities for developing vertical pathways for skilled workers
T19	Skill Development is a collective responsibility of industry and governments.
T20	Skill skills are the most important skills that make a person suitably employed at entry level
T21	Regulating bodies may authorise institutes to certify skilled manpower under RPL (recognition of prior learning)
T22	Industries, collectively should set up standards for quality job trainings
T23	Industry may develop assessment standards and help in practical jobs assessment to make the training relevant as per job market
T24	On the job training of trainees in industries will be rather more helpful than institutional training in developing skill proficiency

T25	If the job roles are provided/suggested by the industries, it will lead to highly employable skilled manpower.
T26	Offering scholarships will encourage bright students to join skill development programme
T27_a_	Allocations of funds for skill development under corporate social responsibility Is a good solution
T27_b	Allocations of funds for skill development under corporate social responsibility Is just a formality
T27_c	Allocations of funds for skill development under corporate social responsibility Will not be fruitful in long run
T28_a	A properly run skill development centre with industrial association will lead to Encouragement to student to opt skill courses as first choice
T28_b	A properly run skill development centre with industrial association will lead to Availability of skilled workforce that can be directly hired through campus placement
T28_c	A properly run skill development centre with industrial association will lead to Reduced training cost on the fresh appointees
T28_d	A properly run skill development centre with industrial association will lead to More motivated candidates available to industry for recruitment
T28_e	A properly run skill development centre with industrial association will lead to Safer work environment
T_28_f	A properly run skill development centre with industrial association will lead to Reduced cost of manufacturing/services
T28_g	A properly run skill development centre with industrial association will lead to Better quality of finished products/services
T28_h	A properly run skill development centre with industrial association will lead to Reduced wastage
T28_i	A properly run skill development centre with industrial association will lead to Enhance the employability of skilled manpower
T28_j	A properly run skill development centre with industrial association will lead to Help in getting higher pay package by the trainees
T28_k	A properly run skill development centre with industrial association will lead to Create an atmosphere of excellence
T28_l	A properly run skill development centre with industrial association will lead to Any others
T29_a	Collaboration with globally renowned skill development institutions/accreditation agencies will help In achieving international standards and benchmarks
T29_b	Collaboration with globally renowned skill development institutions/accreditation agencies will help In getting the students placed abroad
T29_c	Collaboration with globally renowned skill development institutions/accreditation agencies will help Improve credibility of the institutes
T29_d_	Collaboration with globally renowned skill development institutions/accreditation agencies will help Implementation of best practices of training
T29_e	Collaboration with globally renowned skill development institutions/accreditation agencies will help Certification by international bodies/institutes

## Annexure 3

Esteemed participant,

I have undertaken the Doctoral Research Project on the topic '**Role of Strategic Partnership of Industry- Academia in Skill Development**' under the guidance of Professor S.K. Garg, Pro Vice-Chancellor, Delhi Technological University, Delhi. One of the objectives of the study is to understand the perspective of various stakeholders on the advantages and policy requirements for skill development in India.

The success of the study would depend upon your cooperation in the completion of the questionnaire. Your participation in the present study will not only help in framing a conceptual model to utilize the full potential of available resources but will also help in reaping the benefit of democratic dividend.

The samples and data that are collected through the present survey will only be used in accordance with the purpose of the study as described above. All the data and samples will be processed confidentially without disclosing identity of any individual participant.

Thanking you and hoping for a genuine response in the enclosed questionnaire,

Yours sincerely,

(Manoj Kumar)

### **Role of Strategic Partnership of Industry- Academia in Skill Development**

Please give your opinion on the following statements on a scale of 5, where 5 represents strongly agree; 4 agree; 3 neutral; 2 disagree and 1 strongly disagree.

<b>S. No</b>	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.	The demand of skilled manpower will increase in the coming years in India.					
2.	The present efforts of skill development in India are sufficient to meet the future needs of skilled manpower.					
3.	The institutions are sufficiently equipped to train the students for skills desired by the industry.					
4.	Industry is providing the necessary support to the academic institutions in developing the skills relevant to the industry.					
5.	Institutions need to create an environment conducive to receive support from industry.					
6.	Skill Development is primarily a responsibility of Government.					
7.	Trained manpower may effectively improve by collective efforts of industry and skill development institutes.					
8.	Soft skills (like communication, leadership, team work) are the most important skills that make a person employable.					
9.	Indian centres are in a better position than global institutions in achieving benchmark standards					
10.	Industry associations may provide information about future job roles and their prospective demand so that training in the institutes may be planned accordingly					
11.	Industry associations should regularly conduct placement drives to help in placements of graduates of skill centres					
12.	Industries may take up the initiative of certifying skilled manpower under RPL (recognition of prior learning)					

13.	Every undergraduate academic institute should have at least one skill development centre along with their normal academic activities.				
14.	Professional skills (like decision making, problem solving) are the most important skills for good career path of an employee				
15.	Having an industrial production unit in skill development institute will not help much in Indian institutes.				
16.	There should be regulation for industry to actively participate in skill development				
17.	Pro-activeness of industry association towards budget allocation, corporate strategy will not be suitable in Indian circumstances				
18.	Training centres in the industry should be linked to the skill universities for developing vertical pathways for skilled workers				
19.	Skill Development is a collective responsibility of industry and governments.				
20.	Skill skills are the most important skills that make a person suitably employed at entry level				
21.	Regulating bodies may authorise institutes to certify skilled manpower under RPL (recognition of prior learning)				
22.	Industries, collectively should set up standards for quality job trainings				
23.	Industry may develop assessment standards and help in practical jobs assessment to make the training relevant as per job market				
24.	the job training of trainees in industries will be rather more helpful than institutional training in developing skill proficiency				
25.	the job roles are provided/suggested by the industries, it will lead to highly employable skilled manpower.				

26.	Offering scholarships will encourage bright students to join skill development programme					
27.	Allocations of funds for skill development under corporate social responsibility					
	a) Is a good solution					
	b) Is just a formality					
	c) Will not be fruitful in long run					
28.	A properly run skill development centre with industrial association will lead to :					
	a. Encouragement to student to opt skill courses as first choice					
	b. Availability of skilled workforce that can be directly hired through campus placement					
	c. Reduced training cost on the fresh appointees					
	d. More motivated candidates available to industry for recruitment					
	e. Safer work environment					
	f. Reduced cost of manufacturing/services					
	g. Better quality of finished products/services					
	h. Reduced wastage					
	i. Enhance the employability of skilled manpower					
	j. Help in getting higher pay package by the trainees					
	k. Create an atmosphere of excellence					
	l. Any others					
29.	Collaboration with globally renowned skill development institutions/accreditation agencies will help:					
	a. In achieving international standards and benchmarks					
	b. In getting the students placed abroad					
	c. Improve credibility of the institutes					
	d. Implementation of best practices of training					
	e. Certification by international bodies/institutes					

30.	Various dimensions of skill development where industry would like to contribute are:- (Rank 1 – 10) Rank 1 for highest contribution and 10 for least contribution				
	i.	Curriculum development			
	ii.	Development of instructional material			
	iii.	Training of the trainers			
	iv.	Guest Lectures for the trainees			
	v.	On the job training of trainees			
	vi.	Training youth with skill proficiency and competency through internship programmes			
	vii.	Offering scholarships to the bright and needy students			
	viii.	Capacity building of the skill training institute			
	ix.	Development of appropriate infrastructure in skill development institutes			
	x.	Any other, please specify			

**Background Information**

1. Age Group      25-34      35-44      45-54       55 & Above

2. Gender                      Male                      Female

3. Highest Academic Degree       Graduate       Post-Graduate      Ph.D.

Any other (pl. specify) \_\_\_\_\_

4. Present Designation: \_\_\_\_\_

5. Organization: \_\_\_\_\_

6. Experience (in years)      0-5                      6-10                      11-20

20 and above

7. You can be best described as:

Recruiter/ Industry Executive      Trainer                      Member Skill Council

Professor                      Policy Planner                      Head/Executive of Skill Centre

Any other \_\_\_\_\_

In case you are a trainer, would you like to continue in the same profession : Yes/No

In case you are not a trainer, would you like to join as a trainer : Yes/No

(Optional)

Name : \_\_\_\_\_

Contact No. (Phone/e-mail) : \_\_\_\_\_

Address Office : \_\_\_\_\_



## Annexure 4

Esteemed participant,

I have undertaken the Doctoral Research Project on the topic '**Role of Strategic Partnership of Industry- Academia in Skill Development**' under the guidance of Professor S.K. Garg, Pro Vice-Chancellor, Delhi Technological University, Delhi. One of the objectives of the study is to understand the perspective of various stakeholders on the advantages and policy requirements for skill development in India.

The success of the study would depend upon your cooperation in the completion of the questionnaire. Your participation in the present study will not only help in framing a conceptual model to utilize the full potential of available resources but will also help in reaping the benefit of democratic dividend.

The samples and data that are collected through the present survey will only be used in accordance with the purpose of the study as described above. All the data and samples will be processed confidentially without disclosing identity of any individual participant.

Thanking you and hoping for a genuine response in the enclosed questionnaire,

Yours sincerely,

(Manoj Kumar)

## Role of Strategic Partnership of Industry- Academia in Skill Development

Please give your opinion on the following statements on a scale of 5, where 5 represents strongly agree; 4 agree; 3 neutral; 2 disagree and 1 strongly disagree.

S. No.	Statement	1	2	3	4	5
1.	I find the training offered in the institute to be very practical and relevant					
2.	I am enjoying my training in the institute					
3.	Trainers in my institute are very skilful, knowledgeable and well trained as per the present day industrial standards					
4.	My trainers keep on motivating me to complete my training and to develop myself as an all round personality possessing not only in core skills but also in soft skills and employability skills:					
	a. My trainers have been guiding appropriate career path during my training institute					
	b. My trainers have been my role models					
5.	In my institute many training programmes and guest lectures are organised in collaboration with industry partners which enhance my knowledge					
6.	Principal in my institute has been a role model for the students					
7.	My principal has been highly enthusiastic to provide industry relevant skills to the students					
8.	Partnership with various agencies that provide soft skills training and employability skills is really beneficial for my growth					
9.	Presence of trainers from the industry in the institute makes learning more useful for suitable employment					
10.	Industrial internship has widened my horizon					
11.	My Institute has very good class rooms which make study more interesting					

12.	I perform my practical training in very well maintained workshops that have all the latest tools and equipment					
13.	I find all the staff members in my institute, i.e., C.Is, G.Is and non technical staff to be very cooperative, skilful and trained					
14.	There is a very good library in my institute					
15.	Ambience of my institute is very good that motivates all trainees and we are proud of it					
16.	The curriculum followed in my institute is industry relevant					
17.	I find latest technologies are used in my institute's workshops and labs due to industry collaboration					
18.	I find opportunities of personality development while pursuing the training programme at in their institute as it is a part of the curriculum					
19.	I get opportunities to enhance my communication skills					
20.	The training programme I am undergoing in my institute helps me in understanding business environment					
21.	I feel at the time of completion of my course I will be having complete set of skills that will make me job ready					
<b>S. No.</b>	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
22.	I have learnt leadership skills while my stay in the institute					
23.	I got enough opportunities to visit industries of my trade while my training in the institute					
24.	Many industrial trainers visited my institute during training and that provided opportunities for regular interaction with the industry					
25.	Internship offered unique opportunity to learn in real world circumstances					
26.	Training at the institute has up graded me to be an internationally accepted skilled person.					
27.	If given an opportunity, I would like to accept a global opportunity for employment					

28.	In my opinion future scope of skilled persons in India is highly encouraging					
29.	I feel industries may fund for up gradation of training institutes					
30.	Providing equipment for training is the responsibility of industry					
31.	Inviting resource persons from industry helps not only in building better relationships but also prepare trainees for future job roles					
32.	I feel trainers should be often trained by the industry in real industrial circumstances					
33.	If industries partners with the institutes capacity building of the institutes may take place					
34.	Industrial partnership with the institute has resulted in very good placements for the students					
35.	I would prefer to join a training programme which open an avenue of earn and learn so that, I may receive stipend to sustain myself and my family					
36.	Industries should come forward to enrol trainees under apprenticeship scheme					
37.	Government should offer stipend to the trainees of skill development programmes to keep them motivated and sustain their families					

## PART B

1. I joined ITI course after my education up to
  - a. 8<sup>th</sup> class
  - b. 10<sup>th</sup> class
  - c. 12<sup>th</sup> class (if yes, mention your stream \_\_\_\_\_)
  - d. Graduation
  - e. Any other, please specify

2. I could not continue my studies because
  - a. My family could not support me financially
  - b. I did not like to study
  - c. I wanted to undergo a job oriented course
  - d. All above
  - e. Any other
  
3. I joined ITI course because I wanted to get a good employment. My choice from the given sectors – Govt. Sector, Public Sector, Private Sector, to be a part of my family business or to start my own business is as following:  
  
1<sup>st</sup> choice-\_\_\_\_\_
- 2<sup>nd</sup> choice-\_\_\_\_\_
- 3<sup>rd</sup> choice-\_\_\_\_\_
- 4<sup>th</sup> choice-\_\_\_\_\_
- 5<sup>th</sup> choice-\_\_\_\_\_
- Any other \_\_\_\_\_
  
4. After completing this programme I expect to get pay package: -
  - a. Around minimum wages fixed by govt.
  - b. Less than 15,000
  - c. 15,000 to 20,000
  - d. 20,000 to 25,000
  - e. More than 25,000
  - f. Any other
  
5. After completing this programme I expect to enter into a job profile of
  - a. A shop floor employee
  - b. Executive
  - c. Marketing Executive
  - d. Service Executive
  - e. Liaison officer

- f. Any other
6. After school education what is your first preference
- a. Graduation
  - b. Job
  - c. Short skill training
  - d. Diploma
  - e. ITI
7. What is your strength
- a. A. Good in study
  - b. Good stamina
  - c. Artistic and creative
  - d. Good communication
  - e. Hard working
8. In your case, what is the motivation for getting skill training
- a. Govt publicity
  - b. High job opportunity
  - c. Lack of money for higher education
  - d. Need to support family
  - e. No interest in study
  - f. Aptitude for creativity and craftsmanship
9. Do you understand the meaning of various terminology
10. What types of skill you want to acquire/you have acquired in skill centre/ITI
- a. Trade skill
  - b. Language
  - c. Personality
  - d. Computer/software
  - e. Design
  - f. Planning
  - g. Quality

- h. Safety
11. On joining the job, what type of training was given to you
- a. Trade skill
  - b. Language
  - c. Personality
  - d. Computer/software
  - e. Design
  - f. Planning
  - g. Quality
  - h. Safety

Background Information

- A. Name
- B. Age
- C. Home State
- D. Belongs to Urban/Rural
- E. Family Annual Income
  - (i) Less than 3 lakh
  - (ii) 3.1 lakh - 5 lakh
  - (iii) 5.1 lakh - 7.25 lakh
  - (iv) 7.26 lakh - 10 lakh
  - (v) More than 10 lakh
- F. State from 12<sup>th</sup> pass
- G. Nature of skill training ITI/Skill Centre/any other
- H. Trade: \_\_\_\_\_