IAMR Report No. 1/2014

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Planning Commission, Government of India

First Edition published in 2014

ISBN: 978-93-83133-36-9

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Preface

India is among the countries with the lowest proportion of trained youth in the world. Moreover, Vocational Education (VE) carried out in the secondary schools (since the mid-1980s) has received very limited funding in recent times, has remained non-aspirational, of poor quality and involving little industry collaboration. In contrast, the VET system in Germany is characterized by much higher proportion of youth participation, intensity of private sector participation and is based on a law.

In this context, this study seeks to understand the experience of Germany's Dual System of education and training as it has been historically cited as a successful model of education and training, and is a reason for the competitiveness of Germany's manufacturing sector. The study also involved a primary survey of 43 firms, mostly large, all in the organised sector, and most in manufacturing. It attempted to identify the skill gaps experienced by German, Indian and joint venture firms in India. The study asserts the necessity for a restructuring and re-orientation of the Indian TVET to address the current and prospective challenges by taking on board the major social partners: the corporate sector, the state and the students/parents.

Institute of Applied Manpower Research is grateful to Bertelsmann Stiftung Foundation for the financial support for this study. We are particularly thankful to Lars Thies and Daniela Roess of Bertelsmann Stiftung for their inputs.

We would like to thank all the firms, organizations, institutes and their officials who participated in the primary survey of the study and provided useful inputs for preparation of the report. We would also like to thank Mr. Venkatram Mamillapalle (Tata Motors), Mr. Sandeep Balooja(Anand Group),Mr. Shrikant Deshmukh(Mercedes-Benz)and Mr. Rajender Tambolifor providing key inputs in the field survey in Pune.We would also like to acknowledge the support extended by Mr. S.D. Shibulal (Infosys), Ms. Aruna (Infosys), Mr. Rajeev Kumar (Wipro) Mr.Jayesh K.P. (Continental), Mr. Rajesh Rao (Festo), Mr. N.P. Anil Kumar (NTTF), Mr. Simon Avinash (SAP), Dr. Goel (BVC), Ms. Shweta (NTTF), Ms. Rajeshwari Krishnaswamy (Siemens), Ms. Padmashree Madhusoodhan and Mr. Sivaraj Ambat (Tech Mahindra) for helping us in the field survey in Bangalore. We are also thankful to Mr. Prakash Gill (Wiltan Telmag, Gurgaon) and Mr. B.P. Pant (FICCI, New Delhi) and the officials of the Indo-German Chamber of Commerce (New Delhi)for their support.

We are also grateful to Mrs. Meenakshi Gupta and Mr. Ravinder Chakravarty for editorial and secretarial support.

Executive Summary

The present study on the issues of reforms in the Indian vocational education and training (VET) has been undertaken at a time when the country faces both opportunities and challenges in India's growth story. While the opportunities are in terms of a demographic dividend, the challenges are posed by persisting skill gaps: hardly 2 per cent of the Indian workforce has formally acquired skills and another 2.4 per cent workers have some technical education. It is estimated that nearly 291 million workers are required to be skilled by 2022 if India is to be a leading manufacturing economy in the world. A drastic restructuring of the Indian VET has been suggested as one of the key conduits through which the persisting skills gaps could be plugged and inclusive growth could be pursued in the midst of a demographic and structural economic transformation. The present study engages with this question by offering a reform agenda but through the adoption of certain critical elements of the historically successful German dual system (i.e. the combination of practical and theoretical vocational training). As Euler (2013) suggests, the dual principle is a core element of dual system, it may well work in other vocational educational models as well. However, the Indian labour market requirements and skill needs raise concerns that go beyond Euler's suggestions.

The three major **objectives** of the study thus are**:** to understand the skill related issues of Indian and German companies operating in four sectors (chemicals, automobiles, electrical and electronics, and IT) in India; to examine the German dual system of education and replicability of some elements of the same in the Indian context; and to develop workable recommendations on how an effective Indian model in terms of skill enhancement, standards and work-effectiveness could be developed and advanced.

The **methodology** adopted in the primary survey is a sectoral approach with a focus on four sectors – does automobiles, chemicals, electronics, and IT – spread across four city clusters of economic (especially manufacturing) activity in India: Chennai, Bangalore, Pune, and Mumbai. The survey was done in three states. 43 firms were surveyed, of which 12 were German companies, 7 joint ventures, 20 were Indian companies and the rest (4) were joint companies with other countries. Thirty two of the 43 enterprises in our sample employed more than 100

workers (and hence were relatively large); the rest, employ less than 100 workers (and are

called 'small' when we report our survey findings). In terms of sectors, 38 companies were in manufacturing, while five of them were in services. Similarly, out of 38 total manufacturing firms surveyed, 22 were from Auto and auto related firms which accounted for the largest share in the sample. Nine were from Electrical and Electronics while about five firms were from chemical sector. If we look at the distribution of firms in terms of nature of products (capital goods, intermediate goods and consumer durables etc.), we find that most of the firms (35) are in the intermediate sector, followed by an equal distribution of firms in capital goods and consumer durables. Many of the firms belonging to the intermediate sector are suppliers of electronics, brake systems, chemicals, ICT and manufacturer of machine tools.

Findings from the primary survey

a) Thirty six firms out of 43 revealed that they were facing some of sort of skill related problems, both in number and quality of skill.

   Smaller companies are facing a major shortage of skilled persons. Small firms generally face competition for low-end skills such as fitters and electricians. Large companies face the problem of quality of skills. However, given the relatively small size of our sample, one cannot necessarily generalize across manufacturing in India.

   The nature of training and availability of infrastructure varies according to the size of firms. Larger firms have fully equipped training centers, while smaller ones give functional and work-oriented training to fresher's, based on their immediate skill needs.

b) A frequently cited deficiency in the current system of vocational education training (VET) was that there was a lack of linkage between theory and practice that needs to be resolved.

c) To meet the skill gaps, companies resort to on-the-job training for new recruits and many firms have an in-house training programme on factory premises. They also resort to technological changes; in other words, firms replace labour with new machines.

   Thirty out of 43 companies surveyed reported in-house training of some description; among these 27 are large companies (employing more than 100 workers) and the rest 3 small and medium.

In-house training was being given in all four main sectors surveyed. Out of 22 companies in automobile sector, 15 had in-house training center. Within the 9 companies in the electrical and electronic sector, 7 had some form of training facilities. The remaining 8 which are having training facilities are in chemical and IT sectors.

d) Twenty seven companies of the 43 surveyed have expressed interest in working with other companies in skill development. Some of the companies expressed a reservation in regard to joint funding models as firms were unwilling to share their "proprietary knowledge". Firms expect government to co-ordinate between firms and contain the *free rider* problems. Firms expressed willingness to be part of such cooperation in case of some generalized basic training. Twenty three companies expressed their interest in working with the government with respect to joint funding; but the small firms are reluctant to make any major investments in training.

   Smaller firms expressed interest in cluster training for skill needs in specific industry. They expect government to play an active role in co-ordination or building nodal agencies to impart training.

e) Some firms expressed a desire that government can ensure a return on forms investment on training by changing regulations or provide incentive to those firms which provide training.

f) Several enterprises suggested that changes in the Apprenticeship Act are required to make the remuneration and duration of training more flexible.

Elements of German dual system that could be adopted

A distinction should be made between the dual system of education and the "dual principle". The latter refers to the "integration of theory and practice, thinking and acting, systematic and case-based learning" (Euler, 2013:8). The great success of Germany is that the dual principle has been systematically institutionalised in the educational system of the country. It is the dual principle that must become the cornerstone of reforms in the Indian VET system, especially in secondary schools. Conception and execution is a continuum and is essentially embedded in the German dual education which could be emulated in the Indian context. This requires an integration of theory and practice in the schools and worksites. Learning venues in the Indian context should be both the class rooms and worksites/factories – this is the first lesson.

Second, while the earliest age at which vocational education is available in Germany is 10 years, it is 13 years in India: an early induction into the vocational education system is worth emulating. However, a miniscule share of all vocational trainees enters formal VET at 13; most enter at age 15.In Germany VET is not treated as distinct and separate from the general education system, a model worth emulating in the Indian context. Early introduction into the secondary school level of vocational education in the country as a whole is a second lesson.

Third, an integrated approach to the VET in which various stakeholders as social partners (private companies, the state, trade unions, employers' associations etc.) are actively involved in Germany in curriculum design, codifying skills and fixing standards. This participatory approach is desirable for India wherein the contribution of the private sector to curriculum building is non-existent. The curricula and codification of skills and standards should be developed in India in conjunction with industry and with the full participation of various stakeholders.

Fourth, Teachers' Training is a strong component of the German dual system which is to be adopted in India. India's VET faces serious shortage of teachers. Even more serious is the problem that teachers themselves have had little or no practical industry experience, which is the opposite of the situation in Germany or China. China's success as a manufacturing nation is partly founded upon good industry exposition of both students and instructors.

Fifth, the VET should provide a vertical and horizontal mobility for progressively gaining further qualifications which would in turn inspire parents and students to treat the vocatinal pass outs dignified. This problem may now get addressed in India on account of the introduction of a national vocational education qualification framework.

Sixth, the public-private partmenship model as integral to the German dual system with joint curriculum design, codification of skills, and joint certifiation should be followed in the Indian case where at the movement is solely governed by the Ministry of Human Resource Development.

Seventh, while more than 70 per cent of training costs are met by the private sector in Germany, it is abysmally low in India. The public-private participation in sharing the cost of training as in Germany should be adopted in the Indian case as well. This should be read along the lines of 19

large companies which reported their willing to earmark funds for skill development joint funding.

Only 3 small companies expressed their interest in joint funding which implies they require support from the government.

Finally, the regulatory system in Germany with the involvement of the federal, regional and local governments and the various stakeholders offers lessons for the development of an institutionally and legally embedded VET in India. Indian VET Act can be passed along the lines of German VET Act which would integrate governance strategies.

Recommendations

Vocational education in the school system

Germany's dual system of education is embedded in the school system, and at least half of all school children are part of the vocational stream. This fact offers an important lesson for India, since the Indian school system did not allow (until the recent rollout of the vocational qualification framework by the Ministry of Human Resource Development) for VE at secondary level (classes 9-10).

Assuring Duality Principles

The dual principal is needed to be implemented in India to meet the serious skill shortage Indian firms are facing. Drawing on the spirit of Euler's duality principle and the German experience steps are required to be taken by Government to bridge the gap between theory and practice, and private enterprises need to proactively collaborate in this task.

Partnership between Government and Private Enterprises

A significant element of the dual system in Germany is active collaboration between Governments and private enterprises which is desirable and replicable in the Indian context.

There have been many initiatives for such collaboration on the PPP model (public private partnership) in respect of government Industrial Training Institutes (ITIs) since 2009. The National Skill Development Council (NSDC) – which is owned 51 per cent by industry chambers and 49 per cent by the Government of India – has been a successful initiative in this sphere. However, the most promising example of partnership (found in our survey) which provides training to a large number of trainees was that of Tata Motors, which has adopted over 100 government ITIs, in the auto trade, and both trainees and the company have benefitted from this collaboration. The other excellent example of government/private enterprise participation in training is the 'Campus Connect' program of Infosys, the Indian software giant, which is a first of its kind industry-academia interaction program. Sixty engineering colleges all over India have taken part in this program, with more than 275,000 students and nearly 10,000 faculty members benefitting from an aligning process between engineering talents and industry requirements. SAP labs India (P) Ltd. too has tie-ups across colleges in India.

Funding: public-private participation

The most significant element in the German dual system that is most desirable in the Indian context is the partnership between government and business in sharing the vocational training cost. Almost four-fifths of the total cost of VET in Germany is borne by the private sector – which alone should be a salutary lesson to private firms in India. In order to attract private investments in the training sector, the government would do well to introduce the necessary institutional-legal governance structures. There has already been action in this direction. Members of the Federation of Indian Chamber of Commerce and Industries (FICCI), individual firms like Tata Motors and so on have already adopted many Industrial Training Institutes (ITIs) in India and have expressed interest in running many more.

Industries and their associations should be encouraged to help revamp teaching materials, practical training and occupational standards in the light of their skill needs. Even before the National Skills Qualification Framework becomes mandatory, local industry must contribute in the following four ways: a) offer teachers/trainers from industry to vocational school courses and to ITIs to meet the shortfall of teacher/trainee who have practical industry experience; b) local industry must be encouraged proactively by the central and state

governments to introduce new courses relevant to the needs to local industry, and contribute to the design of curriculum for such courses; c) industry should be required as part of its corporate social responsibility (as articulated in the new Company Law passed by parliament in 2013) to provide internships to both students of vocational education in school as well as ITIs; and d) based on such application of the duality principle, enterprises should provide counseling to students of such vocational schools/ITIs in respect of job placement. These actions can all be taken immediately, without waiting for any law.

In our primary survey we found that while large firms have the financial muscle to conduct in-firm training, smaller firms do not. Therefore, appropriate mechanisms need to be developed to facilitate training for smaller firms.

What is important in this context is that the duality principle should be made mandatory in which the state and industry associations should play a key role. The government and private companies should come to a consensus regarding the norms to be followed with respect to the structure and content of the course and how they should be rendered integral to the practical training.

Cluster-based training for small firms

Small firms can develop cluster based approaches; industry associations are required to support such approaches through offers of funds with the help of state initiatives. This would supplement the work of the central government's Ministry of Micro, Small and Medium Enterprises (MSME), which runs cluster-development programs for MSMEs.

A National Training Fund

The German construction industry pays a small tax, earmarked for use by the industry for purposes of training. In fact, 63 other countries of the world have an earmarked tax on companies, which is used to reimburse the training costs of firms. India should similarly adopt a National Training Fund (which has been proposed in the 12th Five Year Plan's chapter on skill development (Planning Commission, 2013). NSDC, FICCI and CII should cooperate with

think-tanks working on employment/employability issues to develop the design of a NTF for India to address the long-term problem of skill shortages.

A legally-embedded VET system

Germany has had a VET Act for several decades, which underlines the importance accorded to VET by the state. China has had a similar Act since 1996.India is in urgent need for such a legally-embedded VET system. It would be particularly helpful in mandating private sector participation in training. It could also provide legal sanction to the introduction of joint certification by government and private institutions of skills, which is another feature of Germany's VET system. Such certification would facilitate the placement of students/trainees in enterprises, as the latter would have greater confidence in the competencies of trainees who they have certified.

List of Abbreviations

AICTE	All India Council for Technical Education
AITT	All India Trade Test
ACMA	Automotive Component Manufacturers Association of India
ATS	Apprenticeship Training Scheme
BiBB	Federal Institute for Vocational Education and Training
BBiG	Vocational Education and Training Act
BVC	Bosch Vocational Centre
CII	Confederation of Indian Industry
CBS	Continental Business Systems
CTS	Craftsman Training Scheme
FICCI	Federation of Indian Chambers of Commerce and Industry
GEC	Global Education Centre
GTZ	German Technical Cooperation
ITI	Industrial Training Institute
OS	Occupational Standards
SDIS	Skill Development Initiative Scheme
SSC	Sector Skill Council
MHRD	Ministry of Human Resources Development
MKI-DS	Mubarak Kohl Initiative-Dual System
MOLE	Ministry of Labour and Employment
MSME	Micro, Small and Medium Enterprises
NCERT	National Council for Education Research and Training
NCVT	National Council for Vocational Training
NSDC	National Skill Development Corporation

NSQF	National Skills Qualification Framework
NSDC	National Skill Development Corporation
NTTF	Nettur Technical Training Foundation
NOS	National Occupational Standards
NSDA	National Skill Development Agency
NSF	National Skills Fund
NTF	National Training Fund
PPP	Public Private Partnership
VTP	Vocational Training Provider
SSC	Sector Skill Council
SSLC	Secondary School Level Certificate
TVET	Technical and Vocational Education and Training
VET	Vocational Education and Training

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Chapter 1
Introduction

The challenges posed by the existing skill gaps are shared by both the advanced West as well as the emerging economies in the global south, the latter with an added dimension. A combination of factors such as integration of global markets, intensification of international competition, shifts in international division of labour and advancement in technology contribute to the persistence of skill gaps in the advanced countries. Only a concerted effort to improve the quality and quantity of the skills of the work force would help maintain or improve their levels of living (see OECD 1994; Finegold and Wagner 2002). While the above factors hold good in the emerging economies with respect to skill gaps in certain countries like China and India, the problem has yet another dimension in terms of their demographic dividends. India's demographic window, for instance, offers both opportunities and challenges.

From the perspective of the opportunities coming up, India is all set to become one of the youngest nations in the world by 2020. It is further strengthened by the fact that the average working Indian will be only 29 years by 2020 as against 37 in China and the US and 45 in Europe and 48 in Japan, thus clearly indicating how India would have an edge over the rest of the world with respect to its key human resources. However, the challenges, if not addressed, may render such demographic dividends null and void leading to chaos. The larger structural transformation of the Indian economy has triggered an outflow of rural workers from the traditional fields of agriculture: thirty seven million workers left traditional fields of agriculture between 2004-05 and 2011-12 (Mehrotra et al. forthcoming) to join construction, manufacturing and service sectors. They end up in the formal sector working low paid jobs, largely due to lack of any form of vocational training. Another challenge that the country currently faces is what we call the human resource paradox: high youth unemployment against a low skill availability of the workforce. Currently, it is as low as 5 per cent if the vocational education and other forms of technical education taken together as against nearly 60 per cent with respect to many other countries. The challenge is further strengthened in light of the fact that it is specifically in employment creating sectors such as manufacturing, software and automobiles that the firm-skill incompatibility is most severe.

1.1 Persisting skill gaps

Persisting skill gaps in the Indian labour market have been a serious concern for both policy makers and industrialists in India. Various studies have highlighted skill gaps in different sectors in India (Nasscom 2011; Mehrotra 2012; Chenoy 2012). At an aggregate level, hardly 2 per cent of the Indian workforce has skill training in vocational education and only another 2.4 per cent workers have some technical education. The graduates who are trained in vocational education are also lack the skills required in the labour market. Thus, the employability of graduates continues to be a major concern and there is no formal link between general education and vocational training in the country. In addition to this, the labour market in India is undergoing a dynamic change. According to National Policy on Skill Development 2009, it is expected that over the next 15 years, 365 million people will be eligible to join the workforce and about 11–13 million people are expected to look for employment opportunities each year. Sensing this urgency, 12th five year plan positions the skill development in different sectors as an important task (Mehrotra et al, forthcoming).

Persisting skill gaps also has its qualitative dimensions, an aspect often not highlighted in the public discussions. Studies on the quality of skills and mismatch in demand and supply (FICCI 2006, World Bank, 2007, ILO, 2003, IAMR, 2010) have brought to fore issues such as lack of marketable skills and low standards of quality. The reasons cited include obsolete and traditional courses, lack of up-gradation of modules, failure to respond to market signals and the consequent lack of functional skills (NAARM, IAMR, 2011).

It is in this context that the study seeks to understand the experience of German dual system as it has been historically been cited as a successful model of education and training (Brandt 1998, Ertl 2000, Heinz 2000, Euler 2013) and identify the practical solution for the issue of skill gaps in India by reforming the Indian technical and vocational education system (TVET).

The study asserts the necessity for a restructuring and re-orientation of the Indian TVET to address the current and prospective challenges by taking on board the major social partners: the corporate sector, the state and the pupils/parents. It is argued that by timely adopting some of the critical elements of the German dual system, the Indian VET could be strengthened by

eliminating its weaknesses which in turn would fortify the Indian economy. The study would explain what they are and the differences between them and more importantly, how they could be adopted to make a blue print for practical applications. Given the fact that 'borrowed models' do pose their own problems (see Phillips & Ochs 2003; Robertson &Watsman 1992) what is intended in this study is not to replicate the German dual system as such but to identify the most relevant and useful aspects of the dual system which would be more relevant for India which could be successfully integrated into the Indian VET system and eliminate its weaknesses. Euler (2013) provides an entry point for such an exercise.

1.2 Euler's Approach

Euler (2013) makes a distinction between the "dual system" and "dual principle". The dual system refers to specific institutional regulatory set up and training sites that are needed to implement dual principle while dual principle means the way in which theory and practices are combined in the worksites. As Euler suggests, although dual principle is a core element of dual system, it may well work in other vocational educational models as well. Euler (2013) identifies 11 essential elements in German dual system and suggests ways to export those elements to other countries in a modified form. All those components are not strictly replicable in other countries. The study identifies certain key components in Euler's study that are adaptable in Indian context. However, the Indian labour market requirements and skill needs go beyond the prescription of Euler's suggestions. We shall return to this in chapter 3.

Going beyond the German dual system or Euler's approach implies the identification of best practices the world over. The present study does engage with some best practices across countries and cultures. The idea would be to reform the Indian VET system in its peculiarly Indian context wherein the Companies have been a passive beneficiary of the VET, often parallel to that of Anglo-Saxon model(s). A series of reforms were initiated with the formation of National Skills Development Mission in 2007 and the National Skills Development Commission in 2008-9 followed by the up-gradation of vocational institutions funded by domestic and international sources.

The challenge then lies in unpacking the "cultural fit" (Lewis 2007) and identifying the adaptable elements as has been suggested by Euler (2013). As has been pointed out by many scholars (see Lewis 2007; Green and Sakamoto 2001, Lloyd and Payne 2005; Clarke and

Winch 2006), the historically evolved Anglo-US "political economy tolerates skills polarization and social inequality" (Lewis 2007), which is something to be resolved in the context of reforming Indian VET system. The developing countries in Asia, particularly South Korea and China, offer mixed results with respect to the broader application of German dual system which again offer cautious signals of transferability for the rest of the world including India. We will return to this as we progress with the study.

1.3 Objectives of the Study

First, the study attempts to understand the skill related employment issues of Indian and German companies operating in four sectors (chemicals, automobiles, electrical and electronics, and IT) in India.

Second, it examines the German dual system of education and the probable integration of some elements of the same in the Indian context, broadly by engaging with the suggestions made by Euler (2013). This is done by comparing and contrasting the two models of VET in Germany and India in terms of skill deficiencies, readiness for joint funding, participation in curriculum design and so on.

Third, it indicates recommendations for the improvement of the Indian VET system with the objective of minimizing the skills gaps in India.

1.4 Outline of the Research Questions

The research questions this study addresses are:

- What are the current requirements and availability of different skills in the main business sectors in which German firms concentrate such as automobiles, pharmaceuticals and chemicals and to what extent are they met through in-house training and what are their expectations regarding the same from the state and how well would they be able to co-operate with the programme?
- What exactly are the hurdles faced by German companies and Indian companies in India in terms of the supply of skills required and firm-skill compatibility?
- What institutional mechanisms and arrangements could be developed as part of reforming the Indian VET by enhancing the cooperation between the government and business sector in the area of skill development?

- What specific recommendations could be generated to improve VET in India which would integrate some of the critical elements of the dual system such as public-private partnership and in-house training and what role could each of the stakeholders involved play?

1.5 Methodology: A Sectoral Approach

We have adopted a sectoral approach with a focus on four sectors - automobiles, chemicals, electronics, and IT spreading across four city clusters of economic (especially manufacturing) activity in India (Chennai, Bangalore, Pune, and Mumbai). This enables us to study the differential nature of requirements of different sectors with the common running element being the recognition of two aspects:

(i) that there is a shortage of required skills in the respective sectors and;
(ii) that they still manage to run their business activities with their own way of making trained workers available. This could be either through in-house training as it has been in the case of large firms or through finding alternative ways of training in the case of small and medium firms.

This led us to adopt a random sampling technique from a comprehensive list of firms in each sector made available to us by the Indo-German Chamber of Commerce, New Delhi and Bertlesmann Stiftung, Germany

In the process of selecting the firms, we factored in the sectoral composition of firms and adequate representation by state. In order to compare and contrast Indian and German firms, we included an additional sample of Indian companies. Through specific questions, we sought to ascertain firm satisfaction with the availability of skills, the in-house training provided, firms' expectations from the state with regards to meeting the skill gaps and the mechanism for potential collaboration.

1.6 Organization of the Report

The Report is organized in five chapters. Following the introductory chapter, chapter 2 discusses the demand for skills of both the Indian and German firms operating in India. This is done with a focus on four major sectors selected for study, namely, automobiles, electronics, chemicals, and software. We have also touched upon the gaps between the demand of the companies and the "supply" of the current VET system in India and the lessons for the Indian VET system to identify what changes are necessary in the Indian VET system. This is largely based on our field survey. In Chapter 3, the VET system in Germany is analyzed followed by Euler's approach to the dual system in terms of dual system and dual principle. The closely related issues such as joint funding, possibilities of partnerships and the institutional mechanisms are elaborated. Chapter 4 discusses the Indian VET system with its strengths and weaknesses and highlights the necessity of reforming the system. It also deals with the elements of the dual system which could be integrated into the Indian system with a focus on Euler's approach and going beyond it as it takes into account the 'the best practices' from the world over. In Chapter 5, we provide reform recommendations for the improvement of the Indian VET system in such a way that in both the short run and long run, the skill requirements of the industries could be met with the broader objective of higher performance of the economy as a whole.

Chapter 2

Demand of Skills for German and Indian Companies

The skill training requirments keep increasing at two levels: making new job seekers enteering the labour force employable and reskilling those who shift jobs. This is necessitated by two underlying trends in India: justified on two grounds such as the demographic dividend and structural transformation, trends which we have briefly touched upon in Chapter 1. We engage with the same question in this chapter as well with a view to link up the demands of skills by the German and Indian firms, both operating in India. This would be based on our field survey of four sectors: automobiles, chemicals, manufacturing and software/IT in the city clusters of Chennai, Bangalore, Pune and Mumbai.

Section 1 introduces the skill gaps in the present context and our estimate of projected skill gaps in another ten years from now. Section 2 discusses the reasons for the urgency of skill training as explained in terms of demographic and structural transformation of the economy. In section 3 we present the survey coverage of the firms under study in terms of ownership (joint ventures, German, Indian etc) and sectoral composition. This is followed by the survey results in terms of theory and practice with reference to those who qualify through the VET programme as experienced by industry (Section 4). In Section 5, the ways in which the firms address the skill gaps and the nature of alternative arrangements such as in-house training that they resort to are addressed. In section 6, the issue of the willingness to cooperate with joint funding is raised along with the options left for small firms. Section 7 briefly discusses the gender demension in the larger context of the falling female labour force participation and mentions how it is to be arrested and in what way the private sector could play a key role in this. In section 8, the question of technological advancements and its implications for VET training is briefly touched upon. This is followed by the concluding remarks in Section 8.

2.1 Skill Gaps: Present and Future 2022

It must be pointed out that a large proportion of the workforce in India is either totally illiterate or with primary/less than primary education. In 2009-10, out of the total workforce of 460.2 million, the number of those who had a secondary education was 50.79 million, those

with formal Vocational Training was 7.9 million and those with Technical Education was 10.51 million. As seen in table 1, 54 per cent of the workforce was either totally illiterate or with primary/less than primary education (Mehrotra et al 2013).

Table 1: Education and Training of those in workforce, 2009-10

	Workforce in age group 15-59 (420.6 million)	
	Current number (in millions)	Share in per cent (approximation)
Not literate	125	29.72
Below primary, primary and literate without formal schooling (up to 5th standard)	103.2	24.53
Middle (6 to 8th standard)	74.1	17.61
Secondary (9 to 10th)	50.8	12.07
Higher secondary and above (diploma/certificate/graduate/postgraduate) (11th and above)	67.5	16.04
Total	**420.6**	**100**
Distribution of Workforce having Vocational training and Technical Education		
Formal Vocational Training	7.9	1.9
Technical education	10.5	2.4

Source: Mehrotra et al, 2013

It is argued that the challenge for skill development in the 12th Plan is two-fold (Mehrotra, forthcoming). The first is that half of the current work force (228 million) that is either illiterate or only has attended primary or less education (likely to be functionally illiterate except for the ability to write their name), must be ensured functional literacy and numeracy. Even though such workers have acquired their skills informally, they should be able to now get recognition for their prior learnt skills, for which there is provision in the National Skill Qualification Framework (Planning Commission 2013). The second challenge is to ensure that all children between the ages of 6 and 14 (i.e. who will enter the labour force) are completing elementary education by the end of the 12th Plan, as required by the Right to Education Act, 2009. Eight years of schooling is an essential pre-requisite for any teenager for admission for vocational training. Yet another challenge is directly related to the demographic and structural transformation of the economy and the requirements of future skills in India.

A recent estimate of the number of people to be skilled by Mehrotra et al (2013) reveals that the the number of workers entering the workforce each year in India would be 2 million and the projected labour force at 2022 would be around 580 million. Of this, nearly 291 million or around half of the work force will need to be skilled by 2022.

Table 2: Numbers to be skilled by Education Level in 2022

Formal Vocational Training	136
VT for those Informally trained	55
General education higher secondary & beyond	100
Total	**291**

Source: Mehrotra et al (2013)

2.2 Demographic and Structural Transformation in India

With the fact that the current growth rate of population is 1.4 per cent per annum and the Total Fertility Rate falling towards the replacement rate of 2.1, what is likely to happen is that the workforce to be skilled would increase but at a declining trend. The new entrants into the labour force and those who shift jobs would be composed of heterogenous levels of skills, both in terms of scale and quality. They all would require varying degrees of skilling and reskilling.

The necessity of targeted skilling has yet another dimension, now in terms of structural transformation of the economy. As has been highlighted by Mehrotra et al (2013), there has been an outflow of labour from the agriculture sector mostly to services and manufacturing in the urban areas. Nearly37 million workers have already left traditional fields of agriculture between 2004-05 and 2011-12. At the moment, only 10 per cent of the total work force has some form of vocational training. If we exclude the agricultural sector, the proportion of workers having vocational training would be 20 per cent. If we still exclude services, the proportion would be around 44 per cent. The rest of the workforce need to be reskilled in order to save them from stagnating in the low paid informal jobs in the urban labour market. The focus of training thus should be on enriching skills sutiable for the organised sector.

Training the unskilled and semi-skilled workforce and making them employable would be the first major task of any government. The 12th Five Year Plan has thus

challenging tasks the government has identified 20 high-growth sectors of industries and services that have the ability to provide expanded employment. It consists of 10 high-growth job creating sectors (manufacturing, textile, construction, automotive, health care etc.).

The World Bank's Investment Climate Assessment (ICA) enterprise surveys in more than 100 countries show that micro and small firms, typical of those in the informal sector, do not train workers in the same proportion as medium and large sized firms with under 20% of employers reporting training in India (Adams 2011). Moreover, public providers tend to ignore training for those in small firms for reasons such as the potentially higher cost of small scale training, the loss of production due to time away from work in a small firm, the lack of trainers with knowledge of training needed for assessments and designing training programs in small firms, the cost and difficulty of multi-skill training needed by those in the informal sector performing more than one function in the firm, and finally the lack of cash flow and capital. It is further argued that there is a tendency for the government to think of skills development as only taking place in schools and training centres when much larger investments in skills are being made by households and businesses. It is argued that this results in the under-provision of skills in this segment of the market to disadvantaged workers (Adams 2011).

While the macro evidence as cited above highlights the fact that there is an increasing requirements of skill training, the same evidence is corroborated by our field surveys. What is encouraging is that it is still possible to learn lessons from the German dual system in terms of public-priave partnership in governing the entire VET system including theory-practice continum, curriculum design and funding. The field level analysis also suggests the necessity of going beyond Euler (2013) for which the best practices also need to be briefly addressed. However, it is to be noted here that our survey is a slice of the organised sector firms. As argued elsewhere (Mehrotra et al 2012) that organised sector contribution to total employment in manufacturing is just about 15 percent while its contribution to total output is about 78 percent. Therefore one has to take this fact into account before prescribing any policy suggestions based on the field survey.

2.3 Survey Results

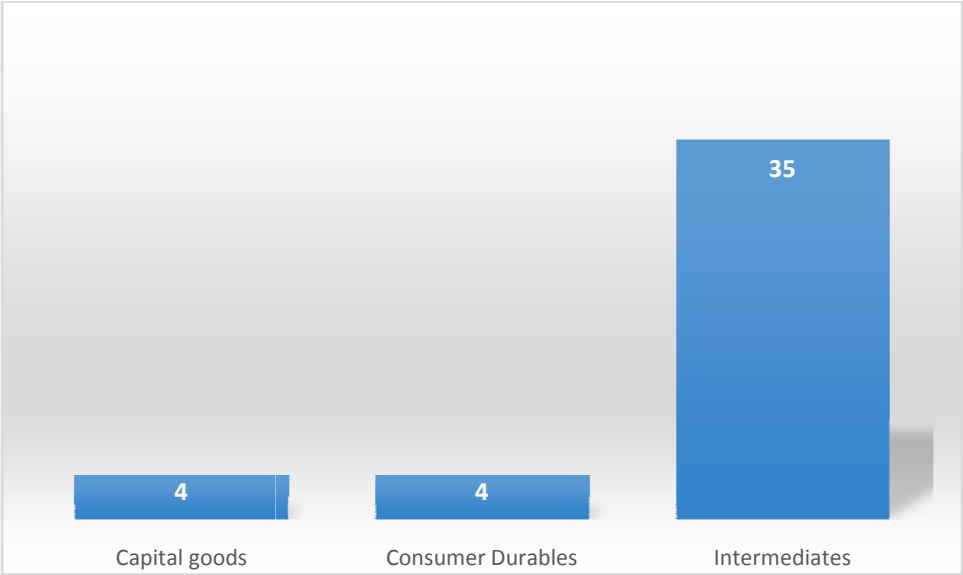
The survey was done in four sectors across three states. As shown in the tables below about 43 firms were surveyed, of which 12 were German companies, 7 joint ventures, 20 were Indian companies and the rest (4) were joint companies with other countries. In terms of sectors, 38 companies were in manufacturing, while five of them were in services (see table 3 below). Similarly, out of 38 total manufacturing firms surveyed, 22 were from Auto and auto related firms which accounted for the largest share in the sample (see table 4 below). Nine were from Electrical and Electronics while about five firms were from chemical sector. If we look at the distribution of firms in terms of nature of products (capital goods, intermediate goods and consumer durables etc.), we find that most of the firms (35) are in the intermediate sector, following an equal distribution of firms in capital goods and consumer durables (see figure 1 below). Many of the firms belonging to the intermediate sector are suppliers of electronics, brake systems, chemicals, ICT and manufacturer of machine tools.Case studies of the firms with state- of-the-art in-house training are analyzed with the expectation that other firms could emulate such practices.

Table 3: Distribution of firms according to ownership

		German	**Indian**	**Joint Venture**	**Others**	**Total**
Large	Manufacturing	8	12	4	4	28
	Services	2	2	0	0	4
Small and Medium	Manufacturing	2	5	3	0	10
	Services	0	1	0	0	1
Total		12	20	7	4	43

Source: Computed from the field survey

Figure 1: Firms by nature of products



Source: Computed from the field survey

Table 4: Sector wise distribution of firms

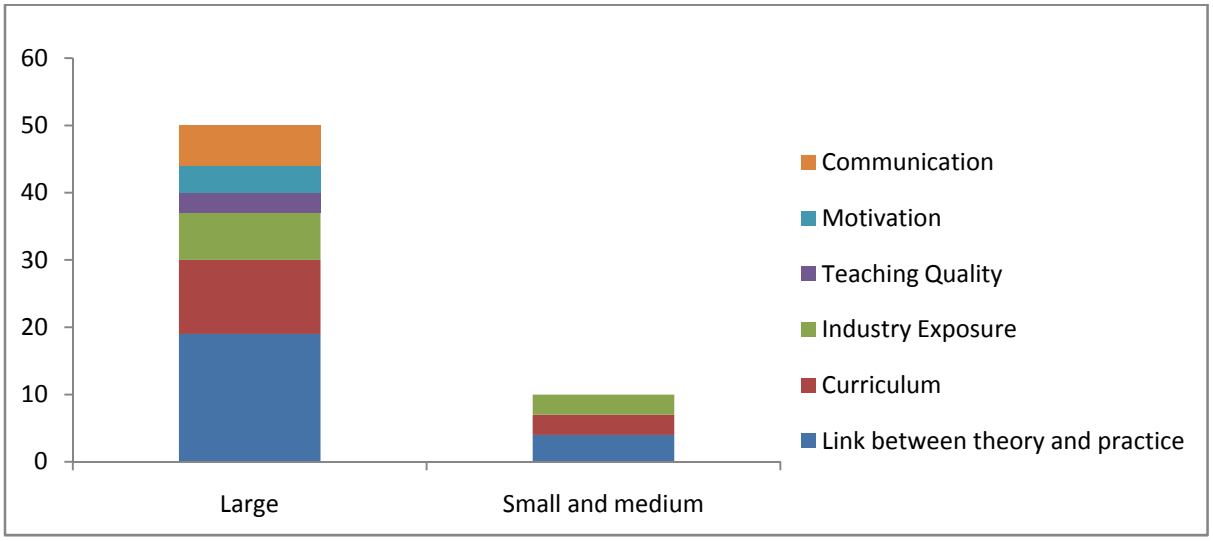
	Electricals & Electronics	Chemicals	Auto and Auto-components	IT	Others	Total
Maharashtra	3	2	16	1	1	23
Tamil Nadu	3	2	5	0	0	10
Karnataka	2	1	1	4	1	9
NCR	1	0	0	0	0	1
Total	9	5	22	5	2	43

Source: Computed from the field survey

There are various macro studies that have highlighted skill gaps in different sectors in India. Our field study only reaffirms the fact and goes further in identifying the nature of skill gaps in the sectors that we selected for our study. Almost all the companies that we had interviewed revealed that they were facing some of sort of skill related problems (36 firms out of 43). The skill related problems are twofold: quantity and quality. The companies that are smaller in size are facing shortage of skill persons more in quantity. Small firms generally

face competition for low-end skills such as fitters and electricians. The large companies face the problem of quality of skills and they attribute the same to the weaknesses of the Indian educational system, including that of VET, beginning with the question of the divide between theory and practice (see figure2 below).

Figure2. Deficiencies in skill development as cited by large and small firms



Source: Computed from the field survey

2.4 Skill Gaps: Theory and Practice

Most companies in our survey complained that the students who pass out from ITIs and Polytechnics lack the application-oriented knowledge, problem-solving skills and some cited the lack of industrial exposure of students (see figure 2 above). The companies were almost unanimous in their plea that they need to train the new recruits with on-the-job training to make them employable. This means that the students who come out from the VET system do not comply with Euler's duality principle, a major shortcoming of the way in which VET is organized and governed in India. Therefore, both micro and macro studies shows that not only the percentage of workforce having formal vocational training and technical education is low, the quality of those trained is also far short of industrial skill needs. For instance, SuspaPneumatics India Pvt Ltd, which specializes in manufacture of gas spring and hydraulic

dampers, mentioned "students lack even basic technical knowledge and don't have curiosity and motivation to learn".

VET may attract the sufficient number of candidates but as NetturTechnical Training Foundation (NTTF)[1] has rightly pointed out in the interview, "instead of increasing the intake of students, it is better to increase knowledge of students" which in turn requires intensive teaching and practical training, the latter in labs and worksites. In addition, as has been raised in the discussions organized by the Bertelsmann Stiftung in Bangalore, in the Indian vocational education, "the orientation towards application is missing" and there should be an exchange programme between the personnel of companies and vocational schools/universities of at least 3-6 months for teachers to get experience in companies. This would enrich the networks between companies, industries and educational institutes. As the HR faculty of Continental Automotive Components Ltd stated, the lecturers need to go through training and should be exposed to industry: "they should be working for industry compulsorily". That Wipro representative noted that teaching has delivery issues.He expressed concern about how to evaluate students: "today I don't know how to calibrate a Tamil Nadu kid's grade with a West Bengal kid's grade", "our 12th grades and engineering grades are highly non-calibrated" in regard to content and the extent to which real life experience is imparted. To quote him, "We don't promote enquiry based teaching… we need to promote the culture of one question with many right answers".

In this context, it is worth mentioning the case of Bosch Vocational Centre (BVC) in Bangalore which is based on the German Dual System. Bosch has training centers in Pune, Jaipur, and outskirts of Bangalore. The student employees are paid a stipend of Rs. 3-4,000 during apprenticeship and 30-40% students are from SC/ST/OBC; most of the students are supporting families. Students at Bosch are trained after 10th grade for three years under the Apprenticeship Training Scheme. Students are selected on the basis of marks, written test, and interview. The curriculum at BVC is customized to Indian requirements and is the culmination of systems expertise and infrastructure. Within the ITI/Craftsman Training Scheme industry exposure is limited, whereas students at BVC are engaged with industry (see box 1 below on Bosch Vocational Centre)**.** Further, NTTF mentions that "Bosch Vocational

[1] NTTF is an educational foundation established in the year 1963. It implements its program of Technical Training Through more than 20 training centres located in various states across India. NTTF assists industries by establishing training centres in partnership with industry associates.

Centre can be treated as role model…people should realize importance of dual system… we are ready to tie up with BVC, Siemens…" confirms NTTF.

Box 1. Bosch Vocational Centre

Training activity in Bosch Ltd dates back to 1953. Need for skilled manpower was felt from the start of Bosch's operations as its product lines consisting of Spark Plugs and Fuel Injection Equipment are high precision items. Prompted by the requirement for skilled manpower, the Tool Room Apprenticeship scheme was started in 1953, and Bosch Vocational Centre (BVC) was established in 1960. BVC was conceived and set up as a full-fledged training centre to develop a reservoir of skilled personnel required to produce quality products on sophisticated machines. It is noticeable that the establishment of BVC preceded the enactment of the Apprentices Act. In fact, the committee responsible for the formulation of the act visited Bosch Ltd and found that BVC was a working model for them to study. Bosch's views were sought on the draft memorandum of the act and since then BVC has been the centre to cater to all training needs of the company.

Presently, there is a group of 24 dedicated faculty members to guide the trainees to achieve excellence. The training schemes include trade apprentices training which takes 60 students at the SSLC level in two batches each year, and graduateapprentices training which takes 30 engineering graduates in Mechanical, Electrical, Electronics, Mechatronics, Automobile, IE&M and IP&E streams, each year. In addition, the scheme of project trainees in Bosch Ltd was started from the year 1995 as a social obligation to strengthen the industry-institute relationship. In this scheme, final year engineering students from various colleges are allowed to carry out their project activities to fulfill their academic requirement and also to get an exposure towards industrial working environment.

Source: Information Booklet, Bosch Vocational Centre, Bangalore

Most of the firms in our study expressed a desire to participate in the curriculum design of ITIs through an appropriate institutional mechanism developed by Government. They also believed that collaboration between industry and government is possible and employers' associations have a role to play. In addition, they expressed a need for lecturers at vocational schools to go through training and be exposed to industry. Moreover, enquiry based teaching needs to be promoted. Subjects taught need to be industry relevant.

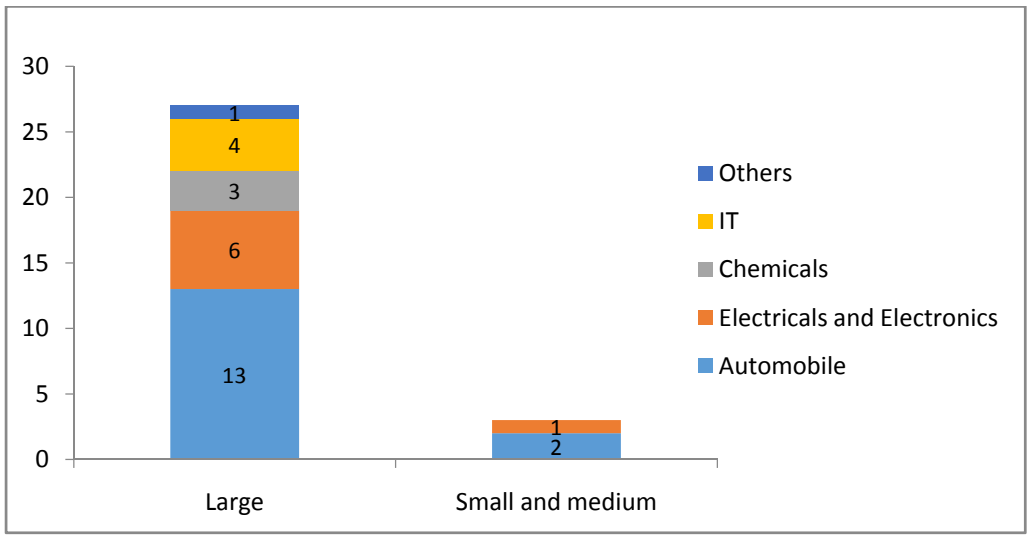
2.5 Training Strategies: In house Training

The way to overcome skill deficiencies is to resort to some form of in house training for new recruits and employees. The HR faculty of chosen companies were asked whether they have had any form of in-house training centre at all. Even a single room training considered to be running in house training.

The size of the companies was determined according to the number of employees on the payroll; those employing less than 100 workers designated as small, and those with over 100 employees were designated as large. For the small firms, the number of employees varies from 9 to 100 and for the large firms, it varies from 110 to as high as 100,000. Half of the firms employing 110-1000 workers are in the auto and auto components sector, and 15 firms provide employment within the range of 110 to 100,000 of which 8 are in auto and auto components sector.With respect to the IT sector, 4 firms out of the 5 surveyed employ workers within the range of 1000-100,000. It is clear from the survey that the large companies have to resort to some form of in house training to maintain productivity and competitiveness. Small companies repeatedly said that they cannot afford to have their own training centre and most of them are facing a shortage of skilled workers. Often shortage of skills and skilled workers result in higher wages than the competitive equilibrium wage.

Within the 30 companies reporting facilities for in house training, 27 are large companies (employing more than 100 workers) and the rest (3) small and medium (see figure3 below). Out of 22 companies interviewed in the automobile sector, 15 had in-house training centre. Within the 9 companies in the electrical and electronic sector, 7 had some form of training facilities. The remaining 8 which had training facilities are in chemical and IT sectors. It is to be noted here that the largest share in our survey sample is from automobile sectors. 24 of the firms in the intermediate sector are large and of these 23 provide in-house training.

Figure 3. In-house training by sector and employment size of firms



Source: Computed from the field survey

The firms interviewed, mostly big ones, involved in manufacturing have some sort of in-house training facilities. Of the 22 firms interviewed in Bangalore and Chennai, 11 of them have training facility within factory premise or outside. However, the nature of training and availability of infrastructure varies according to the size of firms. Larger firms have fully equipped training centers, while smaller ones give functional and workable training to fresher based on their immediate skill needs. Investment in training is made where firms are assured of a return from the training and are confident that they could retain trained workers. A comprehensive training programme that caters to both the potential employees and external candidates and faculty (as in the case of Infosys)is often indicative of efforts towards corporate social responsibility(see box 2).

Box 2: Socially Embedded Strategy? Infosys Technologies Ltd., Bangalore

Caring for one's own employees and the potential employees – from training schools to corporate cabins - can be both a strategy and an act of social responsibility. In the context of training, it ensures a steady supply of skilled professionals and in terms of social responsibility, it boosts the morale of the firm while projecting a favorable public image of the company. In this context, no other Foundation Programme is as vast and well integrated in the world as that of the Infosys Global Education Centre (GEC). The residential training programme for entry-level engineering graduates at the GEC in Mysore has been imparting generic and stream-specific training in various technology domains, to new recruits every year. GEC also offers training in soft skills and leadership programmes by talented trainers. Nearly 50 per cent of trainers are teachers and from technical and non-technical backgrounds. The designed training programme and its deployment start with basics and include very comprehensive modules with the generic technologies. The 23-week course begins with internship followed by regular training in chosen technologies to enable adaptability to the organizational context. To quote one of the representatives of Infosys, "we hire graduates; we can't say they are not employable".

Over 100,000 entry-level engineers have so far been trained here, and it can house 15,000 trainees at any point in time. This is the brainchild of Infosys, one of the leading IT companies in India which currently employs 103,000 persons in over 50 offices across the world. Infosysians, as they are known, are responsible for designing and delivering IT-enabled business solutions to the global clients. These solutions focus on providing strategic differentiation and operational superiority to clients.

Campus Connect

Knowing well that the IT industry as a whole need to "scale up industry-ready quality students to meet the growing demands of the industry", Infosys launched Campus Connect in 2004, a first of its kind Industry-Academia interaction programme. CC aims to be a partnership forum where the best practices at Infosys are shared with institutions. As on date 60 engineering colleges all over India have taken part in this programme with more than 275,589 students and 9814 Faculty members have benefited by this aligning process between engineering talents and the requirements of the industry. The CC also conducts Faculty Enablement Programs to train the partner college faculty on Foundation Program course delivery and industry oriented courses such as BusinessIntelligence, Building Enterprise Applications and, Mainframe systems. Both the GEC and the CC are testimonies of Infosys' commitment to building the competency of their own employees and corporate social responsibility to the larger society.

In 2009, the Infosys announced the expansion of its GEC in terms of infrastructure, training programmes and business activities. While trainees from India find GEC none less than a home, special programme participants from Australia, Bhutan, China, Columbia, Japan, Malaysia, Mauritius, Panama, Thailand, UK and the US find it a home away home with state-of-the-art academic facilities (master class rooms, training rooms, libraries, conference halls) and holistic day to day life with fitness and recreation facilities which includes football, cricket and tennis grounds spread over 337 acres.

Given the fact that Infosys is one of the global giants, it only attracts young professionals and thus obviating the free rider problem. The firm is also insulated from attrition, a common concern among other firms.

Source: Infosys Technologies Ltd, www.infosys.com

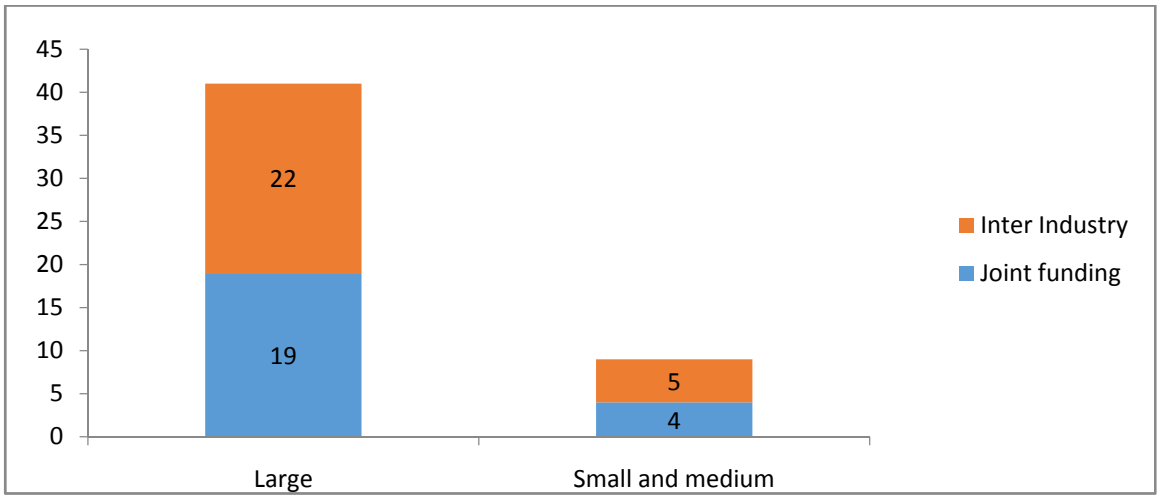
2.6 Small Firm Options: Cluster Training

Smaller firms express interest in cluster training for skill needs in specific industry. They expect Government to play active role in co-ordination or building a nodal agencies to impart training. Firms expect the surety of return to the investment they make in training. Some firms expressed the desire that government can ensure such return by changing regulations or provide incentive to those firms which provide training. They also express changes in Apprenticeship act and to make it flexible in terms of setting pay and duration of training.

It was mentioned in our survey that firms are unable to influence each other's decisions to engage in inter-firm collaborative project as that involves acceptance on part of the other company and a lot of investment. Firms expect government to co-ordinate between firms and contain free rider problems. Firms also express difficulties in inter industry cooperation in case of proprietary technologies as technology provides an edge in competition between firms. However, firms expressed willingness to be part of such cooperation in case of some generalized basic training (see figure 4 below).

2.7 Joint Funding: Willingness to Collaborate

Figure4. Large and small firms interested in Inter-Industry collaboration and Joint funding with Government



Source: Computed from the field survey

Another significant finding is the willingness of companies to cooperate with others in skill development programmes and joint funding with Government. About 19 large companies reported their willing to earmark funds for skill development joint funding schemes while in the small scale sector, only three small companies expressed their interest in joint funding (see figure4 above). However, those firms that already have a training centre have less interest in participating in joint funding. Some of them have international training arrangements as in the case of Wipro. Small companies are of the opinion that they can't afford to invest in skill development. Similarly about 22 companies have expressed interest in working with other companies in skill development. Some of the companies expressed reservation in joint funding models as there is unwillingness to share their "proprietary knowledge". The companies that are already have training centers have no interest in further co-operation with companies save a few. While companies like Wipro, Continental Automotive Components Ltd., and Bosch have international collaboration for their training programmes (with Germany, the UK,etc), small firms are deprived of such facilities. Continental Automotive Components Ltd., a large company, who states that training requirements are "client specific" runs three sets of training – developmental trainings on automotive components, leadership program and different verticals (body and security of vehicles, fuel supply, IT materials and car interior). They have a training team for CBS (Continental Business Systems) – imbibing concepts of production, quality, related parameters and they also invite trainers from Philippines and Germany.

The representatives of Bosch are of the view that ITIs in India are not lacking in funds but their infrastructure needs to be better maintained. The BVC has had experience with MoUs with ITIs where they took up a few ITIs and improvised them according to industry requirements, organized affiliation tours with government, and participated in fixing course curriculum. Trainers in ITIs were given technical knowhow, exposure to maintenance under the train-the-trainers program; Junior Technical Officers in government get trained on different skills (6-8 batches in a year). Bosch is also of the opinion that various associations such as ACMA, Karnataka Skills Council, CII and so on could intensify their involvement in skill training. They view that investment in training happens over a period of time, on shop floor, few classes etc. Further, in certain sectors such as automobiles, the amount of training investment could be higher, while in fitting no significant investment is involved and

investment could involve around Rs. 5 Crores for 4-5 trades taken together. What is more important, according to them, is not the actual budget constraints but to quote, “the optimum use is the idea….” Large firms like Tata Motors and many members of FICCI have already adopted ITIs and introduced very imaginative way of running the courses by revising the modules, upgrading the technologies available and absorbing the outgoing students in remunerative jobs (see box 4 on Tata Motors in chapter 4).

2.8. Women’sLabour Force Participation and Skilling

Falling femalelabourforce participation Rate (FLFPR) has generated debates and discussions in India not only in policy circles but in academia and the public sphere as well. Not only is the rural and urban FLFPR low at 25.3 per cent and 15.5 per cent respectively but it also has been declining over the years since 2004-5. The National Sample Survey reveals that there has been a consistent decline in FLFPR since the 70s, the only exception being 1999-2000 to 2004-5 (Mehrotra et al 2013). The average rural FLFPR in 2004-5 was 33.3 which declined to 25.3 in 2011-12 and the urban FLFPR declined from 17.5 over the same period. Leveling of the declining FLFPR thus becomes a key policy variable for inclusive growth in which the private sector could play a key role. Our field evidence suggests that in the case of Kirloskar Brothers Ltd, the nature of employment seems to be quite promising with almost all the employees in its Coimbatore plant being women (see box).This is especially interesting because other than in the garment sector, women are rarely in organized manufacturing.

Box 3: Kirloskar Brothers Ltd (KBL)

Kirloskar Brothers Ltd (KBL) is the only Engineering Company in India which operates with 100 per cent female associates in the manufacturing process. The ASSOCHAM Award is recognition to the efforts made by KBL’s all women Coimbatore plant that was established in 2011. The plant which is equipped with state of the art facility manufactures different models of domestic pumps and has 70 women between the age group of 19-30 employees on the shop floor. KBL provides an intense two months industrial training to the women recruited at the plant who are mostly school drop outs.

In 2011, the workers at the plant took 60 seconds to assemble a pump. The female associates have significantly reduced this time to 20 seconds in April 2013 that tripled the plant production to 34,000 pumps per line per month. Around 500,000 high quality pumps are manufactured in this plant per year with an extremely negligible rejection rate of less than 0.5 per cent.

When women are generally underrepresented in the manufacturing sector, the KBL performance sets an example for the other companies in India. In certain software companies such as WIPRO, the employees in the cohort of 20-30 years are overwhelmingly female. As raised by the participants at the Bertelsmann-led workshop at Bangalore, the companies should expand their reach-out to the rural masses, particularly women.

2.9 Technological Change and Skill Gaps

It is argued that given the shortage of skilled workers coupled with higher wages in labour market, firms tend to switch to capital intensive production. However, there are range of factors that influence the production structure and composition of inputs. The shortage of skilled workers may be one of the reasons for the low level of employment elasticity witnessed in the last decade. The decade has indeed witnessed decline in employment elasticity of output especially in manufacturing (Mehrotra et.al 2013). It declined from 0.44 in 2000-05 to 0.01 2005-10 for the economy as a whole. Non-agricultural sectors witnessed a decline in employment from 0.58 to 0.18. Manufacturing too has suffered in employment generation. The employment elasticity for this sector has come become negative in 2005-10 from 0.76 in 2000-05 (Mehrotra et.al 2013).

Firms surveyed gave mixed responses on the question of technological advancement. It is observed that the VET curriculum including the practical training should be continuously upgraded so as to capture the technological advancements taking place in the firms. This might be one of the reasons why there are difficulties for finding placements for youths who have only a high school diploma. It has been argued that there should be a better integration of VET and mainstream level education (preferably University level) and the VET-graduates need possibilities to progress to further education. This however should take into account the changing levels of technological advancements in various sectors. Those companies resorting to such advancements should also look into the changing patterns of employment as making profit at the expense of job creation should not be the only criterion for such innovations.

2.10 Concluding Remarks

The micro level field evidence from our survey in Bangalore, Chennai, Pune and Mumbai substantiates the macro picture of shortage of skilled workforce in India's labour market. The firms under study respond to this skill gap in two ways: they resort to on the job training for the new recruits and some firms have in house training programme in factory premises, and they change the production structure and composition of inputs towards capital intensive production. With regards to the former, India clearly has the lowest level of in-firm training among the BRIC countries such as Brazil, Russia, India and China. However, our evidence suggests that as many as 30 firms of the 43 surveyed have in house training of some description. While large companies have organized training schemes with huge investments, the smaller firms are satisfied with low levels of training.

The empirical evidence suggests three major lessons on how VET succeeds and fails to meet the skill gaps in Indian labour market.

First, given the fact that there is a wide difference between theory and practice as explained by the firms, reforming the Indian VET has been of utmost importance, which would be possible only by assuring private participation in the administration of Indian VET system. Private companies expressed their interest in joining the preparation of curriculum, codifying skills and practical training and thereby bridge the gap between theory and practice. However, we found limited evidence of this interest/intent on the ground.

Second, the private firms are interested in joint training programs, including joint investments in training, though some reservation was expressed by firms which are already running well organized training programs by some of the larger firms. Large Indian firms have adopted ITIs and invested in terms of infrastructure and training facilities. FICCI members have already adopted several ITIs and have expressed interest in taking over more of them which would help improve the Indian VET system in terms of infrastructure development and practice-oriented and industry-specific training programs.

Third, small firms would do well to experiment with various forms of training schemes such as cluster based programs. Industry associations rather than large employers' associations would be preferred. They also expect Government to play an active role in co-

ordination or building a nodal agency to impart training. Firms expect the surety of return on investment they make in training.

As companies invest in new technique the Indian VET system should become capable of accommodating the same which in turn require active participation of stakeholders through public-partnership models.

Chapter 3

The Dual VET System in Germany: A Model for India?

In this chapter, we discuss major issues: the nature and structure of VET in Germany with its historical evolution, the nature of regulating authority, and the sources of funding for the VET. We would also explore the various approaches to the VET system in Germany with a focus on Euler's approach (2013) with his conceptual framework of duality in system and principle with a view to explore which elements of the VET are relatively significant in the Indian context as elements to be adopted in reforming its system of education.

3.1 Vocational Education and Training in Germany

The German dual system as an institutional arrangement of learning by doing in both the vocational schools and worksites has played a pioneering role in providing vocational training in the world (Brandt 1998, Ertl 2000, Heinz 2000, Euler 2013). The advantages and orientation of the system including the generation of well trained workforce under legally defined social partnerships persuaded many countries to accept the Dual system both in terms of ideas and practice. It is argued that the dual model helps in reducing the skill gaps, unemployment and promotes growth. It is being suggested how best the model can be emulated and adopted in developing countries like India. In this context, it is important to understand how the system works in the home country and its complexities including its achievements and limitations.

3.2 Historical Background

Vocational training in Germany is derived from the Guild tradition that dates back to the Middle Ages. Germany's initial response to industrialization drive in Europe and its specific pattern of vocational education differed from that of Britain or other countries in Europe. Rather than developing a new, modern form of VET appropriate to a society undergoing intense industrialization, Germany largely re-established its own traditional form of class-based craft education that had evolved over the decades. As a precursor to the current form of decentralized dual system, the state handed over the power to supervise and administer craft apprenticeships and control of curricula design and examinations to trade chambers or erstwhile guilds. This sort of mechanism continues to be part of the dual system

in Germany (Country report 2011; also see Brandt 1998; Ertl 2000; Henz 2000). The usage 'dual' indicates a partnership form of education and training between different providers of training: vocational schools owned by the government on the one hand and the private companies on the other (see Mayer 2001). Apart from the dual system, Germany also has full time specialized vocational schools with 1-3 year training under the Ministry of Education. This works as an important supplement to the dual system because in times of shortage of available traineeships they have a complementary function (Mayer 2012:197)

In early 20th century, Germany has attempted process of modernization of vocational education. This modernization drive included an institutional restructuring, with facilities on the shop floor and a school within factories, a new methodological approach, including the use of psychological aptitude testing, standardized training courses and materials. This vocational system produced an entirely new type of qualified worker and, indeed, represented a new "social player", one that had been moving towards a leading role in German VET since the 1930s (Country Report 2011). Economic development and the relatively low rate of youth unemployment of the post-War Germany owes much to the skilled worker and the social integration of youth as evolved through the dual system (Ertl 2000). But the process of Fordist production with its inherent feature of rigidity and lack of flexibility has brought in difficulties in skill development. Such a system based on production-line techniques does not involve nurturing and retaining skills although it encourages specialization. The attractiveness of vocational training thus declined in this period.

3.3 Post 70s Development

The 1970s has again brought back the importance of vocational training in the world including in Germany. The profile and need of the global labour market changed dramatically. The earlier mass production based Fordist system was no longer competitive in the German market, and unskilled and unqualified jobs become redundant. The demand for skilled workers increased tremendously with flexible accumulation as the global strategy of the firms (see Lipietz 2010). These new changes in labour market relations and production structures brought in a series of reforms to strengthen vocational training. The first of that kind was

enactment of the vocational training act of 1969 followed by the establishment of Federal Institute for Vocational Education and Training (BIBB) by federal government in Germany.

The VET act of 1969 brought together the previous fragmented laws on vocational educational training in to a single consolidated body of laws (Diane-Gabrielle 2003). This move provided a base for future institutional reform in regulating vocational training in the country. The Federal Institute for Vocational Education and Training (BIBB) assumed the principal advisor role in co coordinating the stake holders including employers, trade unions and regional ministries (Lander) in policy design and regulation of VET in Germany.

In Germany, compulsory full time education continues to prevail for the age group of 6-18. After four years of primary school, children move into different paths. The basic general educational system is divided into secondary general schools, intermediate schools, grammar schools and other comprehensive schools in different regions (Hippach-Schneider, et al 2007). The dual system is the largest provider of vocational education and training at upper secondary school. The initial different educational paths that provide multiple options to students finally come together in the dual system. The dual system has about 350 state-recognized training occupations.

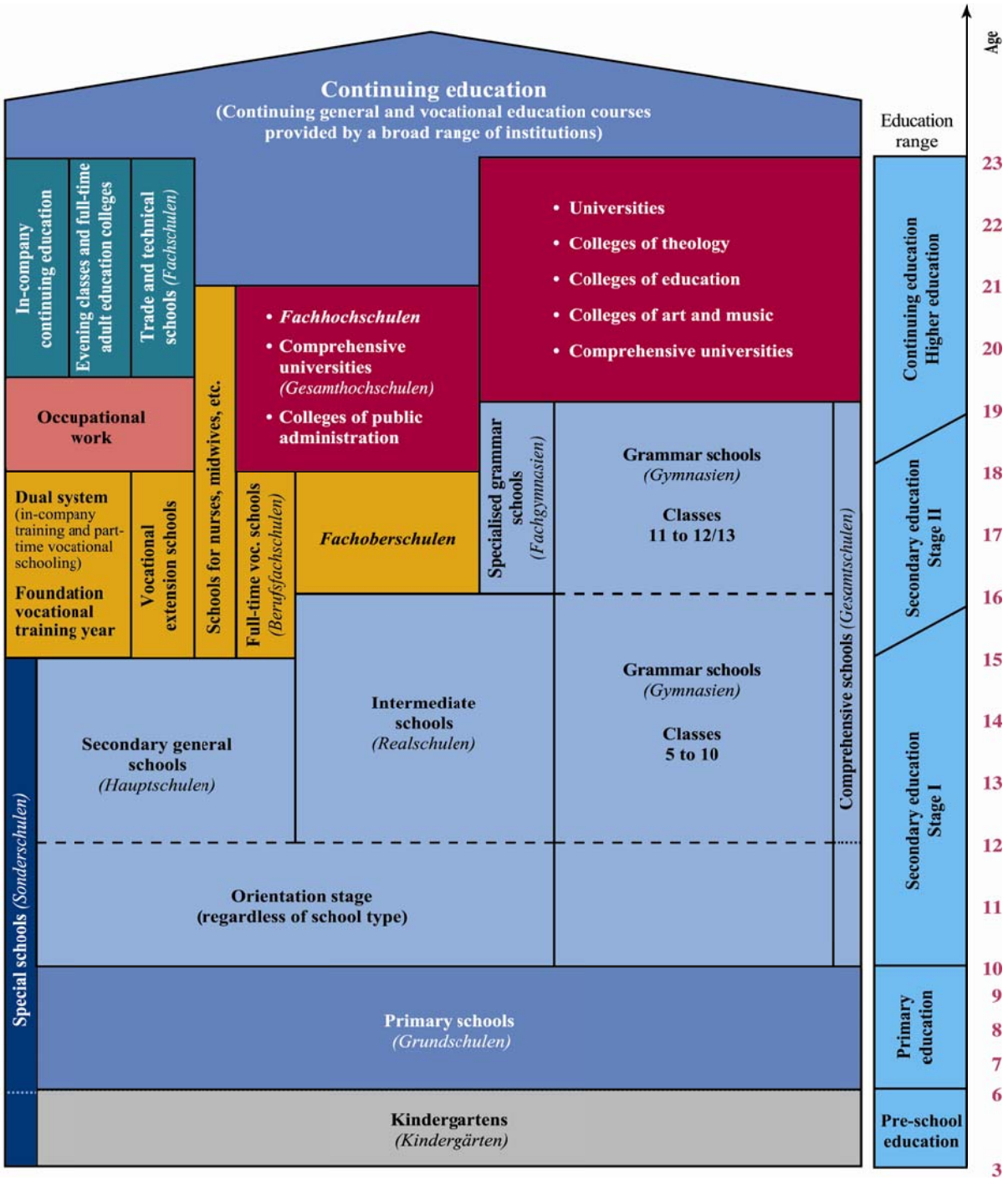
3.4 Structure of General and Vocational Education in Germany

The chart below gives an overview of the German education system and structure of vocational education in the system and their interaction. As the figure 5 shows, vocational education in Germany starts after finishing secondary general education at a very early stage. Germany is well known for primary vocational education. For instance, the average age at which students get in to vocational education system was 18.9 years for 2003 (Rothe 2004). Lower secondary education covers the 10-16 age groups while upper secondary education covers the15-19 age groups (Hippach-Schneider, et al 2007).

There are multiple options available for students in vocational education in the country. For instance, students may choose the dual system and they may also decide to attend a basic vocational training which is prior to the dual system. Other options such as entering a

vocational extension school and attending other specific occupational training school are also available for students. Overall, there are many points of transition between school-based and dual vocational training and from vocational training to colleges. This transition works seamlessly.

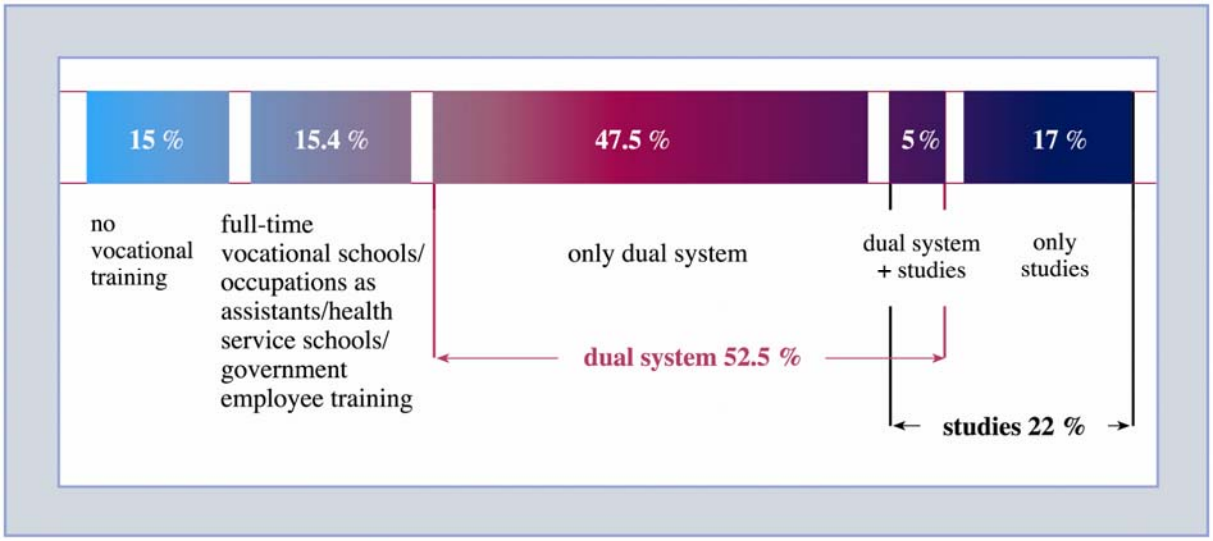
Figure 5: German Education System



Source: BasedonBMBF,2004

Vocational training is provided in companies and schools. More than 50 percent of an age group of 10-19 is involved in dual vocational training (Figure 6). The minimum qualification for entry into dual system is secondary level general education. It also has vocation extension school; these schools are attended either by students who undergo vocational training or those who are employed. Most of these schools are specialized in certain subjects. The duration of training in such schools is generally between 12-18 months (Alexander et al. 2008) In addition to the dual system, and vocation extension schools, the system also has full time vocational schools. The full time vocational schools offer courses of at least 12 months. These schools provide full time vocational training for specific occupations.

Figure 6: German dual System: Distribution of Students in the age group of 10-19



Source: SchaubilderzurBerufsbildung, BIBB, 2006, quoted in Hippach-Schneider, et al (2007)

Besides providing a formal vocational training for secondary general students, the system also has basic vocational training for school dropouts and those who donot have a formal schooling. The arrangement is known as basic vocational training which offers full time or part time classes providing basic general knowledge to certain occupational fields (Bundesministerium 2007 quoted in Alexander, et al. 2008). For Intermediate school certified students, the system offers courses known as 'fachoberschule' which is full time or part time from at least one year to 3 years. Those who graduate from these courses become eligible to enter in to universities of applied sciences (Ibid 2008). Skill assessment in the vocational

education and training system plays a vital role in determining whether or not the students have mastered the learning requirements as laid out in the vocational training. The key stakeholders – Federal Ministries, Federal Institute for Vocational Training (BIBB), Conference for Ministers of Education and Culture (KMK), Employers association and Trade Unions – themselves are involved in regulating the entire VET system. We will come back to this point soon when we discuss the governance issues with respect to the Indian VET system.

3.5 Euler's approach: dividing the system into elements

As noted in the introductory chapter, Euler (2012) makes a distinction between the "dual system" and "dual principle". The dual system refers to a specific institutional regulatory set up and training sites that are needed to implement the dual principle; the dual principle means the way in which theory and practices are combined in the worksites. As Euler suggests, although the dual principle is a core element of the dual system, it may well work in other vocational educational models as well. As it is known about 54 percent in upper general education opt for such vocational training in Germany. Practical training combined with in- house training in companies provides school children with in-depth knowledge about the job and process in worksites.

Euler (2013) identifies 11 essential elements in the German dual system and suggests ways to export those elements to other countries in a modified form. These elements include , (i) the provision of vocationaleducation as a means of achieving socio-economic and individual goals, (ii) production of skilled workers with flexible qualifications, (iii) alternating learning situations in accordance with the dual principle, (iv) vocational training as a task to be carried out in private-public partnership, (v) joint funding (vi) complementary programmes run by schools, (vii) codification of quality standards, (viii) qualification of teachers training, (ix) balance between standardization and flexibility (x) a solid basis for decisions and design, and (xi) for social acceptance of vocational education. All these components are not strictly replicable in other countries. The present study identifies certain key components in Euler's study that are adaptable in the Indian context. However, the Indian labour market requirement and skill needs go beyond the scope of Euler's suggestions.

3.6 Key Components relevant in the Indian Context

In the broader context, adapting the dual system to Indian conditions would require attention to five aspects. First, the main objective of vocational training is to produce skilled workers with flexible qualifications who are mobile and capable of working in their chosen fields. Second, learning sites should be alternated in India in accordance with the dual principle. The dual principle can be implemented using various combinations of locations, with varying amounts of time spent at each, in different ways and to differing degrees, and periods of practical training in the company setting can be integrated into an alternate training system. Third, the vocational training cost should be borne proportionally by both the Governments and the Private enterprises. Fourth, quality standards need to be codified. It is argued that the scope, degree of detail and binding nature of standards can be adjusted to suit the legal culture in the importing country with a view to feasibility, and jobs may be structured and defined quite differently in the importing country compared to Germany. Last, qualifications of teachers and training personnel need focus. It is argued that the quality of teaching staff should not depend on the type of training, and training of school teaching staff should be integrated into national teacher training systems (Euler 2013).

Given the low value perception in respect of vocational education in India, the introduction of such large scale changes in the education system is a challenging task. However there have been attempts by Government of India in this regard. The policy makers increasing cognizance of the same has resulted in a new scheme of school based vocational education in India since the beginning of the 12^{th} Five Year Plan (2012-17). However, they are distinctly different from German models.

3.7 Partnership between Government and Private Enterprises

The regulatory framework of the dual system in Germany evolved over the time in response to the changes in economy and needs of the labour market. The core structure of the vocational training system is the constant alternation between training in vocational schools and training in companies. The foundation of vocational training regulation was made in Germany with the enactment of vocational training act 1969 (Tremblay 2003). The act underwent lot of changes subsequently. Initially, the act only regulated training provided by

firms. Under an agreement concluded in 1972 and consolidated in 1979, coordination was established between the federal government (in charge of in-firm training) and the ministries of Education and Cultural Affairs (responsible for school-based instruction). This provided the basis for harmonizing regulatory mechanism of the dual system between various stake holders in the country. The formation of the Federal Institute of Vocational Training (BIBB) was a land mark in the history of the dual system in Germany.

3.7.1 Regulation in Germany: Federal, Regional and Local Levels

Within the Federal Government, the Federal Ministry of Education and Research (BMBF) was responsible for policy, co-ordination and legislation for all the issues related to vocational education system in Germany (Country report 2011). The ministry also does periodic review of higher education system in the country and plays key role in expansion and innovation of educational system. The other ministry which is closely involved inthe vocational regulation is the Federal Ministry of Economics and Technology (BMWI). It recognizes training occupations, and proposes guidelines and training regulations for training occupations in close consultation with the Federal Ministry of Education and Research. The core institution at the national level for consensus building between all parties involved in VET is the Federal Institute for Vocational Education and Training (BIBB).

3.7.2 Federal Institute for Vocational Education and Training (BIBB)

BIBB was founded in 1970 on the basis of the Vocational Training Act as a federal government institution for policy, research and practice in the field of vocational education and training (Diane-Gabrielle 2003). The institute is recognized as a centre of excellence for vocational research, a platform for dialogue by decision makers (Ibid 2003) for the progressive development of vocational education and training (VET) in Germany. The core responsibilities of the institute are to identify challenges in changing labour market, foster innovation, and develop practice oriented solutions to problems in the VET system. BIBB is responsible for research and development in workplace vocational training. It also plays the role of service provider and advisor to the Federal Government and vocational training practitioners. The BIBB also has the mandate to modernize and improve vocational training

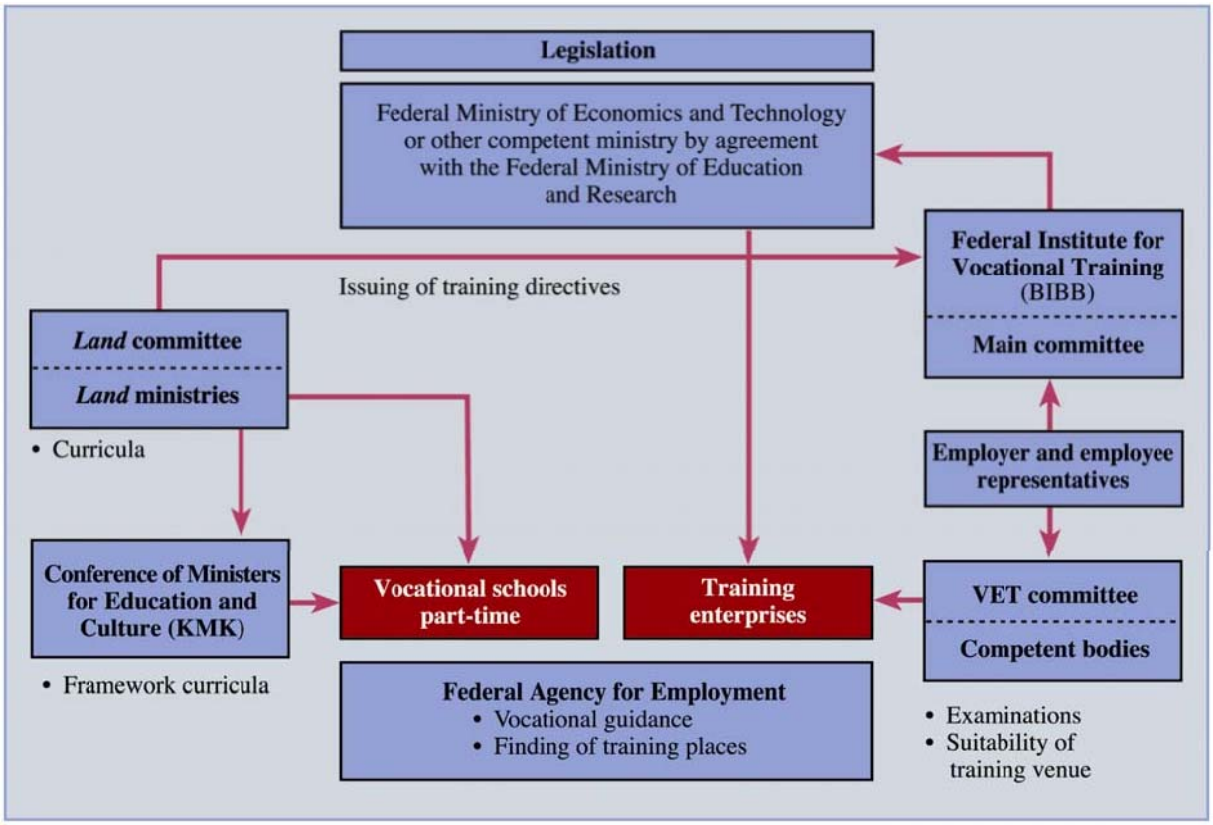
on the basis of technical, economic and social developments. The BIBB is accountable to the Federal Government and comes under the legal supervision of the Ministry of Education and Science (BMBW).

As per the constitution in Germany, the regulation of school education lies with the regional (lander) Ministries of Education and Cultural Affairs. The constitutional provision obliges the regional ministries to cooperate with one another and to work together with the federal government. The Ministers of Education and Culture of the Lander cooperate in a Standing Conference (KMK) to ensure a certain measure of uniformity and comparability, especially in school and higher education policies (Ute Hippach-Schneider et.al 2007). The Standing Conference of Ministers for Education and Cultural Affairs (KMK) issues framework curricula for vocational education at vocational schools. These framework curricula are harmonized with the Federal Government's training regulations. Curricula for general education at vocational schools are essentially developed by the individual Lander.

3.7.3 Role of Social Partners (Employers and Trade Unions)

The important feature of the VET system in Germany is the close social partnership between employers, trade unions and the government (Figure 7). The continuous dialogue and consensus between these stakeholders are important for the policy changes or reform in VET in the country which is being practiced and implemented through the BIBB. The employers' associations and trade unions who are partners in the policy governance of BIBB exert considerable influence on the content and form of VET to ensure that their requirements and interests are taken into account. Responsible action of all participants and consensus over competing interests of the groups is a precondition for the efficiency of the dual system in Germany.

Figure 7: Operation of New Training Modules



Source: Federal Institute for Vocational Education and Training (2006)

Euler's dual system involves the essence of partnership between Governments and private enterprises. This is desirable and replicable in the Indian context, provided a concerted policy framework is developed. There have been a few initiatives for such a collaboration on the PPP model (public private partnership). The National Skill Development Council (NSDC) has been a successful initiative in this sphere.

However, the industry involvement in such training initiatives has been abysmally low in India. For instance, India has the lowest level of in-firm training among the BRIC countries such as Brazil, Russia, and China. The share of firms that are currently providing in-house in-company training to their full-time permanent workers is only 15.9 per cent (World Bank, 2007). This share of Indian firms offering training is low as compared to other developing countries and there has been a decline in the percentage of firms offering in-firm training in the recent times. Our field survey too provides evidence for such a low level of industry

participation in training. However, since industries cannot be compelled to offer in-house training, there may be sector based voluntary initiatives.

The government of India through its National Skill Development Agency (NSDA) can coordinate among companies in different sectors along the lines of the Federal Institute for Vocational Education and Training (BIBB) which plays an essential role in coordinating guidelines and in research relating to vocational training in Germany. Government can identify the level of skills gaps in various sectors and solicit cooperation from companies for vocational training. NSDC has already been engaged in the skill gap analysis, even though it has been done rather quickly, without a representative sample.

3.8 Combining Theory and Practice

Euler's dual principle implies the integration of theory and practice, thinking and acting as part of a single process. Conception and execution as a continuum is what is essentially embedded in the German dual education. The key element of the dual system that is in any case needed in the Indian context is again the mechanism which combines theory and practice effectively. Various studies (NSDC 2009 and Mehrotra 2013.) including our own field survey highlights the need of application and practice oriented vocational education in India. Given the low value perception on vocational education in India, the introduction of such large scale changes in the education system is a big task. However there have been attempts by Government of India in this regard. The policy makers increasing cognizance of the same started promoting an integrated approach to theory and practice among schools and worksites.

The NSDP (MoLE 2009) identifies National Vocational Qualifications Framework (NVQF) as the main instrument for linking education and training pathways. Comyn (2009, as cited in Singh 2012) describes the key distinguishing features of the NVQF as the 24 distinct vocational clusters which align with major industrial sectors. For each of these 24 clusters, vocational qualifications relevant to each sector are to be developed. The qualifications in the Technical and Vocational Education and Training (TVET) sector will include four competency certificates and a further five credentials from diploma to doctorate available from polytechnics and universities within a higher technical education system (World Bank 2008, as cited in Singh 2012).

The National Vocational Education Qualification Framework (NVEQF), on the other hand, is a unified system of national qualifications covering schools, vocational education and training institutions as well as the higher education sector (MHRD 2011). It integrates education and training systems encouraging lifelong and continuous learning. The NVEQF aims to provide recognition and credit for all learning of knowledge and skills, facilitate mobility and progression within education, training and career path and facilitate validation of non-formal and informal learning as recognition of prior learning, thus facilitating lifelong learning besides being designed to provide nationally recognized, consistent standards and qualifications. It also seeks to promote international recognition of qualification offered in the country (Singh 2012).

Similar to NVQF, the key driver of the NVEQF is the need to integrate the range of qualifications that are currently being provided through TVET programmes run by more than 17 ministries (MHRD 2011). A further key objective is to bring out necessary flexibility in the offering of vocational courses and development of 'modular competency based curriculum' in collaboration with the industry to suit the need of both employer (industry) and youth (Singh 2012). The NVEQF (IAMR 2011, as cited in Singh 2012) will have ten national qualification levels – from secondary level to the PhD level, interweaving academic education, vocational education and skills training.

Finally, both NVQF (MoLE 2009) and NVEQF (MHRD 2011) aim to establish linkages between vocational schools and training institutions requiring closer cooperation between the MHRD, MoLE (Singh 2012) and the Industry circles. Also according to the NSDP (MoLE 2009) the NVQF, now called the National Skills Qualification Framework, will be developed as part of an overall National Qualifications Framework (including NVEQF) and will conform to its broader guidelines and structure, but would operate largely autonomously with reference to the particular context of the vocational education and training system (Singh 2012).

3.9 Partnership between government and business: Joint Curriculum Design

Besides the key elements mentioned above which are desirable and replicable in India, there are also other elements of the German dual system which may be considered for their relevance. In Germany, the Ministers of Education and Culture of the Lander cooperate in a Standing Conference (KMK) to ensure a certain measure of codifying skills, standards and curricula at vocational schools along the lines of the training regulations of the Government and the BIBB, the latter adequately represented by the employers and employees. This generates a harmony among various stakeholders on the issue of modernization of vocational training on the basis of technical, economic and social developments.

Firstly, the design of curriculum and preparation of modules are done by the Ministry of Human Resources Development (MHRD) without any participation from the large number of stakeholders who are directly and indirectly related with the vocational education system. Secondly, there is no consultation taking place with the actual employers with regard to the content and standard of the curricula to be followed in the vocational schools. Secondly, there has already been a proposal in this direction. The Federation of Indian Chamber of Commerce and Industries (FICCI) has already taken over many Industrial Training Institutes (ITIs) in India and has expressed interests in running many more. Industries have been advised to take over ITIs and redesign curricula and revamp the teaching materials in the light of their skill needs. There has also been attempt of codifying occupational standards (OS): the performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. This task is currently underway in India, with the Sector Skills Councils (SSCs) taking the lead.

3.10 Partnership between government and businesses: Joint Funding of VET

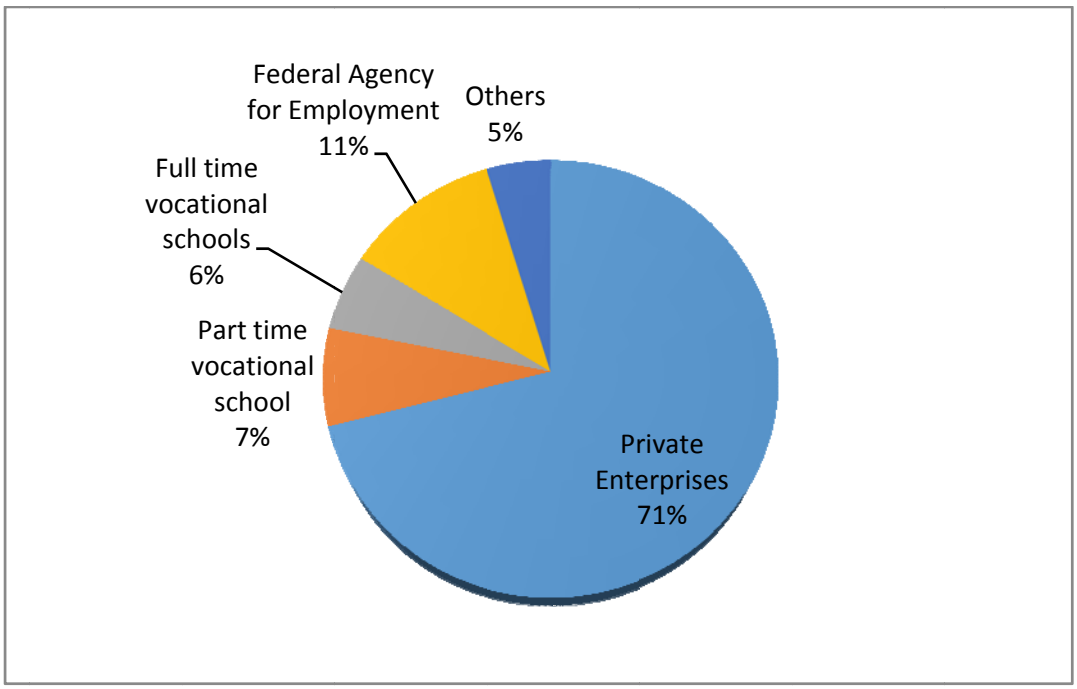
The most desirable element from the German dual is the partnership between government and business in sharing the vocational training cost. In Germany, the government and the business community contribute in different ways to financing vocational training. They also contribute to the codifying process of skills, standardization and curriculum design. As practical training takes place in private work sites, it is also simultaneously a cost sharing and curriculum design mechanism. Further, the private companies themselves have self-governing

bodies (e.g. Chambers that cater to a single industry) which take care of organization, inspection and supervision of vocational training in private enterprises. The partnership between government and enterprises in Germany is also a participation for the general welfare of the entire economy.

The key element of the dual system that is in any case needed in the Indian context is the mechanism which combines theory and practice effectively. Various studies (NSDC 2009 and Mehrotra 2013) including our own field survey highlights the need of application and practice oriented vocational education in India.

For instance, in 2000, of a total of 39 euro billion spent on vocational training, about 27 billion euro was borne by private enterprises. This accounts for 71 per cent of total expenditure spent on vocational training in the country (Ute Hippach-Schneider et.al 2007). The rest of the financing is done by different Government agencies: federal agency (11 per cent), full time vocational schools (6 per cent), full time vocational schools (7 per cent) and the other agencies (5 per cent; see Figure 8). However, there has been a decline in training investment by the private sector over last few years. It has recently been reported that the government in Germany contributes around 57.2 percent of the total costs of vocational training (including federal's 18.5 percent, states at regional level 27.6 percent and local communities' 11.2 percent). The private entities as a whole contribute the rest (42.8 percent; see German Federal Statistical Office 2012: 29 cited in Euler 2013). The private enterprises finance vocational education in various ways such as solidarity contribution and industrial fund.

Figure 8: Source of Financing in German VET System



Source: Ute Hippach - Schneider et.al (2007)

In certain industries, the firms come together and bear the training expenditures collectively. This perhaps becomes viable in the industrial clusters where positive externalities exist. The individual enterprises decide on occupations that are in demand in labour market and need training. They have control on number of trainees to be trained and amount to be invested in training. As stated earlier, in certain industries the financing and skill content and modes of training are done collectively by enterprises.

In certain sectors, private enterprises directly benefit from providing vocational training. The business community in Germany sees financing vocational training as investment rather than cost. The business class as a whole views this as a means of overcoming the free rider problem. The money spent by companies is offset by the increased productive contributions of their trainees and other factors that generate benefits for the respective business. This has also been quoted as one of the prime reasons why Germany leads other European countries in terms of industrialization:

However, the German dual system is also characterized by uneven distribution of cost and benefits across companies. It is felt that some companies hire more staff than they train

indicating a certain level of poaching. This act generates free rider problems in the country and affects training potential in the long run. Another problem in Germany that is being increasingly recognized is the overall decline of company participation in training. For instance, the proportion of businesses participating in training declined in 2010 to an all-time low of 22.5 percent (Euler 2013).

Companies in India need to see training expenditure as an investment rather than a cost. The money spent by companies is offset by the increased productive contributions of their trainees and other factors that generate benefits for the respective business. This also has been quoted as one of the prime reasons how Germany leads other European countries in terms of manufacturing, a trajectory that India will need to emulate, if India is to become a major manufacturing nation.

In contrast to Germany, the Indian companies are passive beneficiaries of the Indian VET system. There is no any single system of governance in which the private companies can take either part in running the vocational education schools or investing in such ventures. Why firms are not motivated in joint investing with the government is a broader question which we will address shortly. As we noted in chapter 2, our discussion with firms suggest that the firms also face serious problems in providing training to their new recruits. These problems are broadly moral hazard combined with a free rider (see Mehrotra and Ghosh 2012) in nature and firms are not guaranteed that joining the government in running the VET system would take care of their concerns since the fast changing labour market is such that other firms will free-ride upon investment made by one firm in any of the state-run vocational schools.

While we broadly agree with the free-rider problem, we do not want to assume that company decisions regarding training investments are based on financial considerations alone, which are often challenged in business literature. Second, we would also want to highlight the fact that companies often do not acknowledge the fact that they themselves avail the free riders' advantages, as long as they are passive beneficiaries of state run institutions. In order to avoid underinvestment in training due to the fears that the benefits of training investments will accrue to competitors if trained workers leave the firm, various countries experimented

with sectoral training investments (see Kamphuis, Glebbeek and van Lieshout 2010). Our field investigations confirm the presence of such concerns regarding software firms, though the firms in other sectors did not have any strong views regarding this. However, we will also engage with this as part of developing a viable strategy of public-private partnership and private-private partnership (chapter 4).

This necessitates working on alternative strategies in which public and private companies take part with common social responsibilities. One way to generate funds for vocational training is by establishing National Training Fund (Mehrotra 2012). About 62 countries around the world have already put some form of training levy in place. Some large economies such as Brazil have had a training fund for over half a century and South Africa has had it for at least 10 years. It is argued the levy for NTF in India may start from the organized manufacturing sector since it accounts about 78 % of output in total manufacturing. Another way is sectoral training investments which are often treated as the resolution to the free rider problems. This could also be along the lines of Germany's construction industry initiatives. In this initiative, all construction companies pay a percentage of their payroll costs into this fund, which is again used to compensate companies for the fees and costs associated with inter-company training and other expenses. We shall return to such alternatives when we deal with the best practices of VET in the next chapter.

3.11 Comparative Context of VET in Germany and India

Vocational Education and Training (VET) systems in Germany and India, as outlined in Chapter 2 and in the previous sections, are different. The following table summarizes the differences between the two systems:

Table 5 : VET systems in Germany and India		
Categories	Germany	India
Earliest age at which Vocational Education is available	10 years	13 years
System	Dual system (vocational school and company)	Vocational education at school, training at ITIs/ITCs, apprenticeship in companies
Learning Venues	Learning workshops, company (production and trade), interplant training centers, class rooms, specialist rooms	Mainly classroom, workshop in ITIs
Responsible Bodies for Financing	Private enterprises, Federal state bodies	Central and state governments, tuition fees
Jurisdiction	Federation (company) and federal state	Central and state governments
Responsibility for Vocational Education	Horizontal and vertical administration	Horizontal and vertical administration
Curriculum design	Public-Private Partnership	MHRD
Regulations	BBiG/HWO training directives, school laws and framework curricula by the federal state for school based training	National Council for Vocational Training
Certificate	Craft certificate and Certificate of apprenticeships, certificate for management assistance in trade related, vocational school qualifications	National Trade Certificate (NCVT of MoLE), Higher secondary certificate (Education Board)
Teachers' Training	Nine semesters of teacher training, two state examinations	-
Other Characteristics	Long tradition of dual system, Concrete regulations and detailed law	-

Source: adapted from Schnarr et al (2008), section 3.4

It can be seen from Table 2 that while in Germany, VET is a dual system which is managed and financed by the government and companies, in India it is managed and financed by the government and individuals privately. In Germany, apprenticeship and vocational training is carried out by vocational education schools and companies according to the framework curricula and training directives which provides an effective combination of

theory and practice (Schnarr et al 2008). On the other hand, in India, vocational education takes place in schools and vocational training in ITIs/ITCs with limited industry linkages. In addition, the German VET is regulated by organizations which strongly support the planning, implementation and control of vocational training, whereas in India VET has not been promoted over the last decades and therefore remains underdeveloped (Schnarr et al 2008). Finally, in Germany there is a long history and tradition of vocational training, technicians and qualified skilled workers enjoy prestige in society. Independent learning, critical thinking and innovation competence are also emphasized in the learning process (Schnarr et al 2008). In India, however, vocational education is culturally associated with a stigma (MHRD 2011).

The VETs in these two countries, given their differences, respond differently to the needs of the labour market. The small difference between general unemployment and youth unemployment in Germany relative to other OECD countries is attributed mainly to Germany's dual system of vocational education which opens up good possibilities for young adults to enter the world of work (Thode2006 as cited in Schnarr et al 2008). The context of a dual system is defined by the presence of a nationally unified, universally recognized and comparable qualification in the form of the crafts certificate. In addition, industry needs influence from the regulatory framework for training professions in Germany and its documents such as vocational training directives (Schnarr et al 2008).

In the Indian context, it is argued that fostering vocational training with adequate geographical coverage is an important channel for improving working conditions of young individuals who have a job and for boosting employability of the low-skilled vulnerable (Biavaschi et al 2012). However, it is also argued that the private sector is not effectively carrying out its roles in provision and financing of skillsfor reasons such as market failures and possible policy distortions (Adams 2011). One aspect of this problem involves the provision of skills for the informal sector.

Closely related issue is the near absnece of VE in secondary schools in India, while German and Chinese systems rely on it. However, the Vocationalisation of Secondary Education at + 2 level is being implemented since 1988 which was subsequently revised on various occasions. It provides financial assistance to the States (to set up administrative structure, preparation of curriculum, text book, training manual, teacher training programme

etc) and offers partnerships with NGOs and voluntary organizations towards implementation of innovative projects for conducting short-term courses. This new scheme has three benefits: it would help stem the drop out in the secondary schools; it would provide employment opportunities with marketable skills and thereby improve their barganing position. The idea of bringing vocational education in the secondary level is also agrees with the observation made by theWorld Bank (2006) that employers prefer students with general education skills in addition to vocational skills.

3.12 Concluding Remarks: What are the lessons for the Indian VET System?

There are wide differences in practice between VET in Germany and India. However, there are many lessons that India could learn and adopt from the German dual system.

First, Germany meets both the dual system and dual principles and it is organized in such a way that the formal theoretical knowledge is conducted in vocational schools run by the State, the practical knowledge takes place in factory sites owned by the private companies. The Indian VET lacks the kind of integration between theory and practice and hence requires a redesigning of its VET in such a way that there should be a theory-practice continuum among class rooms and worksites, approximating to Euler's notion of dual principles.

Second, in Germany, the whole system of VET is governed by a well-coordinated institutional-legal mechanism. This has historically been so and further strengthened by the VET Act in 1969 which has been subsequently revised. In India, there exists no such institutional-legal mechanism binding the stakeholders and leading to the maximisation of requirements simultaneously, a lesson which could be emulated by the government of India.As the German Chambers do self-regulation, SSCs have to learn from them and adopt a method of regulating themselves towards the goal of preparing curriculum design, certification and standardization of syllabus, certification of skills and competencies.

Third, while the public-private participation in Germany has been capable of meeting their skill requirements through cost sharing, India has been averse to such partnerships until recently. For long, there has been no move from the government to persuade the private companies to share the cost of training; nor has there been on the part of the private companies to work with each other in terms of cost sharing. Lately, however, there has been

some development during the 11th Five Year Plan period in the form of Institutional Management Committees for government it is, on which both the local private industry is represented. However, as Mehrotra (2014 forthcoming) indicates, the experience with this PPP-model has been mixed.

Even so, the emerging PPP model needs strengthening in terms of institutional-legal framework.

Chapter 4

Adapting the Elements of the German TVET system to the Indian situation

In this chapter, we address the issues of Indian Vocational Education and Training (VET) followed by a comparison with that of the German VET system. Section 1 explains the nature and structure of VET system in India and how it has been governed. This is followed by the expansion of the VET in terms of growth of ITIs, the enrolment, and the facilities offered for the training of women. Section 3 examines the weaknesses of the Indian VET and the recent reforms launched by the Government in the form of Skill Development Initiatives, National Skill Development Corporation and the Sector Skills Councils. Section 4 deals with the involvement of private companies in the administration of the Indian VET particularly in designing curriculum and codifying standards. The question of regulation of VET is explained in section 5 by addressing the question of governance and coordination of ministries in the context of reforms. Section 6 provides a comparative analysis of VET in Germany and India and this followed by the nature of involvement of private companies in the funding of VET in India. How could a cost sharing between government and business be planned and how the firms could be motivated to agree to a cost sharing is also addressed. This is followed by the concluding remarks in section 8.

As has been highlighted in chapter two, the challenge for skill development in the 12th Plan is two-fold (Mehrotra , forthcoming): that half of the current work force (228 million) that is either illiterate or only has attended primary or less education and even though they have acquired their skills informally, they should be able to get recognition for their prior learnt skills, thanks to the National Skill Qualification Framework – but for which institutional mechanisms have to be created; to ensure that all children between the ages of 6 and 14 are completing elementary education by the end of the 12th Plan, as required by the Right to Education Act, 2009. Completion of at least eight years of schooling is a pre-requisite to preparing a teenager for a vocation. Only an understanding of the Indian VET would allow us to address the challenges highlighted above.

4.1 Vocational Education and Training (VET) in India

Vocational education and training in India has been governed by several educational institutions/organizations functioning under roughly 21 different Ministries of the federal Government (Singh 2012). Vocational education in the country usually starts after secondary school level, and is offered at school level in 11th and 12th standards. There are more than 150 courses under vocational education covering six major disciplines: agriculture, business and commerce, engineering and technology, health and paramedical, home science and humanities and science and education (Agrawal 2012).

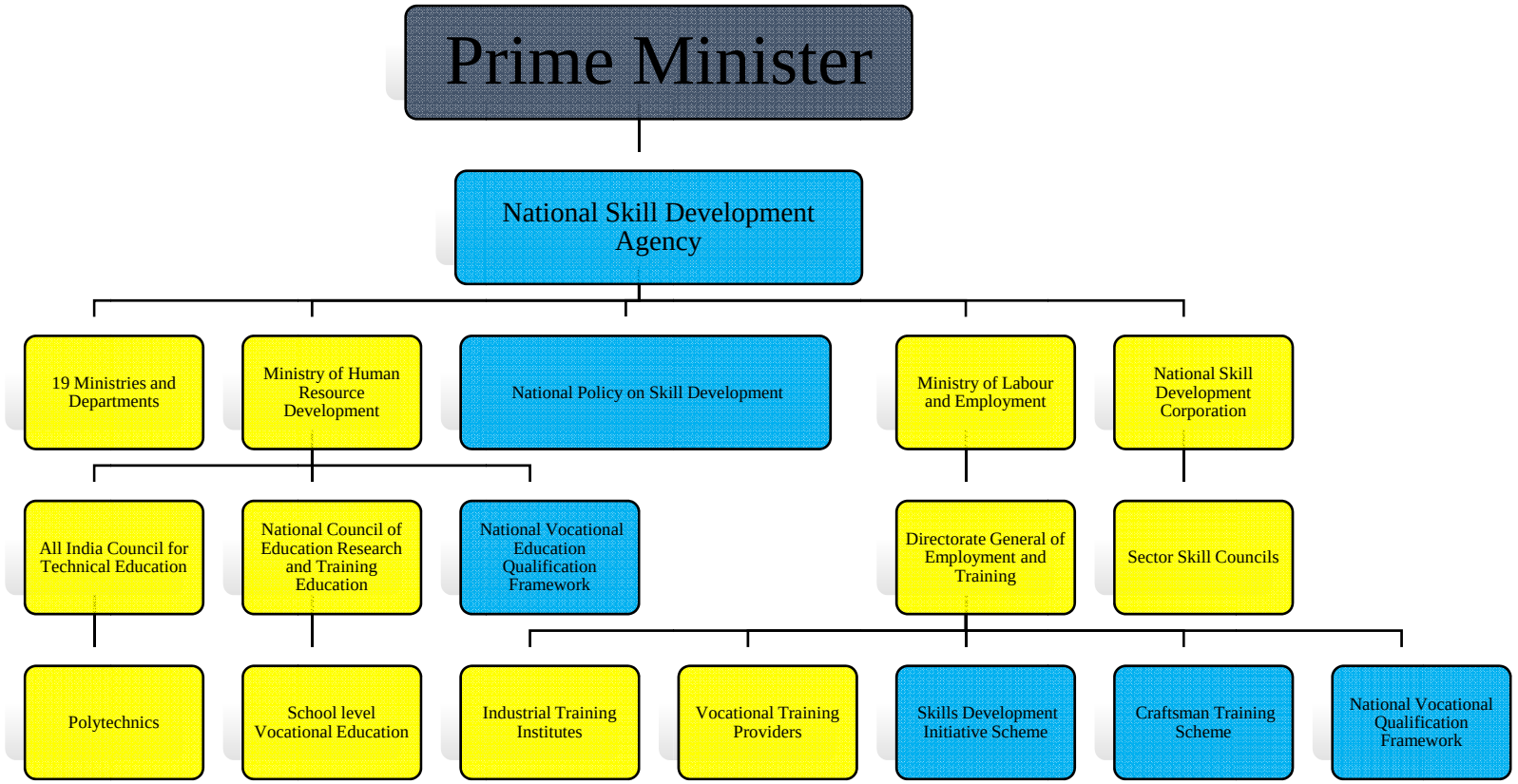
Vocational training, on the other hand, falls outside the formal schooling cycle and includes institution based training programmes. Programmes are administered under two principal schemes, viz., Craftsmen Training Scheme (CTS) and Apprenticeship Training Scheme (ATS). The period of training for various trades varies from six months to three years and the academic entry qualification varies from 8th to 12th standard depending on the requirements of training in different trades. Vocational training is mainly provided through ITIs/ITCs[2] and polytechnics. More than 150 courses/trades are offered both in engineering and non-engineering streams in these institutes. Polytechnics generally offer three-year diploma courses in engineering/technology trades after 10th standard.

The informal structure of skill development includes the transfer of skills from one generation to another in traditional crafts or acquisition of skills on the job. Here, the skill development programmes are too disjointed and routine-oriented. Moreover, as the opportunity cost of training for the workers in the informal sector is high – they cannot afford to forego wages during training - it is argued that state interventions must address this important area (IAMR 2010). The Vocational Education and Training system (TVET) in India as a part of the overall education system is depicted in the following figure 9:

[2] Industrial Training Institutes (ITI) are training providers established by the government, whereas private ITIs are also training providers but managed by private players on self-financing mode. These private ITIs are sanctioned and regulated through the Craftsman Training Scheme (CTS) by Directorate General of Employment & Training (DGE&T), Ministry of Labour, Government of India

Figure 9: Technical and Vocational Education System in India

MHRD regulates polytechnics and school-level vocational education while MOLE regulates Industrial Training Institutes and Vocational Training Providers



4.2 Post 80s Development: Impressive Growth in Training Centres

Until the mid-1980s, the secondary school system (of the Ministry of Human Resource Development (MHRD)) in India offered only general, academic education, with no option for vocational education. Vocational education (VE) was introduced as an option at higher secondary level (i.e. classes 11-12) only in 1985, and was accorded high priority in the National Policy on Education (1986). The NPE, 1986 set out the target of the coverage of cover 10% higher secondary students under vocational courses by 1990 and 25% by 1995. The Programme of Action, 1992 reset the targets for diversification of students in vocational streams at higher secondary level to 10% by 1995 and 25% by 2000. However, an enrolment of only about 5% has been achieved (MHRD 2011). In numbers, the current enrolment of school children in these vocational schools is only about one million against 16 million children who managed to enroll at higher secondary level. Moreover, there are only 9,619 vocational schools as against 171,862 secondary schools (Government of India 2010, as cited in Venkatram 2012). It is suggested that vocational schools create a sense of second class citizenship as the academic stream (general education) seems to promise a higher employability than the vocational stream. Only 3% of those in the age group of 15-29 years receiving formal vocational training are employed, while only 10% of persons receive vocational training, 2% receive formal training and 8% receive informal training (Jamal and Mandal 2013).

The Apprenticeship Training Scheme of the Ministry of Labour and Employment (ATS) aims to provide training facilities to the maximum number of people in different trades in various enterprises under Apprenticeship Act 1961. The ATS and the training of skilled workers under the Advanced Vocational Training Scheme are implemented jointly by union territories/state governments and the central government. There are four categories of apprenticeship trainees, namely, trade, graduate, technician, and technician (vocational) apprentices. As on date, 254 groups of industries are covered under the Apprenticeship Act of 1961 with about 31,587 enterprises engaging apprentices (MoLE 2011-12). Currently apprenticeship is available in 252 trades (Mehrotra et al forthcoming).

The main objectives of the CTS are to provide skilled craftsmen to industries according to their requirements and also provide self-employment opportunities to educated youth by giving them industrial training. The programmes under CTS focus on industrial trades and are operated by Industrial Training Institutes (ITIs) and Industrial Training Centers (private ITIs). After completion of the ITI course, students appear for a test conducted under the aegis of the National Council for Vocational Training (NCVT) and successful students receive a National Trade Certificate (Mehrotra et al forthcoming).

There were 9,447 ITIs/private ITIs (ITIs: 2244, private ITIs: 7203) in India in 2009 with a subsequent increase by 29 per cent [3] during 2008-09 (Mehrotra et al forthcoming). Over the period 2009-2012, the average annual growth rate of number of ITIs/private ITIs has been 4.6 per cent per year with an overall growth of 20 per cent. During the same period (2009-2012), the seating capacity[4] in these institutions grew by around 26 per cent (DGE &T 2011-2012, as cited in Mehrotra et al forthcoming). Presently, the private ITIs outnumber the ITIs and the difference in number of seats between private ITIs and ITIs is 390,012 (DGE&T 2011-2012). These institutes impart training in 127 engineering and non-engineering trades[5] (DGE&T website 2012).

Moreover, some effort has been made to create special facilities for the training of women. For this purpose, DGE&T has dedicated a women's training cell to design and structure women's vocational training programme in the country. At the State level, vocational training for women at craftsmen level are provided through a network of Women's Industrial Training Institutes/Women's training wings in general ITIs under the administrative control of the State governments. There are about 1,409 Women's ITIs and wings in ITIs/private WITIs[6] which have a total of 74,124 training seats (DGE&T 2011-12, as cited in Mehrotra et al forthcoming).

In addition to ITIs, there are six Advanced Training Institutes (ATIs) to provide training for instructors in various trades, and two ATIs for offering long and short courses for

[3] Number of private ITI/ITIs in India, 2009: 7886, 2012: 9447
[4] Seating capacity, 2009: 1062524, 2012: 1335488
[5] Engineering – 67 trades, non-engineering– 60 trades.
[6] 313 government Women's ITIs and 136 Women's private ITIs, 758 Women's training wings in Government ITIs and 202 Women's training wings in private ITIs

the training of skilled personnel at technician level in the fields of Industrial, Medical and Consumer Electronics, and Process Instrumentation.

4.3 Weaknesses of Indian VET: Loose Link between Theory and Practice

A number of maladies affect the vocational education and training system in India. It is found that within the formal structure of skill development, though the internal efficiency of private ITIs is higher than that of ITIs, neither ITI nor private ITI graduates perform well in terms of external efficiency, and the labour market success rates of ITI graduates are somewhat better than those of private ITI graduates. In addition, major problems faced by the polytechnic education system are – non-availability of courses in new and emerging areas, inadequate infrastructure facilities and obsolete equipment, system unable to attract quality teachers, inadequate financial resources, inadequate or non-existent state policies for training and retraining of faculty and staff, lack of flexibility and autonomy to the institutions, inadequate industry institute participation, lack of research and development in technician education, and antiquated curricula (Goel[7]).

The Ministry of Human Resources and Development (2011) has identified the following reasons for the poor performance of Indian VET:

(i) Training verus education: Vocational training is treated as distinct and separate from general education. However, to work in a professional environment and do many jobs effectively, one needs to have a certain minimum of both, i.e. theoretical knowledge of systems as well as the practical (skills training). It is seen that pass outs of ITIs and even private vocational education are given certificates distinct from those of general education, making these dead ends.

(ii) Industry and job linkages: The vocational training institutes, which aim to prepare students for jobs, often do not have close linkages with industry and understanding of employer needs. Hence, the training provided is based upon outdated perceptions of what is needed or on a centralized decision making process. It is argued that courses and

[7] http://www.unevoc.unesco.org/up/India_Country_Paper.pdf , accessed in October 2013

curricula developed in conjunction with industry should have a local context and relevance.

(iii) Redundant and inadequate curriculum and faculty: The curriculum has remained static over years, not reflecting current requirements. Moreover, quality and robustness of curriculum varies and often leads to uneven delivery depending upon the teacher's interpretation and capability. Facilities and labs are behind times, resulting in ill equippped pass outs.

(iv) Poor quality: Lack of strong teachers and pedagogy as well as facilities lead to uneven quality. It is argued that the teachers need to have regular refresher training courses.

(v) Stigma/lack of motivation: Vocational education is often considered the option of last choice. In other words, one would join vocational education if he or she performed poorly in the general education stream and exhausted other options. It is also linked to economic compulsions to enter the work place at an early age. It is argued that this results in vocational education and training leading to low end jobs mostly and a low esteem for vocational pass outs as well.

(vi) Dead end: There is a lack of vertical (or horizontal) mobility for progressively gaining further qualification/transferring into higher education from vocational education.

Aspirational links to higher education and better jobs progression: It is argued that vocational education carries a stigma which has to be dealt with by refoming learning techniques, developing what is called National Vocational Education Qualification Framework (NVEQF), allowing short term courses and modular in nature, and by offering post training jobs.

To some extent there has been a successful attempt at linking theory and practice in recent years. As part of the Skill Development Initiative (SDI), the Government of India created the National Skill Development Mission, a three-tier structure, to design and implement the National Skill Development Policy. The first tier is the Prime Minister's National Council on Skill Development – a largely advisory body[8]. The second tier is the National Skill

[8] An office of the PM's Advisor on Skills was created in 2011, and Mr. Ramadorai, the former Chairman of Tata Consultancy Services, was appointed as the Advisor to the PM on Skills, in the rank of Cabinet Minister

Development Coordination Board (NSDCB), with participants from relevant Central Government and State Government ministries, and also private sector representatives. This is followed by the National Skill Development Corporation (NSDC), which forming the third tier, is non-profit making company under the Companies Act. The NSDC was created in 2010 with two policy objectives (Mehrotra et al forthcoming). First, it is meant to proactively catalyze the creation of quality vocational training providers (VTP) in the private sector. It has been funding the creation of such VTPs in the private sector by lending capital in the form of equity and loans. Second, it is intended to be an enabler for building support systems required for skill development. Such support systems include Sector Skills Councils (SSC), quality assurance, information systems, training trainers and setting standards. The Sector Skill Councils are supported to define the National Occupational Standards (NOS) for the respective skills sectors, and are responsible for engaging with the central- and state-level implementing agencies in developing the curriculum package, in the engagement and capacity building of vocational teachers, and in the assessment and certification of the skills imparted (UNESCO[9]).

NSDC has been very successful in expanding private sector's capacity to train. The total number of privately owned centers financed by the NSDC has grown from zero to 2511 in mid-2013. Within a span of three years, the NSDC financed partner companies have trained about 650,000 people, of which 61 per cent have received placements.

4.4 Involving businesses in the administration of the Indian VET-System and in the design of the Curriculum and Codifying Standards

There are certain serious problems in adopting other components of German dual system in Indian context. The differences in the structure of economy in Germany and India, the stage of industrialization, the expanding size of informal sector(s) should also be taken into account. The Indian education system was originally programmed on the colonial model and it has a certain path dependency thus doesn't provide seamless mobility between vocational and general education. Neither does India has a VET Act as in the case of Germany or China.

Given this background, it is important to understand the specific aspects that need to be considered while adapting certain elements of the German dual system in India.

[9] http://uil.unesco.org/fileadmin/keydocuments/LifelongLearning/en/GlobalInventoryonNQFs_India_130509_final-final.pdf , accessed in October 2013

The aspect of codifying skills standard and devising curricula in vocational education is such a very important component and India in contrast to Germany, has miles to go. There has already been a proposal in this direction. The member industrialists of the Federation of Indian Chamber of Commerce and Industries (FICCI) have already taken over many Industrial Training Institutes (ITIs) in India and have expressed interests in running many **more (see box on Tata Motors).** Industries have been advised to take over ITIs and redesign curricula and revamp the teaching materials in the light of their skill needs. There has also been attempt at codifying occupational standards (OS): the performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. This task is currently underway in India, with the Sector Skills Councils (SSCs) taking the lead.

Box 4 :Tata Motors

The vehicle manufacturing complex produces various ranges of commercial vehicles including the Indigo and Indica passenger vehicle models. Tata Motors established its Pune unit in 1966 to manufacture commercial vehicles, which was later expanded to produce passenger cars as well. The unit has the most versatile tool making facilities and a vehicle manufacturing complex in the subcontinent. It is currently engaged in the design and manufacture of sophisticated press tools, jigs, fixtures, gauges, metal pattern and special tools.

The plant has about 6000 employees, 90% of whom are blue collar workers. It has a fully equipped industrial training centre in its premise and most of the workers are the product of this training centre. It has a long tradition of investing in vocational training and capacity building in the country. For, instance, as of now, it has adopted about 137 ITIs across India. They are adopted under Public Private Partnership (PPP) models. According to this model, Tata Motors provides modern infrastructure for those adopted ITIs and helps in designing curriculum as per needs of the industry and train their trainees. It also facilitates new vocational courses. For instance, some of the courses it has introduced include Motor Mechanic Vehicle, Diesel Mechanic Trade, Fitter and Auto Electrician. These courses were introduced to ensure uninterrupted flow of skilled workforce to its large scale network based dealers placed across India.

Training Centre facility: The training centre is designed on the model of ITI. It has about 23 qualified trainers coming from various disciplines. The centre has fully equipped instruments and other infrastructure. Trainees are given a stipend of Rs 4500 per month. They are also given boarding and lodging facilities within the company premise. The trainees undergo complete theoretical classes in their respective trades and experiment with those concepts in the practical session in the workshop. At times, they are taken to shop floors in the factory for on-the-job training.

4.5 Regulation of Vocational Education in India

In contrast to German vocational educational framework, the Indian system is more centralized. The two ministries such as Ministries of Human Resource Development (MHRD) and Labour and Employment (MoLE) are the key decision makers for Vocational Education and Training in India, and as in so many other developing the two ministries do not often coordinate well.[10] The MHRD controls the vocational higher education including polytechnics and graduates in engineering through the All India Council for Technical Education (AICTE). The AICTE prepares curriculum design, certification and standardization of syllabus and monitors the entire vocational higher educational structure. The ministry also controls vocational education in the secondary schools. This is done through National Council for Education Research and Training (NCERT). The NCERT prepares curriculum, certification etc for vocational education at secondary school level.

Similarly, the Ministry of Labour and Employment (MoLE) regulates and monitors lower end of vocational educational training such as ITI through National Council for Vocational Training (NCVT). The NCVT is mandated to design and develop and maintain curriculum and monitor ITIs across the country. The same ministry also regulates apprentice programme for those who pass out from ITIs and others through its Craftsmen Training Scheme (CTS). After the successful apprentice training, the trainees are expected to appear before All India Trade Test (AITT), the NCVT provides the certificates for those who pass out such exams. Another training scheme is done under the ministry is Skills Development Initiative Scheme (SDIS). The scheme is targeted at workers seeking skill up gradation or certification of skills acquired informally through courses run by Modular Employable Skills. The trainees who pass out from such training scheme are provided certificates by NCVT. The relevance of joint certification scheme with the involvement of various stake holders has not so far been designed in the Indian context. This was also an aspect by and large undermined by Euler (2013) while discussing the replicability of German dual system.

[10] This was in evidence for almost two years (2011-12) in respect of the competing claims by the two ministries in regard to a qualifications framework for VET

A third component of the regulatory framework came to being with establishment of Prime Minister's National Council on Skill Development in 2009. This body later (in June 2013) became known as National Skill Development Agency with autonomous status and parliament mandate. The agency is expected to coordinate and harmonize the skill developments in the country and foster cooperation between the Government and the private sector to meet the skill needs. In addition to the vocational education activities exist under various central ministers, it supports NSDC skill initiatives activities in various ways. It is also expected to anchor the National Skills Qualifications Framework (NSQF) and facilitate the setting up of professional certifying bodies in addition to the existing ones.

As the German Chambers do self-regulation, SSCs have to learn from them and adopt a method of regulating themselves towards the goal of preparing curriculum design, certification and standardization of syllabus. Equally important is the joint certification which in Germany was made possible through the VET Act which enables joint certification of skills and competencies. This should strongly suggest the necessity of passing a VET Act for joint certification as all certification in India has been done by Government so far without any private participation.

4.6 Vocational Qualifications Framework in Germany and in India

It is argued that a common qualification framework for vocational and higher education that reflects the interrelationships between the structure of educational qualifications and the occupational structure of the labour force, and between education and social change, could provide possible synergies between higher education and vocational education (UNESCO 2013).

In Germany, the Federal government and the Länder agreed to develop the national qualifications framework (DeutscherQualifikationsrahmen– DQR) in 2006. A working group consisting of representatives of all major stakeholders submitted a first proposal in February 2009, and approximately 60 qualification profiles/occupational profiles on the basis of the DQR were completed until May 2010 (Spottl and Windelband 2013). The DQR is based on

the European Qualification Framework (EQF) and is meant to initiate a boost for modernization and ensure a fit between the VET system of Germany and Europe. The EQF, in turn, aims to underpin the competency and outcome orientation of vocational education and training and the assessment and equal ranking of formal and informal (work-place oriented) learning, and target occupations and the dual system (Spottl and Windelband 2013). The practical significance of joint curriculum designing with the participation of various stake holders, however, is undermined by Euler (2013) while exploring the German dual system.

In particular, the DQR aims to map the qualification steps within the VET system from prevocational education up to university level with the aid of descriptors which define the characteristics of successful action (indicator-supported descriptions of competency) (Spottl and Windelband 2013).Thus, at level 6 of the DQR, double-tracked formulations allow equal assessment of both the general as well as the vocational qualifications earned in VET and/or academic education (Spottl and Windelband 2013).

It is argued that the DQR should be regarded as a formatted procedure to move from one qualification level to the next within a process of life-long learning (also in different learning environments). This upward mobility is highly supported by the vocational education system and the universities have also opened their doors for this development (Spottl and Windelband 2013).In addition, a study commissioned by the Federal Ministry of Education suggests that all kinds of VET, independent from the venue and the duration of the training measure, should be re-aligned in a national modular system, without giving up the option to get trained in a 'full occupation' (Euler and Severing 2006, as cited in DeiBinger 2012).It is also pointed out that a continuing offer of general education, not only has an integrative function which helps to lessen the ‘esteem gap’ between Technical and Vocational Education and Training (TVET) and general education, it also helps to provide the flexibility that allows for occupational evolution and for individual transfer from one occupation to another (Wolf 2011, as cited in UNESCO 2013). Moreover, Germany has long had routes that allow the holders of initial qualifications to progress within their occupation up to and including the Meister level, which includes expertise in both business practice and pedagogy (Hanf 2011, as cited in UNESCO 2013).

In the Indian context, the employment scenario demands a different approach towards the National Vocational Education Qualifications Framework (NVEQF) (Government of India 2012; IAMR 2012). In light of the fact that the majority of the workforce (about 90%) in India is in the unorganized sector and possesses lower levels of literacy and numeracy skills, it is argued that emphasis should be put on developing the 'educational component' for building a sound base of TVET and providing clear educational pathways for their progression into the formal education system (IAMR 2012). In addition, it is argued, there is a need to build the general education element into the vocational training programmes and vice versa for a holistic approach to human resource development (IAMR 2012). It is to be noted that the TVET has a particular advantage for developing countries that are moving rapidly up the value chain, by allowing for occupational change and mobility and by providing an infrastructure that can cope with these changes (UNESCO 2013).

In this context, the Ministry of Human Resource Development (MHRD), Government of India has adopted the NVEQF, now called the National Skill Qualification Framework (NSQF), to emphasize the importance of the integration of the vocational education and training and general education in all types of education and training (Government of India 2012; IAMR 2012). The NSQF, outlined in the national policy on skill development, mandates the necessity of qualification framework to address inter-alia the issues of the fragmentation in the skill system both at the central and the state level, lack of uniformity in nomenclature of courses, duration, curriculum design, content and examination system of various TVET courses along with recognition of prior learning, easy entry and exit for students between vocational and general education stream as well as progression in vocational education like in the general education and facilitates mobility between programmes and institutions across the country (Planning Commission 2013).

The extent to which the Indian NSQF can draw from the strengths of the German DQF becomes limited by the fact that adapting the EQF to German context itself implies taking note of the 'demarcation lines' typical of the German VET system are a main contributing factor in making VET which takes place outside the dual system, i.e. in vocational schools,

one of the problem zones within the German VET system (DeiBinger 2012). It is argued that although school-based vocational training is recognized in terms of its educational policy function, it has traditionally suffered from the subordinate role accorded to the training function of school-based qualifications (Deissinger 2007, 2010 as cited in DeiBinger 2012). Further, it is argued that occupations which are regulated in accordance with federal law (Vocational Training Act) and for which training takes place at full-time vocational schools produce different 'values' on the labour market compared to training courses constructed under federal state law, which are in a strong competitive relationship with the state-recognized training occupations based on the Vocational Training Act, and therefore with the dual system (DeiBinger 2012).

Nevertheless, in order to be permeable within the education system it is important that TVET qualifications contain a significant technical and general educational element, which in turn is likely to make them more attractive to individuals (UNESCO 2013). It is argued that schools have a significant role to play in emphasizing the importance of academic success for future access to high-quality TVET. In addition, it is argued, apprenticeship has the potential to be attractive to young people because of the employment status of the apprentice and the realistic workplace conditions that it presupposes. However, apprenticeship, by itself, cannot provide either dual value or a broad occupational capacity (UNESCO 2013). It is thus argued that apprenticeship is best located within an educational as well as an employment framework through an integrated and articulated programme combining practical experience, technical expertise, general and civic education, and personal and social development, as in the dual apprenticeship systems of Germany and some other northern European countries (UNESCO 2013).

4.7 Involving Companies in the Funding of VET in India

In contrast to German experience, the private business community’s involvement in vocational training is abysmal. In particular, their contribution to the financing vocational training is next to none. The pre- service technical and vocational training and education (TVET) have been financed by the state through general tax revenues. As stated earlier in chapter, in India vocational training refers to certificate level crafts training and is open for

students who leave school after completing grades 8-10 from any general school. This scheme is looked after by the Directorate General of Employment and Training (DGE&T) under the Ministry of Labour, Government of India (Mehrotra 2012). The main component of the TVET in India is the Industrial Training Institute. Historically the ITI have been regulated and funded by the state. However, there has been private participation in recent years. Currently, there are 9,447 such ITIs out of which nearly 8000 are in the private sector and the increase in private sector participation has been four fold in last 5 years: from 2000 ITIs in 2007 to about 8000 in 2012. There has also been an attempt to adopt the existing ITIs by private the business community. This would involve the active participation of Industry in curriculum design and sort of modernization of the institutions according to the needs of the industry.

In addition to ITIs, there is also the apprentice training scheme offered by the Ministry of Human Resource Development (MHRD) for diploma holders (polytechnic) and Graduates in engineering. The stipends for such apprentices are paid for by the State. The Directorate General of Employment and Training (DGE&T) under Ministry of Labour also offers apprentice training for ITI holders. The cost of such training is shared by both the state and a private enterprise where the apprentice training takes place (Mehrotra 2012).

Another space within vocational education where private players can contribute is secondary schools. Secondary schools were brought in to vocational framework in the mid 1980s. It has become part of the formal education system wherein vocational courses are offered in classes 11 and 12 under a centrally sponsored scheme termed “Vocationalization of Secondary Education”. This scheme falls under the purview of All India Council for Vocational Education (AICVE), the Ministry Human Resources Development (MHRD).

Both ITI training offered and regulated by the Ministry of Labour and Polytechnic and Graduates engineering, secondary education offered and regulated by Ministry Human Resources Development (MHRD) have seen limited private participation. However, in recent time there have been attempts by private players to actively participate in Vocational Training. The existing ITIs are upgraded under the scheme of Vocational Training Improvement Project with support of World Bank. Similarly about 1400 ITIs are upgraded

under Public Private Partnership (PPP) mode (Policy Overview 2011), the performance of the same is yet to be reviewed.

4.8 Best Practices: International Experiments

4.8.1 China-German Collaboration

The 1996 Vocational Education Law of the People's Republic of China was a landmark initiative by the government. The Law was enacted with the vision to implement a strategy for reviving China's industrial growth through promotion of science and education, with important thrust towards vocational education to improve the quality of their workforce. A significant initiative in the world of vocational education in china is the formation of The Sino-German Automotive Vocational Education project in 2011. The project was commissioned by Federal Ministry of Economic Cooperation and Development of Germany in collaboration with Ministry of Education of the People's Republic of China. The project is run under Public Private Partnership (PPP) model and monitored and implemented by the Deutsche GesellschaftfürInternationaleZusammenarbeit (GIZ) GmbH

The project is supported by German car manufacturers such as Audi, BMW, Daimler, Porsche and Volkswagen. These private partners cover about 50 percent of project cost. This public private initiative is an outcome of the realization of challenges brought in by the increased pace of innovation and introduction of technologies in Automotive industry. The companies felt the need of building competencies and capacities in skill development to meet skill challenges in China auto industry. The German car manufactures provided their vocational training expertise consistent with vocational education standard in China. This is done without exporting the German dual systemin totality.(Adams 2011 also see Barabash et al 2008) The training programme consists of rigorous theory training integrated with on the job training. The programme is structured such a way that it gives more focus on theory at initial level gradually moving to more practice oriented training. It is also expected that the project will lead to ensuring a consistent certification for training standard matching the needs of industry for car mechatronics in China.

4.8.2 Egypt: German Adaptation

An example of where employers have worked successfully with secondary technical schools can be found in Egypt (Adams 2011). Beginning with a pilot in 1994, Egypt adapted the German dual system to its secondary technical schools with support from German Technical Cooperation (GTZ). The pilot called the Mubarak Kohl Initiative – Dual System (MKI-DS) was targeted at students from low income families. Under this project, students spent two days each week in school learning theory and four days in a factory where they acquired practical skills. In contrast, students in traditional secondary technical schools spent six full days in school for theory and practice. Further, employers participating in the program helped set occupational standards, design curricula, provide practical training, and assess student performance. On completion, MKI-DS students received a secondary education degree and a certificate of experience from the private sector. It was found by a tracer study conducted in 2009 for the MKI-DS program that 85% of students completing the program were offered full-time jobs by their employers. Students and teachers in the program asserted that placement and earnings rates of the program for completers were substantially higher than those of the traditional technical secondary schools. Also, the cost of technical education was reduced as practical training took place in the workplace on actual production equipment. Additional financial funding was mobilized by employers and students were provided with a training stipend. In 2007, the Ministry of Education institutionalized the program as an option for secondary education (Adams 2011). Thus, while Germany continues its own reforms of the dual system, Egypt demonstrates the benefits of applying the principles of the dual system in a developing country (Adams 2011).

By exploring the question of ‘cultural fit’ in the adoption of German dual system, Lewis (2007) maintains the view that it remains an area of controversy in the Anglo-Saxon world and is considered a failure in in South Korea, one of the Asian tigers. However, we have found that there are exceptions to this as in the case of China and Egypt. Many other countries have also started experimenting with the German dual system, partly sponsored by the German International Collaboration Project. India could be one of the countries with greatest potential for a series of reforms in the VET both with and without accepting all the elements

of the German dual system. Based on the best practices cited above and the findings of our field work in the preceding chapters, we offer the recommendations in the next chapter.

4.9 Concluding Remarks

India not only lags behind Germany developing an integrated VET system but also lacks a coherent strategy to bridge the gap. Unlike Germany, the Indian vocational educational system also doesn't provide much scope for the entry of private companies into the vocational education space unless it is brought in a legal system. As the German Chambers do self-regulation, SSCs have to learn from them and adopt a method of regulating themselves towards the goal of preparing curriculum design, certification and standardization of syllabus. This provides the lesson to India the necessity of passing a VET Act for joint certification as all certification has been done by Government without any private participation

The significant progress in Indian vocational training and skill development came out of the formation of a National Skill Development Agency (NSDA), an autonomous body with the mandate of Indian Parliament. It is expected to coordinate and harmonize the skill development efforts of the Government and the private sector to achieve the skill requirement of the economy. With the support and guidance of NSDA, the National Skill Development Corporation (NSDC) was established under Public Private Partnership (PPP) mode with the intention of brining private sector initiatives in skill development. The NSDC has about 51% of its equity by private sector and 49% equity by the Government. In order to financially support NSDC, NSDA set up the National Skill Development Fund as a Trust under the Indian Trusts Act with an initial corpus of Rs 995.10 Crores. As the NSDC itself highlighted, the funds thus channeled are not in the form of grants but loans and equities and hence "re-circulating" which should be treated as perhaps one of the strengths of the recent reforms of the Indian VET.

The NSDC is expected to involve the private sector and create capacity for skill development in various sectors including the high growth sectors, through appropriate

mechanisms with active support of Private players including employer champers like FICCI and CII. It has identified 21 high growth sectors and has plans to set up Sector Skill Councils (SSCs) for these sectors and for some sectors the Sector Skill Councils have already been setup. Sector Skills Councils are industry-led and supported bodies are expected to complement the existing vocational education system for the Industry Sector in meeting the skills needed in each sectors. While the question how to motivate the companies to participate in the Indian VET has been a subject of discussion for several years and some progress has been made, there are miles to go in this direction.

Chapter 5

Recommendations

India adopted a National Skill Development Policy in February 2009 which aims to guide skills development strategies and initiatives of all stakeholders and which has set the ambitious target of skilling 500 million people by 2022 (MoLE 2009).[11] In another estimate (Mehrotra et al 2013), the number of people to be skilled by 2022 in the working age group comes to around 291 million. The common concern expressed by policy planners and industrialists is that there is a pronounced 'skill gap' in India both in terms of quality and quantity, and current vocational education and training infrastructure is not geared to meet industry requirements (CII report as cited in MHRD 2011). This necessitates a radical restructuring of VET in India with a long term perspective.

The differences in the structure of economy in Germany and India, the stage of industrialization, and the expanding size of informal sector(s) should also be taken into account while thinking about adopting the favorable elements of German dual system. This is particularly so because the Indian education system entails a certain degree of path dependency that does not provide seamless mobility between vocational and general education. Neither does India have a VET Act as in the case of Germany or China. The organized segment of Indian enterprises employing more than 10 workers) account for 78 percent of all value-added in the non-agricultural sectors but they employ only 18 percent of all non-agricultural workers. On the other hand, the unorganized enterprises (which are very small in size) account for only 22 percent of value-added in output, but employ 82 percent of all non-agricultural workers. This fact makes the structure of Indian enterprises totally different in character.

Given this background, it is important to understand the specific aspects that need to be considered while adapting certain elements of the German dual system in India. Our primary survey was mainly of firms that are in the organized segment of manufacturing

[11]MHRD estimates that approximately 75 to 80 million jobs will be created in India over the next 5 years, 75% of these new jobs will require vocational training to enhance the employability prospects (MHRD 2011). Even if this 75 million estimate is over-optimistic, given that new non-agricultural jobs created between 2000 and 2012 has been on average only 7.5 million per annum, the fact remains that new jobs require skilled persons, while those already in the labour force also need access to VET.

industry. We have explored those elements in this report – combining theory and practice, joint participation in curriculum building and certification and more importantly, joint funding – between the private companies and the government and found that German dual system by and large offers great insights for reforming the Indian VET. We have also found that India has already begun reforming its VET system though it is too early to review its performance. However, based on the comparative evidence so far discussed, we feel that it is also equally important to engage with, though briefly, the various VET practices in the emerging economies (e.g. China, Brazil, South Africa) before we come to workable recommendations.

What the Government has to do? Where the government and companies need to work together?

Need for introducing vocational education at secondary level

In India vocational education in the school system is introduced only at higher secondary level (classes 11-12). In contrast, children in Germany can enter VE immediately after 8 years of compulsory education. The NVEQF in India must be introduced rapidly across India to enable all secondary school (classes 9-10) to have the option of entering VE.

What is important in this context is that the duality principle should be made mandatory. It means there must be a practical training that should be built in to the VET system for which the state and industry associations should play a key role. Both the government and the private companies should come to a consensus regarding the norms to be followed with respect to the structure and content of the course and how they should be rendered integral to the practical training. A closely related issue is the relevance of joint certification. Industry is to be taken on board during certification as well, as they are the major employers. Unless there is practical training at the work sites combined with class room teachings in schools, the private sector would not be able to participate in joint certification. To ensure the organic involvement of the private companies, the government has to understand how the duality principle could prove to be an agent of change. It will also promote transparency of qualifications and facilitate learner's mobility between different qualifications, thus encouraging lifelong learning.

Assuring Duality Principles

Euler's (2013) duality principle implies theory-practice continuum which has been well integrated in Germany through public-private participation. In India, the National Vocational Education Qualification Framework (NVEQF) developed by the Ministry of Human Resource Development (MHRD) provides a descriptive framework for linking various qualifications for setting common principles and guidelines for a nationally recognized qualification system. This would cover Schools, Vocational Education and Training Institutions, Technical Education Institutions, Colleges and Universities. The MHRD in alliance with the state governments have already initiated the NVQF with more than 1000 VET schools. However, although the Auto sector SSC has been preparing National Occupation Standards, the industry participation in the curriculum building is almost absent and this could only be assured if the SSC are activated across the three sectors we have studied. It is encouraging to see that in the auto sector, SSC has already been done and the Central Institute of Vocational Education Bhopal has developed the modules and standards; yet, the industry participation in this sector also is almost non-existent.

Joint Funding: National Training Fund

Establishing a National Training Fund for skill training is being seen as a way to generate funds from private players for vocational training. In the German construction sector, there is such a sectoral fund to which all companies must contribute, the resources of which are ploughed back into construction enterprises to enable them to provide training. At a national level, for instance, the National Skills Fund (NSF) of South Africa serves as an example wherein payroll levies are directed towards including all sections of the society. Twenty percent of the training payroll levy on formal sector enterprises is sent directly to the NSF and 80 percent goes to sectoral authorities (see Mehrotra and Ghosh 2012). Similarly about 62 countries around the world have already put some form of training levy in place. Some large economies such as Brazil have had a training fund for over half a century and South Africa has had it for at least 10 years.

Financing initiatives such as skill development and capacity building is a big challenge for developing countries. There are various ways to finance skill development initiatives. The National Training Fund could take one of several forms: Pre-employment training fund, Enterprise Training Fund, Equity Training Fund etc. The ultimate purpose of each such scheme differs with each country according to the specific needs of the economy and level of development and composition of sectors. However, what is important is the recognition of active involvement of private business community in financing such skills development initiatives.

Mehrotra and Ghosh (2012) have worked out the modalities of NTF and how they are likely to benefit the firms, across scales, across sectors and also the larger economy. They have pointed out that the levy for NTF in India may start from the organized manufacturing sector since it accounts for about 78 % of output in total manufacturing. Given the fact that the organized sector accounts for only 15 per cent of the total manufacturing employment in the economy (Mehrotra et al, 2012), and the remaining is contributed by the informal sector, the authors have suggested the development of a policy framework to decide which of the firms are to be included in the levy framework depending on the turnover and the size of employment.

Other initiatives in training could also be in along the lines of Germany's construction industry initiatives. In this initiative, all construction companies pay a percentage of their payroll costs into this fund, which is again used to compensate companies for the fees and costs associated with inter-company training and other expenses.

How to motivate the firms to participate in cost sharing and cost sharing look like?

Companies are reluctant to invest in training owing to the concern that there is no guarantee that they will benefit from such an investment as they fear poaching: once trained, the workers may be lured by higher wages offered by another firm without incurring any training costs. As a result, enterprises do not prefer to set up training centers. In fact, we noted in our primary survey that only relatively large enterprises set up in firm training. But,

as our analysis based on cross-country data, only 20 percent of Indian firms conduct in-firm training, which is much lower than in other emerging market economies (e.g. in China 85 percent firms conduct in-house training).

However, the rise in wages facing firms is itself due to the shortage of skills as those who are in short supply continue to bargain for higher wages.

As Mehrotra and Ghosh (2012) pointed out the beneficiaries of NTF should include both organized and unorganized enterprises. It is the large and medium organized enterprises who would contribute the major share of the NTF but the unorganized sector will also need to benefit in the disbursal norms of the funds.

A major suggestion put forward by them is that the training levy funds should also be used for financing students from poorer background as they are unable to bear the opportunity cost of undertaking training first before entering the labour market. Also, often there is a financial cost of the pre-employment training. Together, the financial and opportunity cost of training for poor students are a formidable barrier to students entering training. The students often have to support themselves financially during their training period; the stipend towards their living costs thus would be helpful. This should also motivate parents to send their children to VET schools.

Which Actions are needed from Companies?

Contribution to National Training Fund

As noted above, our primary survey for this study found that it is the small firms that do not have any in-house training (27 large and 3 small and medium firms have in-house training) nor do they have any significant hold in large employers associations. However, medium-sized firms should also contribute to the NTF of the federal government. As Mehrotraand Ghosh (2013) clearly pointed out, there are two major benefits that would accrue to them if the NTF would become fully active. First, the small firms would also get equal access to the public good – the labor force skilled with the funds – which in turn would help them maintain a balance between wages and productivity. All firms need to recognize the fact

that the increase in wage costs is often due to the lack of skilled human resources and hence a viable way to resolve skill gap is to invest in training with other firms and the government.

If the large firms like Infosys, Samsung, Bosch and so on have in-house training which also acts as a strategy of retention of their employees – a model certainly worth emulating - contribution to NTF and assuring a steady supply of skilled labour for all firms could also be considered as an attrition management technique that medium sized firms could adopt. It may not be possible to expect small/micro firms in the unorganized segment of industry and services to contribute to the NTF, since the cost to the firm may not be enforceable in India, given the extremely large number of micro/small enterprises.

Cluster-based Training

There are other possibilities for the small firms to get sufficient number of trained persons. For instance, they could develop a cluster-based training approach where a few firms belonging to a particular locality can jointly generate training programmes through cost sharing. Companies should be convinced of the fact that either a common platform or a sectoral approach – with training based on clusters – would form the first best alternative than the current practice of in- house training or competing for skills in the open labour market(22 companies in our primary survey expressed interest in inter-industry collaboration). In this context also, the two variables become important: the incentives and regulations. One of the advantages of cluster based and locally specific industry level decision making is that it is easy for the firms to effectively assess the local demand and supply of manpower to be trained. Second, it is easy to bring the entire training system under a locally governed legal framework. The Micro, Small and Medium Enterprises Ministry of the central government could facilitate, even though the local companies should take the lead in such institutional arrangements.

Employers' Associations

It is worth noting that a few firms have suggested that employers' association take the lead in training investments. Our evidence suggests that in certain sectors like engineering, the employers' association has taken particular interest in advancing training programmes. FICCI,

an industry wide federation of chambers, has already adopted several ITIs and has expressed interests in taking over more of them. It is true that they benefit by way of free capital cost in the form of buildings, machineries etc., and given the fact that they run efficiently and have wider acceptance, it is a policy which could be encouraged. What we would suggest in this context is that there should not be any discrimination between Indian and a foreign firm in this context as the public good, whether it is realized through the conduit of Indian or foreign, is accessible for all the firms.

It is important to make a distinction between employers associations and industry level associations. While the first one is by and large national in its operations, the latter is more industry specific and regionally bound. Small scale firms would be able to negotiate with the industry level associations rather than the employers' associations though they are not barred from doing it. Locally specific and industry oriented training programmes would be more financially and technically viable for the smaller firms.

Individual Firms

Yet another method which could be highly promising is the adopting of ITIs by large individual firms. Tata Motors, for instance, have adopted nearly 137 ITIs in the country and this model has turned out to be successful in terms of financial assistance, training orientation and diversification. Infosys and Bosch offer good practices for large firms. The PPP model implicit in the above cases could be modified in a similar way that it should be embedded in the larger process of modernization of the economy. To quote the World Bank Policy Paper, "Vocation and Technical Education and Training assumes that training in the private sector – by private employers and in private training institutions – can be the most effective and efficient way to develop the skills of the work force" (2007: 7).

Socially and Legally Embedded VET: Earlier the Better

First of all, there should be an integrated approach towards VET in which the various stakeholders should be properly represented in designing the curriculum, funding and running the entire scheme of education and training as education training continuum.

The primary objective would be to create an atmosphere in which the youth would be able to respond to multiple tasks within companies and across companies at least within a sector. One of the main complaints of small firms interviewed in the manufacturing sector was that they were not getting sufficient number of, say, plumbers or fitters. They also complained that if they get fitters, they would find it difficult to find workers in other trades such as plumbers. This creates a gap in flexibility as far as the firms are concerned. Firms would require workers with multiple skills in order to compete in the international domain and the workers require a fairly remunerative job for decent living. It should be seen as a win-win solution and the government and the private companies and also the other stakeholders (trade unions, parents etc.) could be brought to the negotiating table.

The Indian Companies Act (2013), as ratified by Parliament, prescribes an expenditure of 2 per cent of profits on Corporate Social Responsibility activities in their respective areas of operation. Though the new regime would replace 57-year old Indian Companies Act, 1956 and usher in more transparency in the corporate bodies besides creating a new business environment for growth, the issues of either skill training or VET reforms are not adequately addressed. What would be desirable is to develop a "negotiated corporate social responsibility" (Raman 2010) and thereby neutralize whatever adverse impacts the PPP model is likely to have. The experiments of Tata Motors, Infosys, SAP and Bosch also signal the potential of modified forms of public-private partnerships and corporate social responsibility.

A new governance structure could be brought in through passing of a comprehensive VET Act – broadly similar to that of Germany – which would make the VET eco system more organic and integral to the requirements of the economy. A joint exercise among the stakeholders of the VET system could be part of a building up of the long term institutional and legal framework of the Government of India.

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Annexure 1

Details of Firms Surveyed

(Large refers to the firms that have more than 100 employees and Small refers to 100 and less than that)

The employment figures refers to the plant/firm surveyed.

Sl. No.	Company name	Large / Small	Size of Employees (approx.)	Products	Nature of Goods	Sector
1	Continental Automotive Components (Pvt) Ltd	Large	500 +	Brake systems, systems and components for powertrains and chassis	Intermediates	Auto and Auto-components
2	Continental Automotive Components (Pvt) Ltd	Large	500	Vehicle electronics	Intermediates	Electricals
3	Siemens Technology and Services	Large	4500	Corporate Finance and Controlling, Global Shared Services, and Management Consulting	Intermediates	IT
4	Festo Controls Pvt. Ltd	Large	422	Pneumatic and electric drive technology	Intermediates	Electricals
5	BakaLiftec	Large	110	Manufacturer Battery Operated Pallet Trucks, Battery Operated Stackers	Capital goods	Other

Sl. No.	Company name	Large / Small	Size of Employees (approx.)	Products	Nature of Goods	Sector
6	Tech Mahindra	Large	95,000	Provider of solutions and services in the Information, Communications & Technology (ICT) industry	Intermediates	IT
7	WIPRO	Large	15000 +	Information technology, consulting and outsourcing company	Intermediates	IT
8	Kluber (Frudenberg)	Large	160-170	Speciality lubricants	Intermediates	Chemicals
9	SAP Labs India Pvt. Ltd.	Large		Provider of business software solutions	Intermediates	IT
10	Mahindra Auto and farms Ltd	Large	10,000	Manufacturing tractors	Capital goods	Auto and Auto-components
11	Eagle Burgman India Pvt.Ltd	Large	1000	Design and manufacture mechanical seals and sealing systems	Intermediates	Auto and Auto-components
12	Uhde India Ltd	Large	1,100	Manufacture machines for chemical production	Intermediates	Other
13	EmcoPrecima Engineering Pvt.Ltd	Small	14	Marine Electro Magnet Brakes and Soft Starters For All Marine Applications	Intermediates	Auto and Auto-components
14	Kimo Electronics Pvt.Ltd	Small	11	Motor Softstarters, Drive Panels etc	Intermediates	Auto and Auto-components

Sl. No.	Company name	Large / Small	Size of Employees (approx.)	Products	Nature of Goods	Sector
15	Evonik India Pvt.Ltd	Small	100	Engineering consultancy services, operation and maintenance service, IT solutions for the power sector	Intermediates	IT
16	Connect Chemicals India Pvt.Ltd	Small	9	Import and export of water treatment chemicals, biocides, thermal and carbonless paper chemicals etc	Intermediates	Chemicals
17	Schultz & Co. (India) Pvt.Ltd	Small		Manufacturers and exporters of active pharmaceutical ingredients (APIs) and their intermediates	Intermediates	Chemicals
18	Siemens Ltd.	Large	330	Engineering	Intermediates	Electronics
19	SMR Automotive Systems India Ltd.	Large	350	Polymer processing, manufacturing of electro-mechanical systems	Intermediates	Electro-mechanical
20	JBM Auto Systems Pvt. Ltd.	Large	1700	Manufacturing Frames	Intermediates	Auto and Auto-components
21	Susa Pneumatics India Pvt. Ltd.	Large	350	Manufacturing of Gas Springs	Intermediates	Chemicals
22	Magnetic Auto Control Pvt. Ltd.	Small	21	Vehicle Access Control Automation	Intermediates	Auto and Auto-components

Sl. No.	Company name	Large / Small	Size of Employees (approx.)	Products	Nature of Goods	Sector
23	Witzenmann India Pvt. Ltd.	Small	50	Manufacturing of Industrial and Auto Products	Intermediates	Auto and Auto-components
24	Henkel Teroson India Ltd.	Large	110	Manufacturers of Adhesives	Intermediates	Chemicals
25	Heidenhain Optics & Electronics India Pvt. Ltd	Small	18	Manufacturers in Machine Tools	Intermediates	Auto and Auto-components
26	HaritaFehrer Ltd.	Large	330	Solution Provider of Seats and Seating Systems	Intermediates	Auto and Auto-components
27	OBO Betterman India Pvt. Ltd.	Small	62	Assembling electrical and infrastructure components	Intermediates	Electricals
28	Lumax Industries Ltd.	Large	506	Automobile Lighting	Intermediates	Electricals
29	MindaStaneridge Instruments Ltd.	Large	1200	Electronic sensors and speedo meters	Intermediates	Electronics
30	Yazaki India Ltd.	Large	3000	Automotive wire harnesses and related components	Intermediates	Electricals
31	Dali & Samir Engineering Pvt Ltd.	Small	95	Metal components and exhaust systems for the automotive sector	Intermediates	Auto and Auto-components

Sl. No.	Company name	Large / Small	Size of Employees (approx.)	Products	Nature of Goods	Sector
32	RanvikkAutocomponent Pvt. Ltd.	Large	200	Vehicle door hings	Intermediates	Auto and Auto-components
33	Mercedes-Benz India Pvt. Ltd.	Large	800	Passenger Car manufacturing	Consumer durables	Auto and Auto-components
34	Behr India Ltd.	Large	1000	Manufacturers of Automotive Systems and Components	Intermediates	Auto and Auto-components
35	Kirloskar Brothers Ltd.	Large	300	Manufacturer of Pump sets	Consumer durables	Auto and Auto-components
36	General Motors India Pvt. Ltd.	Large	470	Passenger Car manufacturing	Consumer durables	Auto and Auto-components

37	Tata Motors	Large	5400	Passenger car and commercial vehicle manufacturing	Consumer durables	Auto and Auto-components
38	Knorr-Bremse,	Large	210	Braking systems for trucks and buses	Intermediates	Auto and Auto-components
39	Shriniwas Engineering Autocomponents Pvt. Ltd.	Large	500	Foundries	Capital goods	Auto and Auto-components
40	Tata Toyo Radiator Ltd.	Large	1400	Radiators	Intermediates	Auto and Auto-components
41	Bharat Force Ltd.	Large	4171	Foundries	Capital goods	Auto Mechanical and Metal
42	Gabriel	Large	6000	Shock Absorbers, Struts and Front Forks	Intermediates	Auto and Auto-components
43	MagnetecMangal Pvt Ltd	Small	90	Transformers	Intermediates	Electricals

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