

**Essays on the
attractiveness, role and institutional embeddedness
of Polytechnics in the Indian Vocational Education and Training System**

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List of abbreviations

AICTE	All India Council of Technical Education
ASER	Annual Survey of Education Report
ATS	Apprenticeship Training Scheme
B.E.	Bachelor of Engineering
B.Tech	Bachelor of Technology
CEDEFOP	European Centre for the Development of Vocational Training
CoE	Centres of Excellence
CTI	Central Training Institutes
CTS	Craftsmen Training Scheme
DAAD	Deutscher Akademischer Austauschdienst
DGET	Directorate General of Employment and Training
DGT	Directorate General of Training
DST	Dual System of Training
FICCI	Federation of Indian Chambers of Commerce & Industry
GDP	Gross Domestic Product
GoI	Government of India
HECI	Higher Education Council of India
IIT	Indian Institutes of Technology
ILO	International Labour Organization
ILs	Institutional Logics
ISCED	International Standard Classification of Education
ITC	Industrial Training Centres

ITI	Industrial Training Institutes
LC	learner-centred
LCE	Learner Centred Education
MHRD	Ministry of Human Resource Development
MoLE	Ministry of Labour and Employment
MoU	Memorandum of Understanding
MSDE	Ministry of Skill Development & Entrepreneurship
NASSCOM	National Association of Software and Services Companies
NCAER	National Council of Applied Economic Research
NCEUS	Indian National Commission for Enterprises in the Unorganised Sector
NEP	National Education Plan
Norric	Nordic Recognition Information Centres
NQF	National Qualifications Framework
NSDC	National Skill Development Corporation
NSO	National Statistical Office
NSSO	National Sample Service Office
NVEQF	National Vocational Education Qualifications Framework
OECD	Organisation for Economic Co-operation and Development
PPP	Public Private Partnership
PTs	Polytechnic Colleges
SSC	Secondary School Certificate
TVET	Technical and Vocational Education and Training
UGC	University Grants Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization
VET	Vocational Education and Training
VTIP	Vocational Training Improvement Project

1 Introduction

India as the most populous country worldwide with the largest potential workforce and high economic growth rates, is considered one of the most dynamic and aspiring countries in the world, with its global importance constantly increasing. India, together with other countries with rapidly growing populations, particularly in Africa, but also in Asia, will exert an increasingly significant influence on the global balance of powers. This is primarily due to demographic change, which is leading to a sharp population growth among the young generation in these regions. Against this backdrop, it is becoming increasingly relevant from a scientific perspective to analyse these countries and their education systems more closely as they will potentially set new economic and geopolitical priorities (UN DESA, 2022). The consequences and implications of such a large population are reflected in several areas of society. Politics, economics and infrastructure face the challenges that these immense numbers bring with them, such as resource scarcity, political tensions and social inequality, which are common in large populations (Agarwal, 2012; Lal, 2006; Dyson et al., 2005). The demands on the coordination of systems of society in such a large country are understandably immense.

One of these social systems is the economy, which is influenced by the size of the population. The growing population is accompanied by rising overall economic growth rates and increasing economic output (Bloom, 2012). Although growth in India has often been described as jobless growth (Khare & Arora, 2023), skilled labour is still needed in various occupational fields to ensure production in different sectors (Agrawal & Agrawal, 2017). In principle, the numerical framework conditions in India are actually in place because the population is not only large but also very young (Khare & Arora, 2023; Gupta & Dharap, 2022). The ratio of the working-age population to the total population in India is currently positive, which is why a large number of young workers are available to contribute to the often-discussed demographic dividend in order to sustainably increase economic performance, productivity and social development (Mehrotra, 2014; Singh & Kumar, 2021).

In order to achieve this the young working population must be equipped with appropriate skills to be able to create value on the labour market. However, there has been a mismatch between the skills required by the labour market and the skills offered by employees (Mehrotra et al., 2013; Sodhi 2014; Malik & Venkatram, 2017; Sarin, 2019). This so-called skills gap not only means that the economic potential cannot be fully realised, but also that many young people are unable to enter the labour market, with all the negative social, economic and societal consequences they entail (Ashton 1993; Bisht & Pattanaik 2021). The skills gap shows that

the need for adequate qualification opportunities is particularly important.

The Vocational Education and Training (VET) system has the fundamental function of making knowledge, skills and abilities accessible to a broad section of the population and initiating their professional development (Agrawal & Agrawal, 2017; Agrawal & Indrakumar, 2014). However, VET in India faces numerous challenges that need to be overcome in order to utilise the potential of the system. These are both qualitative and quantitative in nature and have often inhibited an efficient and quality-oriented development of vocational skills of the population in the past (Pilz & Regel, 2021; Ramasamy et al., 2021).

In order to be able to address the quality problems and challenges in a complex system such as the Indian one, however, these systems must first be understood. VET systems are complex institutions in an overall societal context (Agrawal & Indrakumar, 2014; Nayana & Kumar, 2019). The systems are subject to various influencing factors and to different demands from a range of stakeholders and groups. In order to understand the challenges and identify opportunities for the development of the system, it is first necessary to assess the subsystems. The various types of schools in the vocational training system are particularly important here. In addition to the Industrial Training Institutes (ITIs), specifically the Polytechnic Colleges (PTs) play a central role in India.

This dissertation addresses these issues and challenges. At the centre of the dissertation is the concept of the attractiveness of PTs. To approach this construct a general context of the Indian VET system is provided by explaining the supply and demand for Indian skilled workers and addressing the employability of the Indian workforce. The consideration of employability is an important construct of the dissertation, as it is closely related to the attractiveness of the type of school and these elements influence each other. Then the dissertation deals with one of the core elements of the Indian vocational training system, the PTs. The school form is examined in detail by analysing the role, functions and embedding of the school form in the overall Indian system, which is important to understand the school form and because the functions have a decisive influence on the attractiveness of PTs. Subsequently, the central topic of the dissertation, namely the attractiveness of the school form, is analysed by using a stakeholder model to interview important actors such as students, parents, teachers, universities and companies in order to understand how they perceive the attractiveness of the school form. Finally, a fundamental account is given of the theory and practice of teaching and learning in Indian TVET and the impact on knowledge transfer in India as it affects both the attractiveness and employability of PT graduates.

This cumulative dissertation consists of six individual publications and offers the reader a problem-oriented, theory-based and detailed empirical approach to the school form of PTs, as well as the Indian qualification and labour market and the knowledge transfer of vocational training in India. The dissertation thus provides insights into the micro, meso and macro levels of the Indian vocational training context. By taking a comprehensive look at the Indian VET system, the PTs, the attractiveness of the PTs, the Indian labour market and the way knowledge is imparted in India, the thesis provides an important insight into the issue of workforce skills development in India and can outline the complexity and multi-layered nature of the challenges. In doing so, the dissertation can provide guidance to the relevant stakeholders on how to improve the skills of young workers to close the skills gap and on how to make the potential of the population and the labour market meet.

1.1 Structure of the dissertation and connection between the articles

This dissertation consists of six independent papers that are related in terms of content. The individual papers are given a framework that establishes the contextual relationship. The given framework serves to link the individual essays. The dissertation is divided into three main parts. The first part (chapters 1–3) contains an introduction to the topic, the structure of the thesis, the relevance and aims of the dissertation, the theoretical background and the methodological approach. It serves to present the common link between the six individual articles and to give the reader an orientation for the second part of the dissertation, in which the six individual articles are presented (chapters 4–9).

After that the final third part of the dissertation (chapters 10 and 11) summarises the most important results of the articles, discusses and presents their implications.

The structure of the connection between the articles in the dissertation is explained in more detail below. In addition, the individual articles are briefly summarised in order to present a collective overview of them. A summary of the methods applied in the respective articles with regard to data collection, the people interviewed and the number of interviews conducted is presented in detail in table 3.

Article 1: India's labour market challenges: employability of young workforce from the perspective of supply and demand (chapter 4)

The first article deals with the Indian labour market and the implications for the young workforce. This conceptual article contextualises the Indian labour market and vocational education system. It examines the supply and demand for labour and the resulting mismatch on a qualitative and quantitative level. The individual segments of the Indian education system are

also considered. A definition adapted to the Indian context is used to examine what is necessary to acquire employability in India. The first article looks at the research context from the macro level of the Indian VET system and thus shows the political and institutional framework conditions of the research context. This gives the reader the opportunity to classify the overarching challenges in the Indian education system before the organisational unit of the PTs is then discussed at the meso level.

Article 2: The function and institutional embeddedness of Polytechnics in the Indian education system (chapter 5)

The second article focuses on the school form of PTs as these are an integral part of the Indian VET. The functions of PTs and the institutional embeddedness of this school form in the education system are examined empirically. School principals, who have an important function as intermediaries, are interviewed in order to obtain their assessment of the school form. The theory of institutionalism is used here, as the actors and their individual interests play a decisive role and institutionalism helps to understand the institutions in their entirety. The article explains the role and systematic embeddedness of the PTs in the overall Indian system and classifies their functions and relevance for various stakeholders.

Article 3: The attractiveness of Polytechnics in Delhi and Mumbai: a study on the perception from the perspective of students and parents (chapter 6)

After looking at the systemic classification and functions of PTs in the previous article, the third article deals with the attractiveness of PTs from the individual perspective of the specific stakeholder group of students and their parents. A lack of attractiveness is often perceived as a challenge in the vocational education system. Students and their parents are direct users of the school form and can therefore provide – with the help of specifically designed empirical interviews – direct insights into the PT and the assessment of its attractiveness. Using a multidimensional attractiveness model, conclusions can be drawn about the students' and parents' assessment of the PTs.

Article 4: The attractiveness of Indian Polytechnics graduates: an analysis from the (demand-side) perspective of companies and colleges (chapter 7)

Since attractiveness is a multidimensional and complex model, article 4 empirically examines attractiveness from another perspective, namely from the point of view of Indian companies and colleges. For Indian companies, the lack of employability described in article 1 is an im-

pending problem. Indian colleges are another player on the demand side that accept PT graduates and can therefore also provide important insights. In order to analyse the perceptions of the attractiveness of the two different institutions, the concept of institutional logics (ILs) is used in this article. This concept helps to uncover the inherent logic behind the actors' perceptions of attractiveness. By knowing how the different stakeholders assess the attractiveness of the PTs, conclusions can be drawn about which areas of the PTs need to be improved in order to increase their attractiveness.

Article 5: Perceptions of Teachers in Indian Polytechnics: an exploratory Study of the Attractiveness in India in the Higher Vocational Sector (chapter 8)

This empirical article looks at the attractiveness from the perspective of PT teachers. To this end, interviews were conducted with PT teachers about their perception of the attractiveness of the school form. In addition, the teachers were asked about their self-image as knowledge mediators in PTs. The article also attempts to categorise the results of attractiveness in PTs in relation to studies on attractiveness in ITIs. It thus provides an important insight into another key stakeholder group in relation to attractiveness, namely teachers. In addition, the article offers points of reference for categorising ITIs in comparison to PTs.

Article 6: Theory and practice of teaching and learning in the classroom: lessons from Indian Industrial Training Institutes (chapter 9)

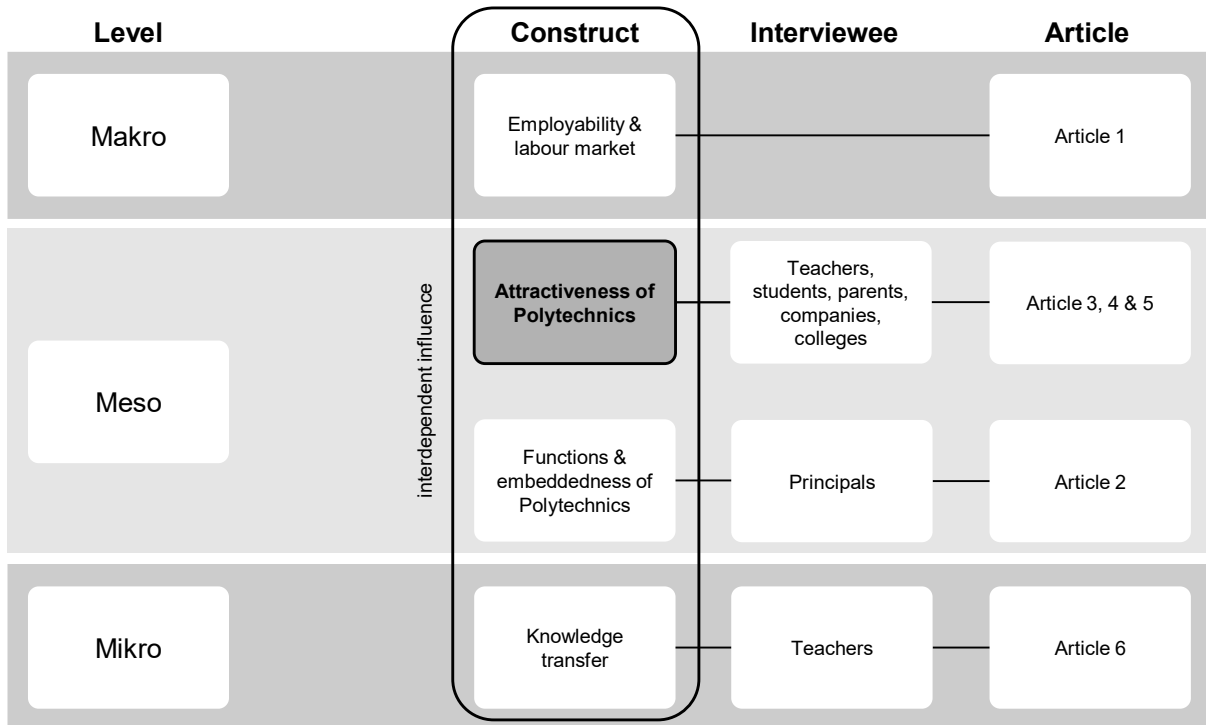
The sixth article deals with the micro level of the VET system in India, i.e. the interactions within the education system between the actors and here in particular with the theory and practice of knowledge transfer in VET schools and thus offers a didactic perspective in the dissertation. The actual implementation of didactic measures is considered, as this has often been named as a point of criticism in relation to the Indian VET system and as a reason for a lack of employability. In order to examine whether this is the case, empirical interviews for this article were conducted with teachers as central actors about their ideas of knowledge transfer and their values. In addition, classroom observations were carried out in order to verify or falsify these with the claims made in the interviews and thus gain an in-depth insight into knowledge transfer in vocational schools in India. The results are then discussed against the backdrop of the concepts of teacher-centred learning and student-centred learning as well as employability and the Indian context. In contrast to the previous article, this one does not focus on PTs, but on another type of school in the Indian VET system, the ITIs. ITIs are also part of the spectrum of vocational education and training in India and therefore provide an important insight into knowledge transfer in the vocational field.

Illustration of connection between the articles

The six articles provide a coherent view of the Indian VET system. The central focus is on the attractiveness of the school form of PTs, which is analysed in three articles. In addition, constructs are considered which have an important influence on the attractiveness of the school form, namely the functions of PTs, employability in the Indian labour market and knowledge transfer. These constructs are important implication factors for the central topic of attractiveness, which also influence each other. The dissertation is structured in such a way that the internal connection between the articles becomes obvious. Overall, several levels have been considered in the dissertation. In principle, the macro level encompasses the structures of society as a whole and educational policies. The meso level refers to institutional contexts such as schools while the micro level describes individual interactions and teaching/learning processes. In this dissertation, the Indian labour market and the vocational school system are examined and the general challenges, also with regard to mismatches, are discussed at the macro level. At the meso level, the specific organisation (PTs) within the education system is then analysed respecting its functions and, in particular, its attractiveness from the perspective of various important stakeholders. Finally, at the micro level, the specific work in the VET schools is analysed and how the transfer of knowledge takes place in VET classrooms. By looking at the different main actors in the different articles, a further link is also established between the articles relating to the actors. The articles thus cover several levels and are empirical (articles 2, 3, 4, 5 and 6) and conceptual (article 1). Overall, the articles consider several important research desiderata in relation to VET in India that have been realised in the articles and have not yet been researched in this extent and depth with consideration of a diverse stakeholder group. Figure 1 provides an overview of the constructs, levels and interrelationships of the articles, as well as the stakeholders interviewed.

Figure 1:

Overview of considered levels, constructs, stakeholder groups and links between the articles



Source: author's illustration

Table 1:

Overview of the articles which are part of this dissertation together with information on their publication

Nr.	Authors	Title	Journal / Peer Review / Publication Date / DOI
1	Sebastian Schneider Matthias Pilz	India's Labour market challenges: Employability of young workforce from the perspective of supply and demand	PROSPECTS - Comparative Journal of Curriculum, Learning, and Assessment (Double Blind Peer Review) Published: 13 June 2024 DOI: 10.1007/s11125-024-09691-y
2	Sebastian Schneider Matthias Pilz	The function and institutional embeddedness of Polytechnics in the Indian education system	International Journal for Research in Vocational Education and Training (Double Blind Peer Review) Published: 19 December 2019 DOI: 10.13152/IJRVET.6.3.5
3	Sebastian Schneider	The attractiveness of polytechnics in Delhi and Mumbai: a study on the perception from the perspective of students and parents	International Journal of Training Research (Double Blind Peer Review) Published online: 18 May 2023 DOI: 10.1080/14480220.2023.2213896
4	Sebastian Schneider	The attractiveness of Indian Polytechnics graduates—An analysis from the (demand-side) perspective of companies and colleges	International Journal of Training and Development (Double Blind Peer Review) Published: 12 December 2022 DOI: 10.1111/ijtd.12294

5	Sebastian Schneider Natalie Grote Usha Ajithkumar Matthias Pilz	Perceptions of Teachers in Indian Polytechnics: an exploratory Study of the Attractiveness in India in the Higher Vocational Sector	Maitra S., Maitra S. and Schwecke ,S. (eds.) Crafting India’s Skill Ecology—Reproductions, Recalibrations, and Reimaginat-ions. ICAS:MP Sage Series. (Single Blind Peer Review) Status: Accepted
6	Sebastian Schneider Antje Wessels Matthias Pilz	Theory and Practice of Teaching and Learning in the Classroom – Lessons from Indian Industrial Training Institutes	Vocations and Learning (Double Blind Peer Review) Published: 10 November 2022 DOI: 10.1007/s12186-022-09305-8

Source: author’s compilation

Notes on the form of presentation

The individual articles have been adopted in the form in which they were published, the changes in format are explained below. The respective bibliographies are summarised at the end of the dissertation in a joint bibliography for the sake of clarity. The respective citations of the individual articles can be found in the joint bibliography. The bibliography has been standardised and presented in the latest APA version. For improved readability, the fonts and font sizes of the articles have been standardised and may therefore differ visually from the original. Tables, figures and footnotes have been numbered consecutively. This means that the labelling of the tables in the published original articles differs from the labelling here. In addition, the section numbers of the articles will change and the references to the corresponding sections within the articles will also be adjusted so that they no longer correspond to the original section numbers. The visualisation of the graphics may differ marginally from those in the original publications. In addition, British English was used throughout the dissertation, even if American English was used in the original publications. No changes have been made to the content of the original articles.

1.2 Individual contributions to the articles

Table 2: *Overview of the individual contributions to the articles*

Nr.	Title	Authors	Share of Contribution in %	Own Contributions
1	India's Labour market challenges: Employability of young workforce from the perspective of supply and demand	Sebastian Schneider Matthias Pilz	70 30	Project development Conceptual development Data collection Data analysis Manuscript draft and revisions
2	The function and institutional embeddedness of Polytechnics in the Indian education system	Sebastian Schneider Matthias Pilz	80 20	Project development Conceptual development Data collection Data analysis Manuscript draft and revisions
3	The attractiveness of polytechnics in Delhi and Mumbai: a study on the perception from the perspective of students and parents	Sebastian Schneider	100	Project development Conceptual development Data collection Data analysis Manuscript draft and revisions
4	The attractiveness of Indian Polytechnics graduates—An analysis from the (demand-side) perspective of companies and colleges	Sebastian Schneider	100	Project development Conceptual development Data collection Data analysis Manuscript draft and revisions

5	Perceptions of Teachers in Indian Polytechnics: an exploratory Study of the Attractiveness in India in the Higher Vocational Sector	Sebastian Schneider	40	Project development
		Natalie Grote	40	Conceptual development
		Usha Ajithkumar	10	Manuscript draft and revisions
		Matthias Pilz	10	
6	Theory and Practice of Teaching and Learning in the Classroom – Lessons from Indian Industrial Training Institutes	Sebastian Schneider	50	Conceptual development
		Antje Wessels	35	Data Analysis
		Matthias Pilz	15	Manuscript draft and revisions

Source: author's compilation

The author's share of the above-listed articles has been assessed on the basis of his contributions to these scientific papers and has unanimously been agreed on by all co-authors. Additionally, the formatting of the articles was supported by student assistants from the Chair of Business Education and International VET Research at the University of Cologne. External unpaid help was also called in for the translation of the articles and language editing.

1.3 Relevance of the research topic

As Pilz (2016a) has already stated, the focus on India is “highly relevant” in the context of VET. This is because, as pointed out in the introduction, India is playing an increasingly important role as a country in the international community. A decisive component for the country’s prosperity is the VET system, as this is of great importance for labour market integration, the recruitment of skilled workers and economic and social development (Agrawal & Agrawal 2017, Agrawal & Indrakumar 2014). In this respect, dealing with the topics of this dissertation, namely PTs, the attractiveness of the school form, employability and knowledge transfer, is relevant for different levels of Indian society such as the political, economic and social one.

The Indian government considers education to be a high priority. Education is seen as a crucial instrument for overall social, economic and socio-economic development (MHRD, 2019a). It is furthermore seen as a crucial element in capitalising on the much-discussed demographic dividend. The Indian government’s goal is to position society as a modern knowledge society with the help of the education system (MHRD, 2019a, Mehrotra, 2012; Lang-Wojtasik, 2021). This can be seen both in the increased political interest in vocational education and training in recent years and in the various political initiatives that have been launched. Various vocational training-related measures such as “Make in India” or “Skill in India” make it clear that Indian policy is increasingly focussing on vocational training (Deka & Batra, 2016, Sharma & King, 2019; Bhandari, 2021; Chenoy et al., 2019). Promoting employability is a key objective of the Indian government (MHRD, 2020). Nevertheless, efforts to improve the system as a whole have so far only met with limited success, as the very ambitious goals have often not been achieved (Agrawal, 2012; Kotamraju, 2014; Saini, 2015; Majumdar, 2016; Pilz & Regel, 2021). In order to improve the opportunities for qualification and the structure of the VET system, it is necessary to understand its individual elements and analyse their role and embeddedness in the system in order to achieve sustainable improvement of the system in the next step.

In this context, it is not only political actors who are interested in vocational education and training in general and its sub-aspects, but also economic actors. In addition, the skills gap or mismatch specifically affects the economy and companies in India (Mundle, 2017). Companies are often unable to fill vacancies because applicants do not have the required qualifications (Khare & Arora, 2023). This can have a significant impact on companies’ productivity, growth and competitiveness. They are therefore dependent on a functioning qualification system that provides employable labour.

This is particularly important as the Indian economy is undergoing a period of change. Due to the ongoing structural development of the Indian economy from an agricultural economy to a more service-oriented economy and towards more formal structures, the service sector is making an ever greater contribution to overall economic output (see article 1). Accordingly, workers with different or higher qualifications are being sought. As a result, PT in particular is gaining in importance as the relevant qualifications for the skills required in the service sector can be acquired here (see article 1). However, graduates from PTs are also playing an increasingly important role in the developing field of manufacturing, as they can fill the positions at the interface between production and management. The demand for skilled workers with intermediate qualifications has risen sharply in recent years (see 4.2.2). PTs in particular play a decisive role in being able to train employees with precisely these qualification profiles, which is why considering and analysing them is of great relevance for companies and the economy in general. In addition, looking at the general labour market situation, the supply of available labour and the demand for labour and its employability is fundamentally relevant to understanding the needs of the commercial level with regard to the VET system (see article 1).

Apart from the political and economic players, this analysis is also highly relevant for society as a whole and for individuals and employees. The challenges of the skills gap and mismatch affect not only the economic players but also the individuals in Indian society (Adely et al., 2021). A lack of match means that potential employees do not end up in jobs that are potentially possible and therefore do not find an adequate position in the labour market (Khare & Arora, 2023; Bairagya, 2012).

In addition to the potential risk of unemployment and the associated negative consequences for individuals, this can also lead to them finding employment, but having to carry out under- or unqualified work or ending up in the informal sector, which is subject to little regulation. This is accompanied by lower wages and low social security (Sakthivel & Joddar, 2006; Srivastava, 2019). For individuals and the young population, it is therefore of great importance to receive an adequate quality education and to acquire labour market skills. For individuals and the young population, an appropriate quality of education is therefore of great importance in order to achieve employability. Accordingly, aspects such as the attractiveness of educational opportunities play an important role in social discourse (Stalder et al., 2022; Bardalai, 2021). For this reason, it is important to consider the attractiveness of the polytechnic school form from the perspective of various stakeholders. Through the different perspectives on the attractiveness of the school form, conclusions can be drawn about the constitution of

PTs and the extent to which it can be a solution to the social and societal challenges of the young population in India. Another key aspect is how the imparting of knowledge is implemented in the school form, as this is often perceived as a problem for the lack of employability. Analysing the theory and practice of knowledge transfer is therefore relevant.

To summarise, the relevance of this dissertation can be observed on various levels. The work is relevant from a social, political and economic perspective. The dissertation looks at the different levels of VET in India. At a macro level, the challenges of the labour market and the challenges of the VET system are considered. At the meso level, the institutional and organisational structures of the system are analysed with a special focus on the school form of PTs. In addition, a look is taken at the micro level by analysing how the actual transfer of knowledge is implemented in Indian vocational schools. The consideration of the Indian labour market, the school form of PTs and their attractiveness, as well as the knowledge transfer in the system show the very broad scientific consideration of the dissertation. What is special about this is that the PT school form has been little considered in an academic context until today. The consideration of a broad spectrum of stakeholders to assess the school form and the topic of attractiveness has not yet been applied to this extent to educational institutions in India.

The relevance of the work is therefore demonstrated for various areas and stakeholder groups as shown. The implications are presented at the end of the dissertation in chapter 10.

1.4 Overview of the research context

The dissertation operates in the field of qualitative international VET research, which conducts research in the context of the interactions between work, education and society (Mulder et al., 2015). In this chapter, the context of the research area and its premises will be presented in order to be able to categorise the environment in which the dissertation operates. In doing so, both the research area and the relevant background in the country under consideration, India, will be discussed. In this section, however, the specific Indian education system is not outlined as it is described in detail in the respective articles.

In general, vocational education and training is gaining more and more attention from the public, but also in the world of research. This trend is generally evident in the Global South and especially in India and has continued at a rapid pace, particularly in recent years (Brown & De Neve, 2024; World Bank, 2008; McGrath, 2012; McGrath & Yamada, 2023, Pilz, 2016a, Gessler et al., 2021; Adely et al., 2021). This has to do with the fact that VET is seen as a potential solution to the above-mentioned challenges in India, which has led to a considerable

increase in interest in the research field although this area is still comparatively under-researched (Pilz 2016a, Pilz & Regel, 2021). On the one hand, this is due to the fact that interest in general education continues to be much higher in India and therefore has a greater influence on the research landscape. On the other hand, the research area relating to VET, vocational qualifications and skill acquisition is not sustainably established in the Indian academic research landscape, meaning that there is no separate research area on VET and the topic is often covered by interdisciplinary researchers. Given the relatively small research community working on the topic in India, there are challenges such as limited human and financial resources, which means that only a limited proportion of the necessary research topics can be adequately covered. This also results in limited perspectives and comparatively low visibility and impact and influence on policy makers and practitioners (Pilz 2016a). Therefore, the view of researchers from outside the Indian system is important in order to work on the necessary problems and to be able to provide new perspectives on the challenges and problems in India. In addition, statistics and data are not available in sufficient quality when compared internationally (World Economics, 2023). In India, there are a large number of governmental and non-governmental organisations that collect data, but the comparability and consistency of the data vary greatly. Due to the size of the country and its population as well as the pronounced informal sector, there is also a difficulty in the coverage and representativeness of the samples. In recent years, data quality has improved, particularly through the National Statistics Office (NSO), but further progress is still needed in terms of data quality and transparency. In relation to the present research, this applies in particular to the data on the number of school types, the data on student numbers, employment and labour market figures. The data influences the evaluation of the success of educational measures and thus affects political decision-making (Kumar, 2021; Babu & Kumar, 2023).

Furthermore, the dissertation operates in a relatively complex field of research (British Council, 2019). This is shown by the fact that there are a large number of political responsibilities for the area of vocational education and training in India. There are up to 21 ministries responsible for VET, each with different competences in this area (MSDE, 2018). The complex nature of governance leads to a system that tends to be inefficient and complicated (Regel & Pilz, 2021; British Council, 2019). In parallel to the governmental elements, there are a large number of private training initiatives, which makes it difficult to gain an overview of the system. In addition, due to the increased political interest, VET is subject to frequent changes, adjustments and reorganisations or the transfer of responsibilities through the enactment of

policies and regulations (Sharma & King, 2019). This can be seen, for example, in the renaming of the ministries during the genesis of this dissertation. For example, the Ministry of Human Resource Development was renamed the Ministry of Education (MHRD, 2019a). In addition, there are recurring differences and divergent interests regarding the direction of education policy between the individual federal states and the central government in Delhi, which can lead to frictional losses (Govinda & Bandyopadhyay, 2006).

Additionally, central elements for a VET system, such as an NQF, were only introduced a few years ago (Pilz & Regel, 2021). The VET system in India is therefore still in a state of constant readjustment and development, making research difficult. This can be seen in the numerous schemes and initiatives that the Indian government has initiated in recent years. These are intended to pursue various goals, such as reducing poverty in rural areas (Carswell & De Neve, 2023). Initiatives such as “Make in India” testify to the desire of political decision-makers to transform the subcontinent into a global production and manufacturing centre modelled on China (Chenoy et al., 2019; Sahoo & Bhunia, 2017), whereby the political orientation of the initiatives changes rapidly, depending on the composition of the government in office.

Large numbers of qualified workers are needed for the relevant key industries. Initially, the quantity of vocational training centres and qualification measures should therefore be increased. This was demonstrated by the very ambitious goals of the Indian government’s “Skill India” initiative to provide hundreds of millions of workers with vocational training by 2022 (Mehrotra, 2014; Sharma & King, 2019). These unrealistic figures could not be achieved for various reasons. In particular, too little focus was placed on the quality components of the qualifications. Further initiatives and the National Education Plans (NEP) are intended to address the lack of quality in the vocational sector in particular in order to reduce the mismatch. It should also be borne in mind that the current political reform efforts are also taking place against the backdrop of a trend towards greater political ideologisation of all areas of society, as demanded by the Hindutva promoted by Prime Minister Modi. Reform efforts in the education sector are not excluded from this either (Clemens & Vollmer, 2019; Lang-Wojtasik, 2021).

However, VET is often regarded as a second-choice option, while academic education system is still seen as the gold standard (Wessels & Pilz, 2018). Academic education is also traditionally considered to be of higher value in India, which means that VET continues to be categorised as less valuable. This has an impact on research activity in both areas. In the past, the focus of political initiatives was often not on VET. The prioritisation and attention of political decision-

makers and the associated allocation of resources was often not made in favour of VET. In line with political prioritisation, research priorities were often not placed on the VET sector, meaning that the relevant topics were often not addressed.

As it has not been established as an independent field of research, the research area has only been dealt with in fragments. Despite the challenges in the field of research, there have been many research efforts in the past on various topics relevant to the present research (Gupta et al., 2024; Cabral & Dhar, 2019). There are fundamental assessments of the system, but without concrete analyses of individual organisations (Rao et al., 2014; Venkatram, 2012; Wessel & Pilz, 2018). With regard to school types in the VET sector, ITIs have been researched in much greater depth. Research on quality (Tara et al., 2016), entrepreneurship education (Zenner et al., 2017), the self-perception of teachers (Jambo & Pilz, 2018) and employability (Neroorkar & Gopinath, 2023) has been conducted on ITIs. Research on the attractiveness of the organisation was also implemented for the ITIs (Ajithkumar & Pilz, 2019). This was also done to determine the attractiveness of VET in India in general (Pilz & Ramasamy, 2022).

VET in India is often discussed in relation to the transfer efforts of elements of foreign systems, e.g. with regard to the German dual system of training (Wiemann & Pilz, 2020; Regel et al., 2022; Valiente et al., 2021; Gessler et al., 2021). In addition, possible reforms of the Indian VET system (King, 2012; Sharma & King, 2019; Maitra et al., 2022) and its challenges (Agrawal, 2012; Saini, 2015; Majumdar, 2016; Pilz & Regel, 2021) are discussed. In the research field, the informal sector always plays an important role in the consideration of skill development (Koops & Pilz, 2019; Regel & Pilz, 2019; Pilz et al., 2015; Pilz & Wilmshöfer, 2015; Brown, 2023; Jung & Pilz, 2016; Schneider & Pilz, 2018). Both the demographic dividend (Mehrotra, 2012; Mehrotra et al., 2014) and the labour market and the challenges with regard to employability (Khare, 2014; Khare, 2018; Khare & Arora, 2023; Mehrotra, 2016a; Agrawal & Agrawal, 2017; Neroorkar & Gopinath, 2020) are also addressed.

When researching systems in a country, the specific characteristics and conditions that exist in that country must be taken into account. This is because cultural, social, political and economic factors influence how education is organised in a country. Looking at these factors makes it possible to develop a comprehensive understanding of the countries and to formulate conclusions and possible solutions for challenges (Bereday, 1964; Evans, 2020; Grollmann, 2009). There are various factors in India that are particularly relevant to the present research topic, which is why they will be briefly addressed again below, although they will also be dealt with in more detail in the individual articles.

This is, for example, the already mentioned large informal sector in India. This has a major impact on various aspects of life including the labour market and (vocational) education (Sodhi 2014). A considerable part of value creation takes place in the informal system, which means that educational activities and labour relations are also located in the informal sector (von der Bank et al., 2024; Koops & Pilz, 2019; Regel & Pilz, 2019; Pilz et al., 2015; Pilz & Wilmshöfer, 2015; Brown, 2023; Jung & Pilz, 2016; Schneider & Pilz, 2018). As this is scarcely regulated, it is hardly affected by formal systems, initiatives and measures (Kus, 2010). This should be noted, as key elements of the research work, such as PTs, are elements of the formal education system and the work therefore takes place in a formal setting.

It should also be noted that India, with its large population, large geographical area, 28 states and eight union territories, has strong regional differences. Both the economic performance and the infrastructure in terms of educational institutions can vary significantly (Kumar et al., 2020; Sharma & Patil, 2022). This has an influence on local labour markets, but also on the equipment of educational institutions, and the different conditions also influence the decisions and actions of the respective local actors in the regions under consideration. This means that the place of observation has an important influence on the results. This becomes particularly clear when looking at urban and rural settings. In India in particular, the differences between metropolitan regions such as Mumbai, Delhi and Bangalore and rural areas such as the north-east of India are immense. This relates not only to the infrastructure and economic differences, but also to the demand for education (Schneider & Pilz, 2018; Gupta et al., 2024). There are also major differences with regard to the heterogeneous organisation of Indian society, which differs significantly in terms of ethical characteristics, religious customs and linguistic diversity (Panda & Gupta, 2004). It should be pointed out here that it is therefore not possible to speak of “one India”, but that there are many different forms of India and that a generalisation of the subcontinent could lead to a reduction in the knowledge gained. In addition, the colonial context is to be considered in the context of the Indian educational landscape. The colonial legacy continues to have an impact on the current education system and influences it in many ways in terms of educational practice and policy. This should also always be considered when discussing the introduction of Western systems or methods from Western spheres of influence (Singh, 2001; Singh, 2012). In addition, the consideration of ethnic minorities and the promotion of gender equality continues to be an issue of particular importance in the context of education and research in India.

1.5 Aims of the research

This dissertation addresses the central challenges in relation to the Indian vocational training landscape and in particular deals with three central aspects that have received little attention in the previous field of research and are therefore dealt with here.

Firstly, the VET system is analysed in relation to employability and the labour market. The questions that will be asked are what the concept of employability means in the Indian context and what aspects are necessary in the Indian context to be employable. Furthermore, the question of which areas of the VET system need to be improved and adapted in order to create employability opportunities for the population in order to solve problems such as mismatch and matching problems for the population and the economy will be discussed. One aim of the dissertation is therefore to find out what role the VET system plays in creating employability for the population.

The second and central part of the dissertation builds on the first question and deals with an important type of school in the system, namely PTs. The aim is to answer the question what functions the school form fulfils in the Indian education system and how it is embedded in the Indian education system. Against this background, the central question of the dissertation is what attractiveness is attributed to the school form. The question is to be answered in particular by analysing various central actors. The aim of the dissertation is therefore to analyse the role and function of PTs in the Indian VET system and the attractiveness attributed to the school form by the various relevant stakeholders.

The third objective of the dissertation ties in with the previous objectives and raises the questions of how the didactic measures are realised in everyday life in vocational schools, how teaching is implemented in India and what teaching methods are used. Of particular interest is the relationship between theory and practice in the classroom and the role of the teachers in the classroom. The third aim of the thesis is therefore to find out how teaching practice is organised in India, how learning processes take place in vocational schools and what role teaching methods and teachers' self-images play in this and what influence concepts such as student-centred learning (SCL) could have.

The different objectives of the individual articles are linked and connected in different areas. It should be noted that the primary aim is not to compare the different types of school. Overall, the concepts of employability, the role and attractiveness of PTs and the implementation of teaching methods examined in the dissertation build on each other by highlighting different aspects of the Indian vocational education system and identifying solutions to improve the

employability of graduates. Linking these concepts helps to develop a comprehensive understanding of the challenges and opportunities in the field of VET in India. Together, these different parts of the dissertation form a comprehensive approach to analysing and improving the Indian VET landscape by addressing the key challenges and thus providing implications for the further development of the Indian VET system.

2 Foundations of the dissertation

In order to be able to realise the stated aims of the dissertation, various concepts must be addressed. Since the corresponding theoretical constructs of this dissertation are described in detail in the respective articles, the following will only briefly discuss the respective constructs below in order to present them at a glance and to clarify the foundations on which the dissertation is based. The state of research and the lines of conflict in the individual areas are not addressed again, as these have already been covered in the corresponding articles. In addition, one of the central subjects of the dissertation, namely PTs, will be briefly introduced in order to be able to explain why it was chosen for the analysis.

2.1 Attractiveness of Vocational Educational Organisations

The central concept of the dissertation is the examination of the construct of attractiveness (see articles 3, 4 and 5). The attractiveness of PTs is analysed from the perspective of the relevant stakeholders.

The construct is closely connected to the role and functions of PTs. If the school form is able to fulfil the specific functions for the respective stakeholders, it can be assumed that it has a certain attractiveness for the stakeholders. Here too, however, reference must be made to the interdependencies between actors and the other organisations of the education system, so that a complex overall view can be taken, whereby a comparison of the attractiveness of the various organisations of the education system is also not in the foreground, but is implicitly taken into account.

In order to examine whether PTs are an attractive type of school for the stakeholders, the latter must therefore be surveyed. If deficiencies in the attractiveness of several or even individual stakeholders can be identified, then this is an indication of possible weaknesses of the organisation and shows where possible adjustments need to be made by the policy makers. For this reason, an extensive consultation of the central actors was carried out in this dissertation in order to obtain a broad view of the perspectives of the stakeholders and to be able to compare them. The concept of attractiveness was supplemented and adapted for this research. Thus, by combining the consideration of the topic of attractiveness together with the ILs, the background for the perception of the actors could be worked out in detail. In addition, the cultural and institutional context was adapted and supplemented, as the assessment can take on different forms depending on the cultural context (Ajithkumar & Pilz, 2019; Jambo & Pilz, 2018). The attractiveness of vocational education and training varies from country to

country and is influenced by various factors (Stalder et al., 2022). The topic of the attractiveness of vocational education and training is discussed in many countries around the world (Hao & Pilz, 2021; Lovšin, 2014; Russo et al., 2019) and is particularly relevant in India, where the frequently cited lack of attractiveness is a fundamental problem of vocational education and training (Tara et al., 2016; Pilz & Ramasamy, 2022).

While the attractiveness of ITIs has already been analysed (Ajithkumar & Pilz, 2019; Jambo & Pilz, 2018), there is still a complete lack of research on PTs. Raising awareness on this topic in India and researching attractiveness in PTs therefore is essential. For this reason, and because the concept provides a good insight into the mindsets of the various stakeholders and reveals possible weaknesses and challenges of PTs, it was selected as the central construct for this dissertation.

2.2 Polytechnic colleges

The Indian vocational education and training system is diverse and comprises a very wide range of different school types. In turn, the school types differ greatly in terms of their facilities, quality and visibility (Wessels & Pilz, 2018; Kotamraju, 2014; Goel, 2011; Rao et al., 2014). While there is a fundamental distinction between general and vocational education, in the vocational sector there is a distinction between vocational education and vocational training (Pilz & Regel, 2021). PTs are categorised as part of vocational education, which is part of higher education in India. In addition, the PTs are categorised as Technical Vocational Education, as the training courses mainly relate to technical areas such as engineering, electronics and mechanics.

In the dissertation, PTs are considered both as an organisation and as an institution. PTs are regarded as an organisation when it comes to exploring their functions and embeddedness in the administrative and organisational structure of the Indian education system, as well as the way knowledge is imparted. On the other hand, PTs are viewed as institutions, i.e. in terms of their social norms, values and significance, when their attractiveness is assessed by stakeholders. By combining the perspectives of PT as an organisation and institution, a comprehensive picture of the attractiveness of polytechnics can be drawn, which takes into account both the structural and administrative aspects as well as the cultural, normative and social dimensions. The PTs are analysed as a self-standing form of school and not as a collection of different training programmes. As an organisation of initial education, PTs operate in the upper or post-secondary sector and offer tertiary vocational education (Regel & Pilz, 2021; UNEVOC, 2018).

Despite being categorised as higher education, vocational diplomas rather than academic degrees are awarded (Pilz & Regel, 2021). The categorisation as a stand-alone institution clarifies the classification of PTs between academic and vocational education. This is also reflected in the corresponding responsibilities. Vocational education institutions, including PTs, are administered by the Ministry of Education (MoE) and the All India Council for Technical Education (AICTE).

This type of school was chosen for two reasons. Firstly, there is evidence that few workers in India have marketable skills at an intermediate skill level (Mehrotra, 2014). This is particularly significant as it is these skills that are needed in a developing economy. This is particularly true in the area of technical occupations. The categorisation of PTs shows that they occupy a position between academic and technical vocational education. This means that they offer demanding education that also imparts vocational skills. PTs can therefore offer precisely these skills, as they offer training programmes at the desired qualification level. The names of PTs often vary, so that they are also referred to as polytechnics, polytechnic colleges or polytechnic institutes.

The second reason for looking at PTs is that too little research has been done on the school form to determine whether it can really be a solution to the problem outlined above. There is a distinct shortage of academic research that goes beyond policy briefs. The existing research either has a very limited geographical or thematic focus, is outdated or fragmented, or is of poor academic quality (Earnest, 1990; Prasad & Singh, 2010; Rathod & Singh, 2015; Saha et al., 2016; Shelke et al., 2017; Kinker et al., 2021; Kinker et al., 2023). Basically, there is a lack of a fundamental categorisation of the school form. It is necessary to take a look at the actual functions of the PTs, which should be done from the perspective of the various actors involved. However, the focus is not on comparing PTs with educational organisations such as colleges or ITs, although a comparison between neighbouring educational organisations is often implicit.

2.3 Employability

Employability is a much-discussed concept in the discourse of the world of work (ILO, 2004; Zenner-Höffkes, 2021; Kraus & Vonken, 2009). A variety of definitions are used, as the concept is applied in different contexts and disciplines. Basically, employability is about the ability of individuals to participate in the world of work. The labour markets themselves and their needs and demands on individuals differ, depending on the country under consideration. The economic, social and cultural implications play a key role (Benbow & Hora, 2018; Bardalai, 2021).

The discussed mismatch in the Indian economy between the existing skills of employees and the skills required by employers is attributed to the lack of employability of employees. This dissertation therefore examines employability to determine whether this is indeed the case in India. For this purpose, a definition of employability is developed for the Indian context (see 4.3), as there is no standardised definition for the Indian scenario to date. This analysis aims to determine what skills are crucial in the Indian labour market and whether the Indian school system can impart these skills. It also examines what adjustments are needed in the Indian VET system to ensure that these skills and competences can be successfully acquired.

A common criticism of the concept of employability is the assumption that the lack of employability is solely the responsibility of the employee, neglecting structural problems in the system or on the labour market (Moreau & Leathwood, 2006). In reality, however, the employability of individuals arises from a complex interplay of various elements, including the requirements of employers, the systemic framework conditions, political support measures and individual career development strategies. The dissertation therefore takes a holistic view of the concept of employability. The aim is both to give individuals the opportunity to pursue rewarding employment and to help companies find employees with the necessary skills on the labour market. Thus, the concept of employability serves as one of the underpinnings for the aims of the dissertation by examining both the labour market and the employability of individuals and its systemic implications.

2.4 Institutionalism

The theoretical basis for understanding the actual functions of PTs in the Indian VET system is institutionalism. Institutionalism also helps to understand the perception of stakeholders. It is concerned with the significance of institutions in society (Hall & Taylor, 1996). This is used to analyse the functions of the institution, in this case the PTs. In order to understand the institutions, the perspectives of the stakeholders are included in the analysis. This approach broadens the understanding of the institutions, as the actual functions for the individual actors are revealed, which go beyond school laws, regulations and formal organisational rules. The institutions try to maintain their institutional legitimacy by adapting to the requirements of stakeholders such as political decision-makers, trade unions and associations (Diogo et al., 2015; Wiemann et al., 2018). The functions of the school form can change over time with regard to its original orientations and adapt to the institutional logics of the respective stakeholders (Thelen, 1999; Pierson, 2004; Bulmer, 1998). In addition, the institutional view of the school form can reveal interdependencies with other institutions in the education system. This helps

to categorise PTs in terms of their embeddedness in the Indian vocational education system. These interdependencies can also affect the individual actors among themselves by revealing the interactions of interests that influence the organisation of PTs. Institutionalism thus helps to analyse the actual functions and embeddedness and role of PTs in the Indian system, which is why it is used in this dissertation.

2.5 Knowledge transfer

Article 1 on employability analyses which skills and competences are necessary to be employable in the Indian labour market. It is often shown that the way in which knowledge is imparted is a key factor in creating employability (Segbenya et al., 2023; Petruzzello et al., 2022). It is not only the content that is important in the development of employability, but also how the knowledge is transferred. This is one reason why the theory and practice of knowledge transfer is considered in this dissertation. The way in which knowledge is imparted in the vocational system can vary significantly. Once again, cultural and social circumstances have a strong influence on the transfer of knowledge. Various concepts play a role in this, such as teacher-centred learning or student-centred learning. There is evidence that teacher-centred learning in particular is widespread in India (Brinkmann, 2015; Pilz et al., 2022; Pilz & Gengaiyah, 2019). In contrast, with regard to the concept of student-centred learning, it is often claimed that the skills taught are necessary to create a connection to the world of work and could strengthen employability opportunities. For these reasons, the dissertation looks at the way knowledge is imparted in Indian vocational schools and analyses aspects such as the role of learners and teachers, the methods and forms of learning and the learning environment and examines whether the way knowledge is imparted can help develop skills to create employability for individuals.

3 Methodological classification of the dissertation

3.1 Methods of data collection and data analysis

The dissertation operates within the framework of qualitative social research. The research methods were determined depending on the research objectives and the research context. As described in chapter 1.3, the dissertation is conducted in a field of research that has not yet been researched to in depth in regard to PTs, and accordingly there are still few findings in this field. The dissertation is therefore an exploratory study that is intended to help generate new findings on PTs. In addition, the further objects of investigation, such as individual assessments of the attractiveness of school types, are characterised by subjective and individual assessments and experiences of the interviewees. Qualitative research methods make it possible to capture the complexity of social phenomena and create a contextual understanding, which is why they are used here. Qualitative methods were also chosen because the objects of research have not yet been explored to any significant extent. In such cases, these approaches show their particular strengths (Flick, 2014; Lamnek, 2010; Kuckartz, 2014).

In this dissertation, the main data collection instruments used were semi-structured interviews, focus group discussions and participant observation. A total of 125 individual interviews were conducted, as well as ten focus group discussions and 25 classroom observations (see table 3). The reasons why these methods were chosen are described below. The individual process of each interview in each article is explained in detail in the corresponding methods section of each article.

Semi-structured interviews have the advantage that they have both a certain degree of standardisation, i.e. theory-based pre-defined questions, but also a certain degree of flexibility, as it is possible to respond to participants' answers, e.g. to ask in-depth questions that are not pre-defined (Adams, 2015). The semi-structured interviews therefore help to develop comprehensive and detailed knowledge. Theory-based interview guidelines were used to conduct the semi-structured interviews. The questions from the guidelines were derived from the theoretical foundations and concepts (see 1.4) to ensure that the questions were closely linked to the core aspects of the theoretical framework. Semi-structured interviews were conducted in all articles with empirical data collection.

In article 3, focus group discussions were added to the analysis of the student groups. These were used in order to be able to speak to a relatively large number of pupils and to record a broad spectrum of opinions and perspectives (Caillaud & Flick, 2017). The method was used

as a supplement to the semi-structured interviews in order to include several perspectives in the sense of method triangulation. The results of the focus group discussion were also used to incorporate interesting aspects into the individual interviews and deepen them where necessary.

In article 6, the method of lesson observation was applied. In using this method, lessons are systematically observed and analysed (Hilberg et al., 2004). As a result, aspects such as knowledge transfer, the use of teaching methods, the role of students and teachers and the lesson structure can be observed and systematically analysed. This method is therefore suitable for observing the questions posed in the article on the theory and practice of knowledge transfer in Indian vocational schools. In addition, the lesson observations are used as a comparison to the interviews with the teachers and serve to confirm and categorise the results.

By using different methods, the individual articles' different objectives and questions can be answered. Method triangulation is helpful because different perspectives can be integrated by combining different methods and results can also be compared and checked. Overall, this increases the quality of the data obtained (Carter et al., 2014).

Qualitative content analysis was used to analyse the data obtained. Qualitative content analysis makes it possible to capture the complexity of the data and enable interpretations of the data (Kuckartz, 2014). To this end, the recorded individual interviews were first transcribed in full. The focus group interviews were not transcribed, but only the relevant information was recorded, using field notes. The transcription programme "f4 Transkript" was mostly used to transcribe the individual interviews. With regard to the research interest, the knowledge expectation and the method of analysis, a procedure was chosen for the transcription that focuses on the semantic content, whereby the level of detail of the transcription is limited to the content and, for example, non-verbal statements are not included.

The transcribed interview data was then used for further analysis. For this purpose, the data was categorised using a deductive approach, which was previously derived from the theoretical concepts. The categories were defined in advance. To this end, a direct link was established between the interview data and the theoretical references. However, if further aspects were discovered during the data analysis, the predefined categories were inductively expanded accordingly. The data was then analysed, presented and interpreted on the basis of the categories (Kuckartz, 2014).

In the collection and analysis of data, confidentiality and privacy are of crucial importance. This is done to create an atmosphere of security and trust between the researcher and the

interviewee. For this reason, the anonymity of the interviewees was guaranteed and ensured, for example by using anonymised names. In addition, the data was subsequently stored in encrypted form. The interviewees were also informed about what data was collected and stored, i.e. what the data was used for.

Table 3:

Summary of the methods of data collection, the interviewees and the number of interviews conducted

Article No. and title	Number of interviews conducted and interview partners
1 India's Labour market challenges: Employability of young workforce from the perspective of supply and demand	without own empirical data collection
2 The function and institutional embeddedness of Polytechnics in the Indian education system	14 semi-structured interviews with principals of PTs and two additional interviews with state authorities
3 The attractiveness of polytechnics in Delhi and Mumbai: a study on the perception from the perspective of students and parents	33 semi-structured interviews with students of PTs and 17 semi-structured interviews with parents of PT students as well as a total 10 focus group discussions with 20 to 35 PT students per focus group discussion
4 The attractiveness of Indian Polytechnics graduates—An analysis from the (demand-side) perspective of companies and colleges	Semi-structured interviews with representatives of 9 companies and 10 colleges
5 Perceptions of Teachers in Indian Polytechnics: an exploratory Study of the Attractiveness in India in the Higher Vocational Sector	17 interviews with PT teachers
6 Theory and Practice of Teaching and Learning in the Classroom – Lessons from Indian Industrial Training Institutes	Interviews with 25 teachers of vocational schools (ITIs) and 25 classroom observations in ITIs

3.2 Selection of interviewee groups

In order to be able to include a variety of perspectives in a field that has not yet been researched in depth, it makes sense to analyse a broad range of actors. The inclusion of different perspectives means that a comprehensive understanding of the topic can be achieved. This also makes it easier to identify challenges and problems and uncover connections that were previously unknown. Surveys of different stakeholder groups are particularly useful when opinions on a topic differ from those of other stakeholders.

This allows points of conflict and different interests of the stakeholders to be identified. By including various stakeholders in the analysis, different interests can be taken into account, which can lead to more comprehensive solutions that meet with broad support, which also increases the relevance of the results. The interviewees are each experts in the area under consideration, as they have specific experience or knowledge (Lamnek, 2010).

For this reason, a broad stakeholder approach was chosen in this study. Principals were interviewed about the role and embeddedness of PTs. With regard to the attractiveness of PTs, both pupils and parents as well as representatives of companies and colleges were interviewed. Furthermore, teachers from vocational schools were asked about the way in which knowledge is imparted. The interviewees are listed below according to their appearance in the articles, starting with the principals (article 2) through to the students and parents (article 3), the representatives of the companies and colleges (article 4) and finally the teachers (articles 5 and 6).

Principals

Principals are intermediaries and gateways in the education system, as they are in direct contact with various interest groups such as teachers, school authorities, pupils and parents. Principals act as facilitators between the various interest groups, and a lot of relevant information flows through the principals' hands so that they are regarded as multipliers or distributors of this information. Principals are important interfaces, particularly with regard to cooperation with state organisations such as ministries and education authorities, as they are crucial for the implementation of reforms and measures. In this dissertation, principals were asked about the categorisation and role of PTs in the system (article 2). For the reasons outlined above, principals are ideal interview partners.

Students of the PTs

The students responding were attending the PTs. This means that they have direct personal experience with this type of school and can share this experience through their perspective

and impressions. The students have insights into many areas of the school form, as they actively experience everyday school life. They can provide assessments of various areas such as their learning experiences, the teaching methods, the support provided by the teachers, the infrastructure and other aspects. In addition, by surveying this group of stakeholders, the individual needs and expectations of the students with regard to the type of school can be clarified. Students are therefore a key stakeholder in determining the attractiveness of a type of school (article 3).

Parents of students

The parents are closely connected to the students. Family background plays a very important role in the choice of school in India, which is why the parents were also interviewed, as their expectations and previous experiences often influence the students' decisions (Ullah & Mukherjee, 2023). In many cases, the students' autonomy with regard to their choice of school is already severely limited due to the socio-economic factors of their family, which is why the family circumstances should also be taken into account by interviewing the parents. The inclusion of the parents' perspective complements the consideration of the pupils' perspective and thus adds further aspects to the consideration of the attractiveness of the PT school form (article 3).

Companies

As direct demanders of graduates from the VET system, companies are important interview partners. Companies have a strong interest in ensuring that graduates have the right skills and qualifications to fulfil the requirements of employers. As demanders of labour, they are a key player when it comes to considering employability. As companies usually employ workers with different educational histories, they also have the opportunity to compare educational qualifications from their own subjective perspective. This makes companies an important stakeholder group when it comes to assessing the attractiveness of a type of school (article 4).

Colleges

In addition to companies, colleges in India are also in demand for PT graduates. Their options are to enter the labour market or become self-employed or continue their education, which means that it is also possible to go to college after PT. Colleges therefore represent the next step on the educational path of some PT graduates. Colleges thus have an insight into the level of knowledge, skills and qualifications that PT graduates possess. As an educational organisation, they can also assess educational pathways and evaluate how the transition between school types can be achieved. For this reason, colleges are a suitable interview partner for the

assessment of attractiveness (article 4).

Teachers

Teachers have a significant influence on the VET system and in particular on the quality of the system (Pilz et al., 2022). Just like the students, they experience everyday school life first-hand and therefore have practical insights into most areas of PTs. Teachers are particularly responsible for the implementation of the syllabus and design of lessons and therefore have a major influence on the quality of teaching. PT teachers can provide an insight into the resources available, the challenges faced in everyday school life and the performance of the pupils. As a result, teachers provide a valuable perspective when analysing PTs and the Indian education system and are therefore indispensable when considering a broad range of actors, which is why they are included multiple times in the analysis. On the one hand, they were asked about the theory and practice of knowledge transfer in vocational schools (article 6), and on the other hand they were interviewed about their assessment of the attractiveness of the PTs (article 5).

3.3 Methodological reflection

The choice of methodology and research instruments is a central part of research work and has a considerable influence on the quality and validity of the results and statements. The methodology influences the way in which data is collected, analysed and interpreted. In addition, the methodology also influences the limitations of the work, some of which are already mentioned in relation to the methodology in this chapter, but are then presented in detail in chapter 10.3.

In this study, the research instruments were selected according to the objectives of the study and the research context. Practical feasibility also plays a role in the choice of method. This is particularly important in the present work, as the research environment can certainly be described as challenging, especially for a non-local researcher. On the one hand, this concerns the linguistic and communicative challenges, as the interviewees (especially the parents) spoke Indian languages such as Hindi or Mahrati in addition to English. Working with translators is a challenge that centres on aspects such as linguistic accuracy and avoiding distortions in the data (Flick, 2014; Lamnek, 2010).

Cultural sensitivity plays a central role in data collection, which is why the research instruments must be adapted appropriately to the relevant culture. The methods were culturally reflected in advance and discussed with researchers from the local Indian context and adapted

accordingly to ensure the validity of the instruments (Peters & Giacomo, 2020). Sensitivity is also of great importance with regard to the topic being researched. Reflecting on individual and personal choices of school type is a particularly complex and sensitive topic, especially for students. A survey about the background and social dynamics therefore requires a skilful and sensitive questioning technique. The personal nature of the questions makes it difficult to obtain a larger data sample from certain stakeholder groups. However, a random selection could not be achieved under the given conditions. This also relates to the size of the samples, which can limit generalisability. A solid research network and partners with local contacts and expertise are also essential for acquiring interviewees.

With regard to the systemic affiliation of the interviewees, it should be noted that the students and parents, for example, have already made their decision in favour of PT and therefore argue from within the system. It is likely that they tend to defend their choice, which could influence their answers (Jambo & Pilz, 2018). Similarly, teachers and principals may tend to emphasise the benefits of their type of school and downplay possible negative aspects. The potential tendency towards social desirability must be taken into account, which could play a particular role in a hierarchical context such as the Indian education system (Randall et al., 1993). In order to minimise any possible influence on the students' answers, they were interviewed separately from the parents, and no teachers were present during the interview; in addition, the confidentiality of the information was emphasised so that they did not have to expect negative consequences for their statements.

When selecting methods and when implementing and carrying out the methods, the researcher has to reflect on him- or herself and critically analyse his or her own role and assumptions in order to prevent the researcher from predetermining the research results with his or her own ethnocentric view (Bereday, 1961; van de Vijver & Leung, 2021). For this reason, the research results were always critically reviewed with the help of the local research network and checked during the research process to see whether the methodological approach needed to be adapted to the circumstances.

A number of measures were taken to minimise the methodological challenges. Various stakeholder groups were interviewed in the sense of data source triangulation, as the reliability of the data can be increased by comparing the findings. This also makes it possible to identify possible contradictions in the statements of the individual stakeholders. The diversity of the stakeholder groups also contributes to obtaining a holistic picture. In addition to the actors who are "in the system", such as students, teachers and principals, actors who operate outside

the PT system and can therefore provide an external perspective, such as companies and colleges, were also added. To increase the reliability of the study, all steps of data collection and analysis were documented in detail, while standardised interview guidelines were used to ensure consistency and traceability of the results. In addition, a comprehensive description of the research context and the participants was provided to enable readers to assess the possible transferability of the results to other contexts.

In particular, the method triangulation used helps to increase the quality of the data collected. The results of one research method can be confirmed or validated by another. This was done, for example, when supplementing the interviews with teachers with additional lesson observations, which allowed the statements made by the teachers to be validated and categorised. In addition, the interviews with the students were conducted in different settings, in which the focus group interviews preceded the individual interviews. This can help to deepen topics from the focus groups or to discuss contradictions and lines of conflict (Carter et al., 2014).

With regard to the methodological organisation of the work, it can be concluded that it was carried out in a challenging research setting with different stakeholders on sensitive and personal topics. In order to minimise the challenges, a series of described measures were applied. The selection of interview partners (students and parents, principals, teachers, companies, colleges) can be regarded as innovative as such a comprehensive examination of the relevant stakeholders in the area of the attractiveness of VET and the consideration of PTs has not yet been undertaken.

4 Article 1: India's labour market challenges: employability of young workforce from the perspective of supply and demand

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Abstract

India has one of the fastest-growing economies in the world, and the highest working-age population. The country has a particular demand for skilled labourers, especially at the semi-skilled level, in various sectors. However, many young people find it challenging to acquire the skills employers demand. To approach the issue of youth employability, it is essential to distinguish two sides of the question. On the one hand, the demand side of the labour market, and, on the other, the supply side of the workforce. It is significant that, in quantitative terms, the vocational education and training (VET) system does not yet play a decisive role here. To understand whether the VET system can solve the problem of high youth unemployment, the concept of 'employability' is introduced. A critical analysis of the VET system in terms of the concept of employability follows. Based on the analysis, this paper concludes that the VET system in India requires reform and proposes possible policy interventions to address this.

Keywords: India - Vocational education and training - Youth unemployment - Employability

4.1 Introduction

India is facing a challenge in providing opportunities for the youth population to enter the job market (Mehrotra, 2016a; Mitra & Verick, 2013; Pilz, 2016b). Although employers are searching for qualified employees, they often cannot find them in the Indian labour market (Pilz & Ramasamy, 2022). Not only do the less educated need more skills to enter an employment relationship, but the higher educated also face problems in offering employers the skills they require (Blom & Saeki, 2011; Neroorkar & Gopinath, 2020). Studies show that only 25 per cent of engineering graduates are considered employable (NASSCOM & McKinsey, 2005). This situation not only causes problems for individual jobseekers but also has far-reaching consequences for the economy. In the last two decades, the Indian economy has grown faster than the pool of well-trained workers (Khare, 2018). There is an economic debate

about this mismatch and, thus, the lack of employability in the Indian workforce (Bhandari, 2021).

To examine whether the Indian VET system can solve the mismatch problem and address the high rate of youth unemployment, we use the concept of employability. The paper is divided into six sections: Following the introduction, the second section will explain how the mismatch occurs by presenting both the supply side and the demand side of the young workforce. The third section presents the concept of employability, showing what aspects are necessary for young people to enter the labour market. The fourth section highlights the Indian VET system as a supplier of the labour force, with its different levels. The fifth section outlines the challenges of the system, while the sixth includes limitations and scope, discusses possible solutions, and explores implications for the researchers, practitioners, and policymakers.

4.2 Mismatch between supply and demand

4.2.1 Supply of labour

In India, young people (aged between 15 and 29 years) comprise 29.1 per cent of the total workforce, making it the youngest workforce globally (NSSO, 2014; UIS, 2021). The situation is often called a 'demographic dividend' (Mehrotra, 2014). The country has a core labour force of 433 million; on average, another 6–8 million youths will be entering the labour force every year for the next decade and a half (Ghose, 2016). They are, however, much more likely to be unemployed than older people (Smith et al., 2014). The problem of high unemployment among young people concerns not only the low-skilled or unskilled but also the highly skilled, as reflected in the skills gaps evident between supply and demand in the labour market (Agrawal et al., 2016; Bisht & Pattanaik, 2020; Shrotriya et al., 2018).

Since the problem of unemployment affects both highly skilled and low-skilled people, this points to overarching general problems in the Indian system, such as inconsistencies in official statistics, changing education policies, inefficient use of available resources, and neglect of education in rural areas and for women (Agrawal, 2012; Maitra et al., 2022; Venkatram, 2016). Consequently, in some areas more than 60 per cent of all graduates remain unemployed three years after completing their course (Bhandari, 2021; NCAER, 2018).

Table 4:

Unemployment rates (in per cent for the persons of age 15 years and above with different educational attainments). Source: Author's calculation based on NSSO, 2006; NSSO, 2011, NSSO, 2014; NSO, 2019.

General Educational level	Year			
	2004-05	2009-10	2011-12	2017-18
Not literate	0.45	1.1	0.45	1.17
Literate & Up to Primary	1.7	0.9	1.25	2.15
Middle	4.3	2.6	2.37	5.12
Secondary and above	10	7.7	6.9	14.2

Young people who attain a degree, including equivalent technical and other professional qualifications, experience the highest proportion of unemployment. While people with no or little educational experience have a comparatively low statistical risk of unemployment, it rises sharply with higher educational attainment (see Table 4). There are several reasons for this. A significant factor in the high level of unemployment among the better educated is a lack of practical skills, highlighting the disconnect between the theoretical learning and practical skills being taught at the institutions (Mamgain & Tiwari, 2016). The illiterate and the less-educated face underemployment in the informal sector, and low-productivity jobs (NSSO, 2014; Pilz & Wilmshöfer, 2015).

India has a large informal sector, which is difficult to capture statistically: it is estimated that more than 92% of the labour force of 468 million people is employed in unorganised sectors (NCAER, 2018). The Indian National Commission for Enterprises in the Unorganised Sector (NCEUS) defines the sector as follows: 'The unorganised sector consists of all unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis and with less than ten total workers'. However, due to a lack of statistical data or conceptual clarity and uniformity in the subsectors of the economy, the precise classification of the term is challenging. In contrast to the organised sector, the unorganised sector is characterised by, among other aspects, a low degree of organisation, heterogeneous functions, often labour-intensive activities, and the absence of formal contracts (NCEUS, 2007).

The general education system is mainly responsible for the entry rates to the labour market. Compared to that, the VET system only plays a minor role in supplying the labour market. In the 15–29 age cohort, only 2 per cent have received formal vocational training, while 8 per cent have received informal vocational training. This figure has only changed slightly in the past few years (Mehrotra et al., 2013; NSSO, 2011; NSSO, 2014). The current absolute numbers do not adequately represent the importance of the VET system for the future of the Indian educational landscape. The VET system occupies a key role, especially in the context of the shift from an agrarian society to a technological society, with an increasing demand for professionals with intermediate skills. The VET system and polytechnics, in particular, are well suited to train precisely this kind of employee (Maitra et al., 2022; Schneider, 2022; Schneider, 2023). The shift in employment numbers in the various sectors can be seen in Table 5.

In addition, the VET system is perceived as a central factor in utilising the demographic dividend (Mehrotra, 2016a; Singh & Kumar, 2021).

The following numbers illustrate the quantitative scale of the Indian school system: In 2015–2016, 196.72 million students were educated at elementary level, while a further 39.15 million students were enrolled at secondary level. Some 24.74 million students attended senior secondary education. In comparison, a total of 34.59 million students were enrolled in higher education (diploma, postgraduate, undergraduate, PhD, etc.) (MHRD, 2018a). The following section describes the labour market and the existing demand for young workers there.

4.2.2 Demand for labour

The Indian labour market structure is complex and highly segmented. This section aims to provide a general overview of the demand side (Mundle, 2017). Statistical evidence in India shows that the influence of informal employment in both the organised and unorganised sectors of the Indian economy remains strong and is even increasing (NSO, 2019; NSSO, 2014). In particular, the expansion of informal employment in the organised sector is evident and illustrates a phenomenon of increasing significance in India (NSO, 2019; NSSO, 2014). The labour market's institutional structure can be further divided into agriculture, industry, and service sectors; however, the numerical distribution of labour demand in these sectors is subject to strong fluctuations (see Table 5).

The agricultural sector has seen moderate growth since independence. However, despite a substantial increase in agricultural production, there has been a shift in agricultural employment, which fell by 27 million between 2011–2012 and 2017–2018, with workers moving to non-agricultural activities. This shows that a broad shift in the occupational

structure of the Indian economy has created a demand for new skill requirements among the emerging workforce in non-agricultural sectors, such as industry, construction, and services (Pilz & Wiemann, 2021; Thomas, 2020). However, India's VET system needs to be flexible enough to quickly adapt skills training to react to current technological innovations (Maitra et al., 2022). Such economic restructuring, with an inflexible non-adaptive education system, fosters mismatches (Pilz, 2016b).

But even today, more than 70 per cent of the Indian population lives in rural areas. The country remains a predominantly agrarian-based society, with a large proportion (48.9 per cent) of the workforce still dependent on the agricultural sector (ILO, 2018). Unequal access to opportunities and education is particularly prevalent in rural areas, fostering skills mismatches. In contrast, demand for a manufacturing or service sector workforce is mainly present in metropolitan areas.

Table 5:

Employment Trends in India (15-29 years). Source: Mehrotra, 2019

	2004-05	2011-12	2017-18
	Share of works in %		
Agriculture	55.6	44	36.1
Manufacturing	14.5	16.1	16
Non-Manufacturing	7.5	14	15.4
Service	22.4	25.9	32.5

The informal sector in India is vast, contributing about 60 per cent of GDP, with a large proportion (85 per cent) of the non-agricultural workforce working in the informal sector (Mehrotra, 2019). This means that most employees acquire their skills and knowledge in an unregulated area of the economy.

Some analysts, such as Verick (2018), argue that, in developing economies, the classical pattern of economic development is characterised by the movement of resources and workers from agriculture to manufacturing. In the Indian case, however, this has not happened. Rather than increased employment in the manufacturing sector, the country has witnessed expansion in the service sector, in terms of both economic growth and employment (Verick, 2018). Khare (2016) expresses a similar view: the Indian economic transition shifted directly

from agriculture to the service sector, which now contributes about 75 per cent of GDP. Clearly, the service sector has very different skill requirements from the agricultural sector.

Table 5 also illustrates that India's services sector is an essential driver of economic growth, accounting for more than half of the economy's output; however, it provides a relatively small, though growing, share of employment (Verick, 2018). The National Skill Development Corporation (NSDC) has estimated that 109.7 million skilled people will be required by 2022, of which close to 80 per cent will be in top-ten sectors such as automobile, retail, handloom, telecommunication, and leather (MSDE, 2016b).

The structure of the national economy is changing rapidly. This, in addition to technological change and the significant differences between rural areas and metropolitan regions, helps explain why supply can only respond to demand to a limited extent, resulting in a mismatch. This creates a paradoxical situation for India: high economic growth has created great demand for employment, with good employee opportunities, particularly in jobs for which the VET system can provide candidates, such as those at intermediate level, for example, supervisor or qualified worker on the shop floor. However, at the same time, many potential employees lack the marketable skills that employers require to fill their workforce vacancies (Deka & Batra, 2016; Iyer & Dave, 2015; Mizrahi & Krup, 2022; Singh & Kumar, 2021).

These problems clearly show that mismatch in India operates at various levels. On the one hand, a mismatch exists on the qualitative level, since the level of skills and competencies among employees is not sufficiently developed to meet the requirements of everyday work. On the other hand, it exists also on the quantitative level, since a large number of employees are needed, e.g., in the intermediate skill area, but are not available in this quantity on the market, although many potential employees would be available (International Labour Office, 2014). While supply and demand have now been discussed, the next section presents the concept of employability, which is a potential tool in resolving the mismatch between supply and demand.

4.3 The concept of Employability in the Indian context

Employability is a complex concept to define, as it can vary in context or emphasis and has different foci depending on its orientation (Kraus & Vonken, 2009). That is why there is no single definition of the term, which has led to different understandings of employability in various countries and contexts (Agrawal et al., 2016; Zenner-Höffkes et al., 2021). This is also reflected in the diverse terminology used to describe specific skill sets, for example, employability skills, key competencies, soft skills, transferable skills, or essential skills (ILO,

2004; McQuaid & Lindsay, 2005). Due to the large variety of aspects concerning employability, only those that are relevant to the Indian context and that are compatible with vocational education are presented below. These aspects, which are essential to the Indian context (subject-specific knowledge, person-centred skills, environment), are presented in detail and provide the structure for the subsequent analysis of the Indian VET system concerning employability in the second last section titled Relationship of Employability to the Indian VET System. This section gives a short overview of the literature on employability in terms of its general use and the specific Indian context.

The International Labour Organization (ILO) defines employability as relating to 'portable competencies and qualifications that enhance an individual's capacity to make use of the education and training opportunities available in order to secure and retain decent work, to progress within the enterprise and between jobs, and to cope with changing technology and labour market conditions' (ILO, 2004).

The definition already refers to several aspects that are important and necessary in examining employability, namely, on the one hand, individual qualifications, which help workers adapt to changing employment requirements, and, on the other, the environment, which is subsumed within labour market conditions. In addition, employability depends on personal attributes and how those are presented in the labour market and the work environment, the social conditions, and the economic context. This means that, as well as subject-specific knowledge, personal attributes and the environment must, again, be particularly emphasised. McQuaid and Lindsay (2005, p. 206) argue similarly, defining employability as 'derived from, and affected by, individual characteristics and circumstances and broader, external (social, institutional and economic) factors that influence a person's ability to get a job'. These contextual factors are each essential in defining employability. This is also reflected in the Canadian Labour Force Development Board (1994, p. 9) definition: 'Employability is the relative capacity of an individual to achieve meaningful employment given the interaction of personal circumstances and the labour market'. CEDEFOP (2008, p. 70) also mentions that it is not only entry into employment that matters, but also the maintenance of it and the development of the career. These three steps also reflect the definition of Hillage and Pollard (1998, p. 1): 'Employability is about having the capability to gain initial employment, maintain employment and obtain new employment if required.' This shows that employability includes necessary skills for individuals to gain and maintain employment.

Sanders and de Grip (2004, p. 4), in their expansion of the concept of employability, refer to the changing work environment and thus focus on the need for readiness to adapt in today's fast-moving and dynamic labour market, in terms similar to those set out by the ILO: 'the capacity and the willingness to be and to remain attractive in the labour market, by anticipating changes in tasks and work environment and reacting to these changes proactively'. The changing work environment is a recurring factor when considering employability. This has a strong influence, for example, on selecting and imparting employable skills.

The numerous definitions from across the international spectrum show that employability is often equated with the supply of technical and social skills. In addition, the importance of the learning environment is emphasised. This allows us to draw some conclusions about employability in India.

In India, employability is often understood as to 'gain and maintain' employment (Hillage & Pollard, 1998). This appears to be important, especially in the context of youth employment, as in India this group has particular problems getting into employment in the first place (Mitra & Verick, 2013). To achieve this, technical skills and job-specific knowledge are essential for employers, as are general competencies (such as literacy). Furthermore, the definitions of employability show that the applicability of job-specific knowledge is especially central.

However, it is clear that, in the Indian context, the focus on employability is often particularly visible in the context of skills mismatch and the resulting unemployment. That is why Khare (2014) defines employability in the Indian context as a function of two fundamental factors: (1) the academic qualifications of an individual (in terms of general competencies); and (2) the learning environment that helps him or her build specific general skills. Since the present paper aims to assess the employability of Indian youth, Khare's definition is apt, as it integrates aspects from the international discussion and focuses mainly on acquiring qualifications and skills and the place of education. The definition helps explain what skills, abilities, and qualifications must be taught to workers during their education so that they are sufficiently trained to fill a job vacancy and avoid a mismatch. This is why these are to be considered as part of a framework for analysis of the employability of the Indian VET system. These aspects in detail are:

Subject-specific knowledge

Employers place subjective requirements on individuals in terms of their technical knowledge, knowledge related to the job, and ability to cope with changing technology.

Person-centred skills

Those skills mentioned in Khare's (2014) definition cover a broad spectrum, such as basic skills (literacy), person-related skills (communication), conceptual skills (problem-solving), team-work skills, or personal skills (motivation, loyalty).

Environment

In addition, it becomes clear that while the requirements of employers, and the specific skills of individuals, are decisive in establishing employability, so too is the environment. It includes the economic context, the institutional environment, the learning context, and the education participant's social situation. In particular, Neroorkar and Gopinath (2020) highlight the importance of considering the environmental, external, and institutional factors in the Indian context. Therefore, it is essential to mention that it is not only the acquisition of employable skills that leads to youth employment, but also other aspects such as gender, caste, and race, as they impact on recruitment (Thorat & Attewell, 2007).

Employability exists if the aspects mentioned above are present. As employers want to hire employees with the above skills, educational programmes that teach these skills give learners a comparative advantage in the job market (Srivastava & Khare, 2012).

Therefore, this paper examines the following aspects to determine whether employability can be acquired in the Indian context. These aspects are then analysed in the second last section in relation to employability in the Indian VET system:

- (1) Subject-specific knowledge: specialised skills, knowledge related to the job and the ability to cope with changing technology.
- (2) Person-centred skills: basic skills (literacy), personal skills (motivation), conceptual skills (problem-solving competence), and people-related skills (communication).
- (3) Environment: economic context, institutional environment and social situation.

4.4 Overview of the Indian VET-System

4.4.1 General Overview of the Education System

The school system in India covers 12 years and is known as the 10+2 system. 'Education for all' has been a political goal for many years (Chauhan, 1990), and the Right to Education (RTE) Act of 2009 entitles every child between the ages of 6 and 14 to free compulsory education.

Elementary education is divided into primary school (classes 1–5) and upper primary (classes 6–8). When students complete the mandatory schooling (Class 8), usually at the age of 14, they can make the transition to the two-year lower secondary (classes 9 and 10) and senior secondary level, which consists of two years (classes 11 and 12). Students can pursue higher education after passing the higher secondary (Class 12). Graduate education can take three to five years, and postgraduate two to three years, depending on the stream (Wessels & Pilz, 2018). The Indian government is also planning to modify the current 10+2 structure of school education. The plan of the new NEP envisages a “5+3+3+4” concept, which corresponds to the age groups 3–8 years (primary level), 8–11 (preparatory level), 11–14 (intermediate level) and 14–18 (secondary level) (MHRD, 2020). This would include the age group from age 3. This new structure has not yet been implemented.

4.4.2 VET at the School Education Level

Some pre-vocational education is offered at the secondary education level, providing training in simple and marketable skills to students in classes 9 and 10, developing students’ vocational interests, and allowing the self-exploration of vocational preferences. This also facilitates students’ choice of vocational courses at the higher secondary level (classes 11 and 12) and prepares students for participation in work experiences (Tara et al., 2016). VET starts at upper secondary level (classes 11 and 12), provides general education, and lasts two years.

The vocationalisation of secondary education was begun in 1988 by the Ministry of Human Resource Development (MHRD) as a centrally sponsored scheme. This scheme provides vocational education in secondary schools and is considered an alternative to the general stream of education in schools (NSO, 2019). The scheme offers 150 vocational courses of two-year duration at higher secondary level (classes 11 and 12). Secondary and higher secondary are essential stages in the school education system of general education since only at this point do the young people decide their pathway and whether to pursue higher or vocational education (Planning Commission, 2013). Also, it integrates vocational education with general education and provides horizontal and vertical mobility to the students (MHRD, 2017).

The key focus of India’s eleventh and twelfth five-year plans was on technical and vocational education; therefore, the government shifted the focus from general education to skills education to improve the quality of education and the skill base among students (Bhalla & Meher, 2019). Vocational education was initiated at the school level with the aim of enhancing the employability of individual students, reducing the mismatch between workforce demand and supply, and providing an alternative to the pursuit of higher education.

Vocational education is offered only at the higher secondary level (classes 11 and 12). Thus, the students only have an opportunity to acquire vocational skills once they have completed their secondary schooling (classes 9 and 10) (British Council, 2019). This scenario needs to be considered against the background of the high dropout rate in secondary education (17.2 per cent), which means that many young people take up unskilled, low-productivity employment in the informal sector (MHRD, 2018a).

Table 6:

Percentage distribution of persons of age 15 to 29 years by the status of vocational/technical training. Source: NSO (2019)

	Male	Female
Receiving/received formal vocational/ technical training	3.7	2.1
received vocational/technical training other than formal vocational/technical training	3.2	1.2
did not receive vocational/technical training	93	96.8
Total	100	100

Many young people did not receive any vocational or technical training (see Table 6). Most of the skilled population in India acquires skills through non-formal training, including hereditary passing on of skills, on-the-job training, self-learning, and informal apprenticeship (Agrawal, 2012; Ajithkumar & Pilz, 2019). These areas of skill acquisition are vulnerable to the lack of employability, especially given the background of the technologisation and digitalisation of the economy and rapidly changing knowledge (Zenner et al., 2017).

4.4.3 VET system at the Higher Level

Formal technical education in India consists of a three-tier system comprising industrial training institutes (ITIs) at the first level, polytechnics at the middle level, and professional courses which offer engineering degrees in colleges and universities at a higher level (Agrawal, 2012). In India, vocational training programmes are offered through two principal schemes: the Craftsmen Training Scheme (CTS) and the Apprenticeship Training Scheme (ATS). The CTS and ATS are offered by the Directorate General of Training (DGT) under the Ministry of Skill Development and Entrepreneurship (MSDE). The two schemes are complemented by the Dual System of Training (DST), which strives to create links between industries and ITIs.

Craftsmen Training Scheme

The CTS is the most important in offering vocational training to meet existing and future workforce needs through the vast network of ITIs. These are the oldest and most trusted parts of the VET system (Mehrotra, 2016a), and are expected to play a crucial role in enabling youth to enter the world of work (Kumar, 2016).

Students who have completed Class 8 of school education are able to enrol for vocational training courses in ITIs. However, some courses require an entry level of Class 10 (Venkatram, 2012). The first ITI was opened in India in 1950, and by 2007 there were around 7000 ITIs in the country. Currently, there are more than 15,000 ITIs, of which 11,892 are private ITIs. The total seating capacity of all ITIs is about 2.7 million (MSDE, 2020).

As the country is expected to create a pool of skilled workers through various measures, the aim should be to strengthen vocational training, including expanding the ITI network and establishing more 'Centres of Excellence' (CoEs) with the active participation of public-private partnerships. The programme was launched to upgrade existing ITIs to CoEs to meet the skill requirements of industry clusters in the respective fields by setting up structures to make training wholly demand-driven and thus increase employability (Kumar, 2016).

Dual System of Training

The scheme known as the 'Dual System of Training' (DST) was launched by the Directorate General of Training (DGT) and the MSDE in 2019 in order to create linkages between industries and ITIs. The scheme was set up primarily to improve the link between learning outcomes and industry requirements to positively impact the industry readiness of trainees (MSDE, n.d.). The trainees are taught theoretical knowledge in the ITIs and given practical training through hands-on exposure in industry. Specific regulations apply to the participating companies in order to guarantee the quality of the practical training. These include, for example, a minimum number of employees and the availability of tools and equipment. Depending on the duration of the courses (6 months, 1 year, 2 years), the time spent in the industry must be a minimum of 25 per cent and a maximum of 50 per cent of the total duration (DGT, 2018b). Admission to the ITI and the courses offered, including duration, examination, and certification, are identical to those offered under the CTS. As of January 2020, 748 memoranda of understanding (MoUs) had been concluded between industry organisations and ITIs (MSDE, n.d.). The German dual-training system is seen as a model here. The scheme aims to change the government's implementation strategy for VET, moving away from an input- to an outcome-based approach, and is intended to emphasise practical phases, in particular,

compared to the CTS (UNESCO, 2020). In particular, measures that give employers a central role in design and implementation have been developed in response to the need to increase employability. However, a study by Maitra et al. (2022) shows that due to bureaucratic hurdles and the hierarchical system, the implementation of the DST has had limited impact and has not therefore fully realised its transformative potential.

Apprenticeship Training Scheme (ATS)

The 1962 Apprenticeship Act in India covers four types of apprenticeship: (a) trade apprenticeship, (b) technician (vocational), (c) technician, and (d) graduate. The DGET is responsible for the first type, and the MHRD is responsible for the remaining three. The first and second types of apprenticeship aim primarily to create a cadre of skilled and semi-skilled shop-floor workers. In contrast, the third and fourth aim to train youths as potential managers for manufacturing in the organised sector (Mehrotra, 2014; Wessels & Pilz, 2018). The trade and technician (vocational) apprenticeships are aimed at youth aged between 15 and 18 years and are intended to provide practical on-the-job training to those who graduated from an ITI after a two- or four-year course and those students who have received no training in any ITI, respectively. The technician and graduate types of training are for those aged 18–22 who have acquired a higher level of skills training, such as ITI graduates, diploma graduates in polytechnics, or degree graduates in technical engineering institutions. There are 259 designated trades under the ATS, in which 28,500 establishments conduct the training of 220,000 trade apprentices (MSDE, 2016a; MSDE, 2020).

4.4.4 Post-secondary education: Technical education

While vocational education refers to a lower level of education and training for young people aimed at producing skilled or semi-skilled workers, technical education is after postsecondary level and prepares technicians to work as supervisors. Technical education offers various courses in engineering, technology, management, architecture, pharmacy, and hotel management (Venkatram, 2016). Over the past two decades, there has been a growth in the number of technical education institutions in the country, which has positively impacted the quality of vocational and technical education (Mamgain & Tiwari, 2016).

Polytechnic education offers three-year generalised diploma courses after Class 10. It primarily offers courses in conventional engineering disciplines such as civil, electrical, and mechanical engineering; however, since early 1990, polytechnics have also offered courses in disciplines such as electronics, computer science, and medical lab technology, to increase employment opportunities for students in the diversified labour market (Schneider & Pilz,

2019; Schneider, 2022). In 1947, there were 43 polytechnic colleges in India with an intake capacity of 3400, and, by 2018, there were around 3440 polytechnics in India with an intake capacity of 1.5 million (MHRD, 2019b).

Polytechnic education aims to create a pool of skilled workers to support shop floor and field operations as a middle-level link between technicians and engineers (Khare, 2016).

In addition to the multiple forms of training presented at the school, higher, and postsecondary levels some companies act as training providers. However, the training measures employed differ greatly depending on the sector and the size of the company. Larger companies with more employees and the corresponding financial resources rely, for example, on in-house training with well-equipped training centres and self-created curricula. This can be observed increasingly in the electrical and automotive industries. Meanwhile, small companies tend to focus on cluster solutions or joint programmes to adapt the employees' skills profiles to the company's needs (Mehrotra, 2014; Pilz & Wiemann, 2021; Tejan & Sabil, 2019).

4.5 Relation of Employability to the Indian VET System

As described above, most of the workforce comes from the formal general school system or the informal sector. Numerically the VET system plays a minor role in India; however, due to its structure, and in relation to employability requirements, the VET system needs to be analysed in detail.

4.5.1 Subject Specific Knowledge

Subject-specific knowledge is seen as one of the most important components of employability. For many companies, subject-specific knowledge is a necessity when hiring applicants. In this context, four different aspects are of particular interest.

Curricula

In order to impart this specific type of knowledge in the VET system, it must first be introduced into the curricula; therefore, up-to-date and workplace-based curricula are necessary (Agrawal, 2012). This is often not the case in India, as outdated curricula are still regularly used nationwide. Furthermore, curricula usually take a long time to renew and need to be more effectively designed (Ajithkumar & Pilz, 2019; Tara et al., 2016). In a rapidly changing and dynamic labour market, in which new technologies are relevant, application-orientated, and up-to-date curricula are of specific significance.

Industry involvement

One of the main objectives of the National Policy on Skill Development and Entrepreneurships is to meet the challenge of upskilling on a large scale, with speed, standard (quality), and sustainability (Government of India, 2015). International VET research shows that successful cooperation between employers and training providers is crucial for a functioning VET system. In India, it is clear that more robust cooperation between the actors in a corporatist model would also lead to a more robust labour market capability and enhanced employability (Bosch & Charest, 2010). This is frequently mentioned. However, closer coordination between actors is challenging to implement, for various reasons, including a lack of structures, changing government responsibilities, lack of public investment in the VET system, and the design of trade unions (Bosch & Charest, 2010; Mehrotra, 2014; Mehrotra, 2016a; Wessels & Pilz, 2018). Skill formation in India continues to be individualised with low government and corporate influence and little coordination among them (Pilz, 2016b; Singh, 2012).

Practical components

The practical component of VET, a central dimension of employability and essential for implementing subject-orientated knowledge, needs to be improved in India, particularly at the secondary education level (Majumdar, 2016). Employers think that the vocational training provided at institutions such as ITIs is deficient in providing the practical skills needed to perform on the job. During their studies, graduates get no exposure to the commercial skills required to perform as business persons (World Bank, 2008). Many young people in India struggle to acquire the skills that employers demand. This is mainly due to the issue of skill mismatch and the quality of VET, as well as weak navigation and transition school-to-work processes. The notion that education leads to employable skills, which then lead to employment, differs in India (Comyn, 2014). This highlights the need to embed a hands-on practical component in VET courses and to develop an effective apprenticeship system. Industry associations, sector councils, and companies could also play a more significant role in exposing VET participants to practically orientated subject knowledge (Majumdar, 2016).

Teacher qualification

Another important aspect of imparting specialised knowledge in the VET system is the qualification of VET teachers. Just like the students in the VET system, they often lack industry exposure. Practical periods in the company or mandatory in-service training are only provided to a limited extent in teacher training, so specific expertise is often unavailable (Wessels & Pilz, 2018). Most teachers are only able to teach isolated theory-based knowledge because

they lack contact with industry (Schneider et al., 2023). This knowledge is often outdated, as mandatory continuous teacher training and knowledge refreshers are not provided. This deficiency is transmitted to the students who encounter problems applying subject-specific knowledge.

4.5.2 *Person-centred skills*

In addition to theoretical knowledge, person-centred skills, such as reliability, communication, and behavioural skills, are coming increasingly into focus (Schneider et al., 2023). Often, these 'soft' skills are even more important to employees than general competencies; however, such soft skills cannot be acquired solely by means of frontal teaching, which is still prevalent. Internships, research projects, interdisciplinary courses, technical demonstrations, or laboratory work can be exciting means through which to implement more interactive methods (Mulder, 2017). Many person-centred skills, such as communication or conceptual skills, can only be taught effectively through action-oriented teaching, which is rarely implemented in India (Sarin, 2019). However, deficiencies in person-centred skills, such as basic knowledge, originate before entry into the VET system. For example, even at the primary level of education, expected learning outcomes are not achieved (Agrawal & Agrawal, 2017). According to the Annual Survey of Education Report (ASER, 2017), about 52 per cent of Class 5 students could not read a simple text taken from Class 2 students. Similar findings can be observed for basic numeracy. This has an impact on the entire school career, and thus also has consequences for education at VET institutions, since these often have to make up for the weaknesses that the students bring with them from the general education system: the VET system thus has a catch-up function. Communication skills are also widely regarded as a necessity. This is particularly true in the service sector, but also applies to all other areas of the professional sphere (Pasupathi, 2020). The predominance of teacher-centred, theory-based instruction with little student-centred, hands-on activity negatively impacts the development of communication skills. This effect is reinforced by the fact that many students, especially from rural areas, do not have sufficient basic knowledge of English because they use their local dialects as a colloquial language; however, English is often required for teaching and learning and is also expected as a business language in many companies (Pasupathi, 2020). This also influences employability, although the VET system also tends to play a catch-up role in imparting basic knowledge in these person-centred skills (Agrawal & Agrawal, 2017).

4.5.3 Environment

As already shown, the environment is essential in acquiring applicable knowledge. The economic context, the institutional situation, and the social situation can be considered to comprise the environment in the context of employability.

Economic context

While the country will need higher numbers of semi-skilled workers in the coming years, only 3 per cent of the total Indian workforce has completed VET skills training formally, compared to between 80 per cent and 90 per cent in East Asian countries, such as Japan and the Republic of Korea (Ghose, 2016; Mundle, 2017). As shown above, the large informal sector has a powerful influence on the economic context, whereas the formal VET system has a minor influence. Due to its relatively minor relevance in the Indian system, the VET system can also only react to economic developments to a limited extent. The shift from an agrarian economy to one based more on the service sector requires a far-reaching modification of skills (Agrawal, 2012). However, education provision in these areas is comparatively limited in numbers. In addition, companies have so far shown little interest in participating in the VET system. In general, there is a great deal of scepticism about investing in VET, mainly because there is a fear of competitors trying to poach employees or because the expected quality of future employees cannot be guaranteed (Pilz, 2016b).

Furthermore, comparatively low salaries are paid to graduates from the VET sector. These pay structures also influence employability since low salary expectations mean that only comparatively less-qualified aspirants enter the VET system (Ahmed, 2016a).

Institutional situation

Patterns of integration of youth into work are also heavily influenced by institutional factors that can mitigate or aggravate obstacles to transition and employability (Zimmermann et al., 2013). The VET system is seen to be confusing and ineffective due to its many responsibilities. Nearly 21 ministries or departments implement skills development programmes, especially for young people, mostly using private sector training providers (MSDE, 2018). Such programmes require more effective coordination to address the parallel initiatives and duplication of effort. There are many skill development and employment programmes in India, with significant investment and resources for such programmes. However, there is a lack of systematic evaluation of the impact of these programmes on job creation and little rigorous assessment of whether such initiatives are reaching the target population (Chakravorty & Bedi, 2019). The low-quality standards in the system, and ineffective quality

control, are obstacles to the successful teaching of employable skills (Neroorkar & Gopinath, 2020; Ramasamy et al., 2021; Schneider et al., 2023). Nevertheless, there are significant reforms and increasing efforts in vocational skills development in India, evident from the government's increased interest. In recent years, India has witnessed increased attention to skills development programmes to improve the skills landscape and equip a skilled workforce (see MSDE, 2018).

Social Situation

Successful enrolment in training in the VET system often still depends on which school one attends, as learning outcomes differ enormously between different schools or VET training providers. This divergence in quality is reflected, for example, in the local infrastructure (new machines) and the quality of the teaching staff (Joshi et al., 2014).

The social situation in India also has an impact on employability. Students who show less academic aptitude, and hail from lower socio-economic backgrounds, mostly enter vocational education—often, their parents were also less educationally qualified (Kumar et al., 2019). The parents' ability to raise school fees also significantly influences which school their children attend and what level of employability they can reach. It is implicit that, socially, VET is perceived negatively and associated with low-status manual work and low-paying employment in India (Agrawal, 2012; Ajithkumar & Pilz, 2019; Jambo & Pilz, 2018; Schneider, 2022; Schneider, 2023). Vocational qualifications are considered the most suitable option and are highly valued for those with limited academic ability who will work in jobs demanding a low or medium skill level (Kumar et al., 2019). As Majumdar (2016) points out, identifying emerging skill needs and qualification requirements in the labour market, and providing education and training to meet these needs, could increase the relevance and effectiveness of VET for the young population. In addition, the labour market segmentation at low qualification requirement levels is still strongly influenced by social factors such as the caste system. Other essential factors include the differences between metropolitan and rural areas and limited opportunities for females (Agrawal, 2014; Khare, 2014). However, marginalised groups, in particular, can benefit from VET in terms of lifelong learning, as social background remains a crucial discriminator in participation in learning and VET is usually the only opportunity for these groups to acquire basic skills and abilities that they can develop further in their professional life (Agrawal, 2012). The complex framework conditions in India must always be considered, including in reflecting on the concept of employability. However, the influences of these social conditions differ significantly and do not affect every student

similarly. This illustrates the significant heterogeneity of India, which also results from the large population (Singh, 2012).

4.6 Discussion

The literature reviewed above highlights the different ways in which employability is defined across the international spectrum. For the Indian case, the literature analysis showed that technical knowledge, personal competencies, and the environment are crucial in acquiring employability. To enable people in India to achieve the competencies necessary to be employable, some theoretical, social, practical, and political aspects must be implemented. These aspects are based on the concepts of employability discussed at the beginning of the article. The application of the concepts from the previous section is discussed below.

Theoretical implications

Coming back to the definition of Hillage and Pollard (1998), who describe employability as 'the capability to gain initial employment', the analysis makes clear that the individual capability to acquire subject-specific knowledge, and the person-centred skills, are not by themselves sufficient to gain employment. The environment, with the economic, institutional, and social context, is a decisive factor in achieving employability. However, in India, the environment to acquire employability is limited and dependent on social factors. Ahmed (2016a) argues that a high level of unemployment is associated with those trained in formal VET. Several studies (Agrawal, 2012; Mehrotra, 2014) support this argument and show that VET graduates' quality is insufficient, as they do not possess the required skills expected by their respective industries. Therefore, in India, discussion of the need for an efficient and quality-driven vocational skill development system to develop employability for the high youth population has been ongoing for many years (Saini, 2015; Tara et al., 2016). There are many reasons why VET, despite all attempts at reform, has not yet achieved significant improvements in terms of employability. In addition to the challenge of coordination in a large country with many states and an agricultural sector that only required formal vocational training to a limited extent and dominated in the past, two aspects play a prominent role.

Social implications

First, Singh (2001) emphasises that during the colonial period, the British administration trained only a small group of administrators in university institutions. The broad mass of the Indian population, on the other hand, was offered, at most, a rudimentary general education. Vocational training did not play a role (Steele & Taylor, 1994). At this point, the British colonial power did not have a distinctive vocational education in its own country. Therefore, regarding

policy transfer, the British training system could not be considered a role model (Bhandari, 2021). In connection with this, there were also no promoters for introducing a vocational training system in India. However, this progressively changed in the post-colonial era, especially after the opening and liberalisation of the Indian economy after 1990. Reforms in the education system regarding vocational training were necessary, primarily to develop a skilled and internationally competitive workforce. Subsequently, especially in the recent past through the eleventh (2007–2012) and twelfth (2012–2017) five year plans, the political focus has increasingly been placed on the training of the Indian youth and the improvement of the infrastructure (Maitra et al., 2022).

Second, vocational training is strongly linked to the caste system that characterises Indian society (Singh, 2001). In this system, the lower castes are assigned the manual work, while the higher castes do the intellectual work (Agrawal, 2014; Vincent & Rajasekhar, 2021). Consequently, vocational education is often seen as inferior and stigmatising regarding social status (Agrawal, 2012; Jambo & Pilz, 2018; Ratnata, 2013). The caste system is very differentiated and nuanced, so this classification cannot be generalised. However, studies show that there are still correlations between caste and assignment to occupations. Of course, other factors, such as socio-economic background, also play a role. In addition, attempts are made to level the caste differences, e.g., through quota regulations, so that people from lower castes also have the opportunity to enjoy higher education, e.g., in public universities (Subramanian, 2015).

In addition, there is a further challenge: Since the existing VET institutions often do not guarantee a good quality of training (see above), they tend to attract students with poorer school performance. In turn, students with better qualifications do not apply to vocational institutions due to the stigmatisation of VET. Consequently, the inadequately trained graduates of vocational training programmes, in turn, obtain only poorly paid employment or even no employment at all. In a way, this is a 'self-fulfilling prophecy', as the opinion of employers that graduates of VET programmes do not have suitable qualifications is confirmed, and those interested in VET realise that the training does not lead to adequate remuneration. The concept of employability makes individuals responsible for their employment but neglects structural inequalities and problems in the labour market, which are particularly relevant in India. In the Indian context, in particular, structures in the education system and external factors such as equal access to education are not in place, making it difficult for individuals to acquire employable skills. However, a prerequisite for employability is that individuals can

acquire employable skills in the first place (McQuaid & Lindsay, 2005; Nikunen, 2021). Moreover, when using the concept of employability, care should be taken not only to focus exclusively on the needs and requirements of employers and the marketisation of employees but also to consider personal development, prevailing living conditions, and the social rights of individuals, especially in the Indian context (Maitra et al., 2022).

Practical implications

For a long time, the resulting skills gap was of little relevance to India, as the sectors that dominated either did not require formal vocational training (e.g., agriculture and small trade), or required employees to have previous academic training (e.g., IT sector or pharmaceutical industry). The technical development of products and production in many traditional sectors, as well as the growth of the industrial sector, encouraged upskilling. Thus, the demand for skilled workers at the intermediate skill level has increased massively in recent years. This situation is exacerbated because more demanding production processes require new procedures, especially in the industrial sector. These can no longer be realised consistently with the Taylorisation of work processes common in India up to now. Organisations with complex hierarchical levels, extensive specifications, and control measures are no longer effective in a context in which production processes have become more complex (Pilz & Wiemann, 2021).

However, these new production conditions may also be advantageous to the future employability of job seekers in India. This is because the new forms of production are usually less manually orientated and rarely have anything to do with dirty and dangerous working environments. In this respect, higher vocational programmes with a strong practical orientation, such as those offered in other countries by universities of applied sciences and vocational academies (Köpsén, 2020), could possibly be a solution for India. This is because, in addition to offering appropriate qualifications, such courses also tend to be seen as attractive in terms of reputation and status among young people (Ajithkumar & Pilz, 2019; Jambo & Pilz, 2018; Schneider, 2022; Schneider & Pilz, 2019; Tara et al., 2016).

Policy implications

Such programmes could be established relatively easily at the existing polytechnics (Schneider & Pilz, 2019; Schneider, 2022; Schneider 2023). Current initiatives of the Indian education administration are also heading in this direction, with the introduction of the Bachelor of Vocational Education (B.Voc) degree. The academic education programme contains substantial vocational content to increase horizontal and vertical mobility (UGC, 2015).

In addition, employability can, of course, also be addressed through appropriate reforms in the VET system itself. Past initiatives have predominantly sought to achieve reform through radical and comprehensive improvements in quality. For example, attempts were made to enhance the quality of the ITIs through various projects (DGT, 2018a); however, these projects only relate to a small number of VET providers. For example, the Vocational Training Improvement Project (VTIP) has upgraded the quality of about 400 ITIs (DGT, 2018a). A further 1396 ITIs were upgraded through cooperation between government and private agencies and public–private partnership programmes. In total, there are currently around 15,000 ITIs (governmental and private) in India (MSDE, 2020).

In our view, reform approaches would be necessary to achieve an impact across the whole of India over a more extended period. These should be oriented towards regional labour markets' respective needs to ensure suitable employability locally. At the same time, an appropriate level of qualification for the graduates of such VET programmes can lead to adequate remuneration by employers, which can increase the attractiveness of these VET programmes in the long run. The reform approaches themselves could be achieved, for example, through better equipping of vocational schools, in providing up-to-date as well as needs-orientated curricula and learning materials, in the improved theoretical and practice-orientated qualification of teaching staff, and a closer local cooperation relationship between vocational schools and companies (for example, through the integration of internships in training) (e.g., Mehrotra, 2016a).

Finally, it must be pointed out that this paper is limited in the sense that it focuses on the formal vocational system, neglecting the impact of informal training on skills and employability (Venkatram, 2012).

In recent times, informal learning has proven itself in many areas of the Indian economy because this form of training meets the need for employability in the informal sector (Prakash & Kumar, 2011; Regel & Pilz, 2019). One approach could be the integration of informal apprenticeships, which, despite their informal learning setting, integrate elements of formal educational content and certification (see details in ILO, 2011; King, 2012; King & Palmer, 2010).

This paper argues that the concept of employability needs to be addressed with more emphasis in the Indian VET system to tackle the existing mismatch and to improve the labour market situation of Indian youth. For further work on the topic, it makes sense to examine in detail what the theory and practice of learning look like in the respective institutions of the

VET system in order to discover how the teaching of subject-specific knowledge and person-centred skills can be improved.

5 Article 2: The function and institutional embeddedness of Polytechnics in the Indian education system

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Abstract

Context/Purpose

India's Polytechnics are a fundamental part of its (vocational) education and training system but are largely ignored in VET research. Understanding the status quo and potential of India's (vocational) education landscape requires an understanding of the role played by the Polytechnics, particularly in view of the Indian government's major efforts to implement a functioning VET system.

Because little is known about the function and embeddedness of the Polytechnics the article therefore aims to examine how polytechnics are embedded in the Indian education and training system and what functions they perform for the actors within the system.

Approach/Methods

The article begins by describing the systemic embeddedness of Polytechnics in the Indian education system and demonstrates their role and function in relation to a range of stakeholder groups (individuals, employers, society and the economy). Problem-centred face-to-face interviews were conducted with the principals of 14 Polytechnics in Bangalore, Delhi and Mumbai, among other cities. Semi-standardised interview guidelines were used to conduct the interviews. The interviews were analysed by qualitative content analysis.

Findings/Results

The results show that polytechnics perform various functions in the Indian education system. The Polytechnics teach both theoretical and practical skills, which is a special feature of the Indian system at this level. Qualification takes place at an intermediate level, which means that graduates have the opportunity to enter a company after graduation, where they can hold a kind of supervisor position. It is precisely these employees that are increasingly being sought by Indian companies. In addition, polytechnics provide a pathway to higher education, so students can use the opportunity to switch to a college once they have their diploma at the

Polytechnic. Furthermore, the Polytechnics offers its graduates a good opportunity to become self-employed through the wide range of specialisations and the practice-oriented skill development. In addition, the Polytechnics offer numerous opportunities to promote socially disadvantaged groups.

Conclusion/Key message

The survey findings illustrate the importance of Polytechnics to the various stakeholder groups, demonstrating their “multidimensional bridging function” within the Indian education and training system.

Keywords: Polytechnic - India, Institutional role - Vocational Education - Skill Development

5.1 Introduction

India faces a severe skills gap (King, 2012). Although trends in education have produced a substantial increase in the number university graduates, there is still a shortage of well-qualified mid-range workers (Majumdar, 2016). Employers are unable to find workers with the necessary skills and job seekers struggle to find a suitable job (Pilz, 2016a). According to official data, 90% of companies are unable to meet their requirements for skilled workers and 89% complain that this prevents them from fulfilling their market potential (Agrawal, 2012).

Saini (2015) warns that “India’s demographic dividend can rapidly convert into a demographic nightmare” if the Government fails to give the labour force relevant skills. Large numbers of young people cannot find a job because they lack the required skills, with a potential detrimental effect not only on the economy but also on society (FICCI, n.d.).

This forms the background to this article, which focuses on a key component of the Indian education and training system, the Polytechnics (abbreviated here to PTs). In purely quantitative terms, PTs are an important part of the Indian system as Mehrotra (2016b) and Venkatram (2016) note, but little is known about their embeddedness and function. The article therefore considers how they are embedded within the Indian education and training system and what functions they perform for the actors within the system. Specifically, it seeks to establish which functions the institution performs for the actors (function) and where it sits within the vocational education system as well as how it is integrated into the Indian system (embeddedness). The article contributes to international research in three ways. First, it applies the theory of institutionalism to the Indian vocational training context: institutionalism provides a good explanatory pattern for the function and embeddedness of institutions in the area of

VET. Second, it addresses the debate around the relevance of educational institutions, illustrating the relevance within the Indian system of the institution being considered (PT) and what role the institution performs within the system. Finally, the article widens the current research by focusing on PTs and the differences between them and, for example, Industrial Training Institutes (ITIs), which were not included in the study. This intensive focus on PTs thus contributes to furthering the research base.

The article begins with an overview of India's VET system, putting the PTs in a broader educational context.

It then outlines the research study, describing its theoretical framework and methodological approach. The findings shed light on the role of the PTs and on their embeddedness in the system. The article concludes with an evaluation and discussion of the findings.

5.2 An overview of post-secondary education and vocational training¹

The Indian education system comprises primary education, secondary education, upper secondary education and higher education. Both secondary and upper secondary education (classes 9 to 12) last two years, but secondary education is solely school-based, whereas upper secondary education is provided "either in schools or in junior colleges" (Gupta et al., 2016). The secondary and upper secondary stages of education are considered very important, as this is when students must decide whether to undertake vocational training, start work or embark on higher education (Gupta et al., 2016).

The Indian VET² system has two levels, the school level and the purely vocational level. At school level, VET starts at the upper secondary level (classes 11 and 12) in schools providing general education and lasts two years. School-based vocational education is the responsibility of the Department of School Education in the Ministry of Human Resource Development (Venkatram, 2012; Agrawal & Indrakumar, 2014) 160 vocational courses in "agriculture, business and commerce, engineering and technology, health and paramedical [care], home science and science and technology" are taught at around 10,000 schools in India (Agrawal & Indrakumar, 2014; Gupta et al., 2016). From an international perspective, this kind of education has a much more pre-vocational orientation than exclusively vocational orientation (Gupta et al., 2016; Pilz et al., 2014).

¹ For a detailed account of the Indian VET system, including training, see Wessels & Pilz (2018).

² Although the terms vocational education and vocational training have different meanings in India, they are often used interchangeably in the literature. This article will follow suit and make no distinction between the two terms.

5.2.1 Industrial Training Institutes

At the purely vocational level, VET³ is mostly provided by government-run ITIs and private Industrial Training Centres (ITCs)⁴ (Agrawal, 2012; Venkatram, 2012). The Directorate General of Training (DGT)⁵ in the Ministry of Skill Development and Entrepreneurship⁶ is in charge of the vocational training within higher education level. Training is provided under two schemes, the Craftsmen Training Scheme (CTS) and the Apprenticeship Training Scheme (ATS) (Agrawal & Indrakumar, 2014; Gupta et al., 2016).

Under the Craftsmen Training Scheme, which was launched in 1950, ITIs were set up to meet the needs of the labour market (Sodhi, 2014). Following economic reforms, there was a great increase in their number in the 1990s, with the number of ITIs almost doubling between 1990 and 2000 from 2,137 to 4,274. Since 2000, the number of ITIs has grown even more rapidly. Most newly established institutions have been privately run ITIs whose number more than doubled from 2,772 in 2001 to 6,498 in 2010 (Joshi et al., 2014). The increase in government ITIs was not so marked, going from 1,727 in 2001 to 2,189 in 2010 (Joshi et al., 2014). By 2015, India had 11,964 ITIs (2,284 government-run ITIs and 9,680 private ITIs) offering training courses in 126 trades (DGT, 2015).

The duration of training offered by an ITI ranges from one to two years, depending on the course (DGT, 2015). Admission requirements stipulate that students must have completed either 8 or 10 years of school (Gupta et al., 2016). ITI courses are characterised by the dominance of theoretical over practical instruction. Some other quality problems like the low level of competence of teaching staff and out of date equipment were detected in a number of ITIs (Tara et al., 2016; Zenner et al., 2017).

On completion of the training programme, students receive National Trade Certificates (DGT, 2015). ITIs train “semi-skilled workers” (Venkatram, 2012). In order to be considered a skilled worker, ITI graduates must then complete an apprenticeship (Venkatram, 2012).

5.2.2 Polytechnics

PTs in India have attracted little attention from researchers despite their importance within the system. Most PTs in India offer courses in mainstream disciplines, such as civil, electrical and mechanical engineering, but over the last two decades, many PTs have started offering

³ Within higher education, VET is usually referred to in India as vocational training.

⁴ In the literature, the terms government ITIs and private ITCs are used interchangeably. This article will follow suit and make no distinction between the two terms.

⁵ Former Directorate General of Employment and Training (DGET) (DGT, 2017).

⁶ Former Ministry of Labour and Employment (DGT, 2017).

courses in other disciplines, including electronics, computer science, medical lab technology, hospital engineering and architectural assistantship. Many single technology institutions also offer diploma programmes in areas such as leather technology, sugar technology, printing technology etc. (Goel, 2011). Programmes in civil, electrical and mechanical engineering are, however, the most important and relevant, in terms both of student numbers and of their profile (Rao et al., 2014). The qualifications they offer are very important, as PTs are strongly associated with the 'diploma'. For example, in official statistics, PTs are often categorised as 'diploma-level technical institutions' and those completing courses are referred to as 'diploma holders' or, for example, as 'diploma engineers'. Most programmes – basic diploma courses – run for three years and are broken down into six semesters, but there are also many specialised programmes running for shorter periods. These programmes offer sub-degree diplomas, postgraduate diplomas and advanced diplomas, for example, along with part-time courses for students who are in employment. Students can complete the basic diploma and then immediately enrol for an advanced diploma, but other post-secondary students can also take the advanced diploma.

Admission to a PT requires successful completion of 10 years of general education or of a lower secondary TVET programme (UNEVOC, 2018). This means that the average age of entry is 16. Candidates also need to have passed the Secondary School Certificate (SSC) or its equivalent with an aggregate mark of at least 35% (Rao et al., 2014). Selected programmes may also require 12 years of general education.

Training is mostly theoretical, but curricula also include practical elements, which enhance students' profile for vocational occupations. These practical elements are delivered, for example, in workshops within the institution and are intended as a way of practically applying the theoretical knowledge acquired⁷.

Following completion of a course and the award of a diploma, students are able to demonstrate specific skills, such as understanding and interpreting technical drawings, making cost calculations, or repairing and maintaining machinery (Goel, 2011).

India currently has 3,239 PTs (MHRD, 2018b), a figure that has risen sharply over recent years as the government has placed increasing emphasis on vocational training (MoLE, 2017). More than 1.5 million students are enrolled at PTs, 83% of them male and 17% female. Student numbers are currently increasing substantially year on year (MHRD, 2016b), providing further evidence of the scale, relevance and importance of these institutions. PTs are relatively evenly

⁷ For model curricula, see: <https://www.aicte-india.org/education/model-syllabus#>.

distributed across states, although urban regions and metropolitan areas tend to have considerably higher proportions of such institutions than rural regions (MHRD, 2016a). Special 'Community PTs' have been created to support the teaching of technical skills in rural areas and to promote development in these areas (MHRD, 2009). 'Women's PTs' are another special form of PT and focus on providing technical training for women. They often have a more specialised profile than mainstream PTs and aim to meet women's specific needs and aspirations, for example, they focus on labour market relevant subjects for women like design, fashion and beauty (Goel, 2011).

As higher education technical institutions, Indian PTs are structurally affiliated to the Ministry of Human Resource Development (MHRD). The All India Council of Technical Education (AICTE) administers and accredits PTs (AICTE, 2017), but the institutions themselves sometimes operate very differently from one state to another. The reasons include the federalist principle that underpins the Indian Union and the differences between states in terms of economic structure and training needs. The State Boards of Technical Education play an important part here, as they coordinate the activities of PTs within individual states. They also oversee final examinations and issue diplomas (Singh, 2011; Norric, 2006). Standardised federal-level accreditation by the AICTE does, however, mean uniformity in key aspects of the design of PTs. The AICTE also oversees curriculum design and standardisation of syllabuses (Mehrotra, 2016b).

In terms of financing and legal status, there are three main groups of PTs. Some are private and finance all their costs themselves, meaning that they have to charge higher student fees. Others are trusts funded by non-profit or religious bodies; some of these PTs do not have AICTE recognition or accreditation because of poor quality, and their status is, therefore, marginal. A distinction is also made between government and government-aided PTs. Government-aided PTs have private status but receive substantial public sector funding, whereas government PTs are in public ownership and all their costs are met centrally.

PTs have a long history in India and were initially influenced by the British education system because of the country's colonial past. Following the 1937 Abott-Wood report, technical and vocational education in India was reorganised, with a drive to develop and expand the PTs. The first PT was set up in Delhi in 1941 (Singh, 2011). Over the years, there were then further reforms of PTs (including in 1959 by AICTE), with the main objective of improving quality. Over time, the number and breadth of courses on offer also expanded. Further major reforms included the introduction of post-diploma courses (Singh, 2011).

Vocational training in India faces a number of different challenges and problems related to PTs (Kotamraju, 2014). In some cases, for example, their equipment and infrastructure are inadequate to meet demand. Depending on their legal status, their financial basis is sometimes insecure and, in some instances, is inadequate to enable them to provide high-quality teaching. Inadequate training for teachers and other staff and outdated curricula are major problems for the Indian VET system and the PTs in particular. This makes it difficult to compare individual PTs with each other: the quality they offer is very different (Goel, 2011).

5.2.3 Colleges and universities

Higher education institutions in India fall into three major categories – universities, colleges and stand-alone institutions – and over recent years, their number has risen rapidly (MoLE, 2017; Khare, 2016). The majority of Indian students are enrolled at one of more than 39,000 colleges, which are affiliated to a university and award degrees from that university. Some universities have several hundred affiliated colleges, which are, however, relatively autonomous in terms of what they teach and have only an administrative link with the university in question (DAAD, 2017). A distinction also exists between public and private universities (Khare, 2016).

The degrees awarded are Bachelor's, Master's and pre-Doctoral and Doctoral degrees (Wessels & Pilz, 2018). There are marked differences between educational institutions in terms of quality (Khare, 2016). While, for example, Indian Institutes of Technology (IITs) carry out cutting-edge research, many other universities lag behind their international competitors.

Students wishing to gain admission to a tertiary-level educational institution must successfully pass the All India Entrance Exam. Most school-leavers attempt the test on completion of 12 years of education. Access to higher education continues to depend largely on socioeconomic status and tends to be confined largely to those living in urban areas (Wessels & Pilz, 2018).

5.3 Research focus and theoretical approach

As noted above, the PTs are of great relevance to India's system of formal vocational education and training. Despite this, however, there is a shortage of research into this form of training. Understanding the role of PTs is central to appreciating the status quo and potential of India's (vocational) education and training landscape, particularly against the backdrop of initiatives to reorient and restructure the country's VET system. Policymakers and training experts regard this system as a key factor in reducing social inequality and improving the effec-

tiveness of the Indian private sector (Majumdar, 2016). In this respect, the PTs can also contribute a part to the human-centred development of India with its implications, e.g. in relation to human rights, well-being and empowerment (McGrath, 2012).

This article therefore analyses the roles and functions of the PTs in relation to a range of groups within India's VET system. It also sheds light on the relationship between the formal part PTs play in the system and their systemic role.

In terms of systemic embeddedness, the focus is on the education system itself. This perspective differs from the immediate perspective of individual stakeholder groups. The systemic embeddedness of PTs brings together the claims and aspirations of all stakeholder groups with regard to the institution. The actual form of the institution also reflects the influence and power relationships of the stakeholder groups involved (see below). At the same time, the current education system reflects historical structures and therefore illustrates the negotiation processes through which stakeholder groups have passed (see below).

This line of argument reflects the tradition of "historical institutionalism" and is discussed in detail by Thelen (1999), Pierson (2004) and Bulmer (1998). On an eclectic basis, historical institutionalism explicitly addresses the origins, transformation and functions of institutions.

This shows that functions play a central role in historical institutionalism and help to answer the research question. In this school of thought, institutions are defined by their functions for rational and self-interested actors. Institutions exist, therefore, because they provide efficient solutions for actors. And this means that institutions arise, exist and evolve for a reason and fulfil a specific function with a specific benefit to actors. However, this may change over time as a result of interaction between actors. Interaction between actors and institutions is therefore central to considering institutionalism (Steinmo & Thelen, 1992). (Historical) institutionalism argues that actors act according to their own self-interest. However, they do so within a previously defined framework of social institutions and norms. Social norms influence the preferences of the actors and, thus, their actions (Hall & Taylor, 1996). In the Indian context in particular, social norms play a prominent role.

Furthermore, the origins of institutions are analysed primarily in terms of path dependency (Pierson, 2004), while change is addressed predominantly in terms of critical junctures (Mahoney & Thelen, 2010). Both approaches offer insights into the formal attribution of functions to PTs.

Thelen (2004) turns the spotlight of historical institutionalism on skills development, which is helpful because, as vocational schools, Indian PTs form part of the country's skills development system. Thelen argues that skills development underpins development of other systems: "Vocational training institutions occupy a central role in most characterisations of the various political-economic systems [cited above] – and for good reason. Skills are associated with a variety of outcomes of interest to political economists" (Thelen, 2004, p.8). Thelen has also investigated the institutional origins of skills development in a range of countries (Thelen, 2004).

Bussemeyer (2014) uses Thelen's historical institutionalism approach and refines it by combining it with the partisan approach, to sharpen the focus on the roles of institutions. He establishes an even more explicit link between the stakeholders within an institution and the functions of that institution.

The approaches outlined above illustrate clearly the fundamental importance of stakeholders in the origins and development of an institution as well as in its future functions.

To enable us to survey the stakeholders within PTs relevant to our research question, the article uses the approach of stakeholder analysis as part of stakeholder research (Fullan, 2007; Pilz, 2012). Specifically, it uses an analytical stakeholder model (Berger & Pilz, 2009), which explicitly portrays the benefit and function components of a range of target groups specifically in the context of vocational training. This stakeholder model enables the functions of the PTs to be assigned to stakeholders and facilitates the description, formulation and evaluation of data collected. This model introduces the four stakeholder groups listed below, which form the basis for application of the typology to the Indian PTs.

The individual

Vocational training is a key component in an individual's financial independence and success. The individual benefits from robust training in terms of securing a good income and positive prospects for the future (CEDEFOP, 2011a).

Employers

Employers need workers with vocational skills to enable them to sell their products or deliver their services. They therefore benefit substantially from vocational training, which gives them access to knowledge, competencies and expertise that will add productive value to their company (CEDEFOP, 2011b).

Society

Vocational training is a practical way of reducing social inequality. It also develops general social values that encourage individuals to play an active part in social development (CEDEFOP, 2011b).

The economy

An efficient system of skills development and, hence, a functioning vocational training system are key to a nation's economic development. Skills development is one of the keys to the development of other, related, systems (Thelen, 2004), and the stability of an economy relies on having an effective skilled workforce (CEDEFOP, 2014a). PTs are a basic part of India's vocational training system.

5.4 Methodological approach

The data collection approach may be described as qualitative and exploratory (Flick, 2014). Structured and problem-centred face-to-face interviews were conducted for the study. A total of 14 interviews were conducted over a period of four weeks with the principals of 14 local PTs. Principals were the obvious subjects to interview, because their management role gives them an overview of their institution and the interests of the stakeholders involved. Moreover, as intermediaries between the state agencies that set regulations and the teaching staff who have to implement these regulations, they bring together a number of aspects.

Most of the interviews were in urban centres (including Bangalore, Delhi and Mumbai), where most PTs are based. The team also visited a rural PT and three Women's PTs in Delhi and Bangalore. The PTs included in the study were located in a range of states, taking account of the differences between states. The specific selection of PTs locally was determined by the willingness of the institutions to take part. Access to the institutions was organised in cooperation with local research partners.

To balance the responses of the PT principals and to contextualise them, two interviews were also conducted with the relevant authorities and State Boards in Bangalore and Delhi.

To guide and steer the interviews and discussions, a semi-standardised set of interview guidelines was drawn up in line with theoretical models, enabling interviewees to speak openly on the areas under discussion but also to expand on areas they considered important (Flick, 2014).

The guidelines were structured into three main categories, with several subcategories. Category A included a range of general questions about the PTs under consideration, such as their

legal status and funding basis, the number of students they taught, and the educational programmes they offered. Category B included questions on the content orientation of PTs, their functional aims, and the socio-economic background and employability of their students, such as “Which careers do your graduates choose after graduation?”. Category C, finally, focused on the embeddedness of the PTs and their comparison with other Indian educational institutions, asking questions such as “What are the specific structural characteristics of PTs in comparison to ITIs or colleges?”.

The principals participated voluntarily in the survey, with no material incentives to do so. The interviews were recorded electronically so that a verbatim record could be obtained of the interviewees’ responses. Most interviews took between 50 and 90 minutes, depending on how informative each interviewee was. The interviews were conducted in the principal’s office as part of a visit to the PT, and in some cases, other faculty were present during the interviews. Interviewees were able to express themselves clearly in English, so the interviews were conducted in that language without the need for an interpreter. The guidelines were scrutinised by several local experts with regard to the cultural component.

Mayring’s (2000) open analytical tool was used to analyse the data gathered and devise categories on the basis of qualitative content analysis.

5.5 Findings on functions and institutional embeddedness

This section of the article sets out the findings of the interviews with PT principals in line with Mayring’s (2000) approaches to qualitative content analysis. The categories (graduates’ skills mix; graduates’ skills level; PTs as a path to higher education; skills development for self-employment; a broad range of specialisation; and integration of socially disadvantaged groups) are derived from the material (semi-structured interviews with principals) and represent a simplification of the data to a manageable basic form. The categories reflect the major interview findings and help to extract relevant information from the responses given by PT principals.

The categories enable statements to be related to the various stakeholder groups (the individual, employers, society and the economy). The statements made by interviewees are assigned to the stakeholders from the stakeholder model. The statements made by interviewees, the categories and the stakeholders addressed enable the functions of the PTs to be categorised according to stakeholder group in a subsequent stage. This then leads finally to identification of the embeddedness of PTs within the education and training system.

5.5.1 Graduates' skills mix

The principals reported that diploma holders, like ITI graduates, are considered blue-collar workers but actually carry out a supervisory role. They have an understanding of problems and a critical view of their profession:

They can express and communicate, but they also have hands-on skills.

(DP4: PT principal from Delhi)

These hands-on skills are, according to the principals, what distinguish PT graduates from engineers with degrees and make them very attractive to potential employers. Companies need employees who not only have a solid theoretical foundation but can also operate the machinery. The principals also argued that diploma holders have an advantage over college graduates, whose knowledge is wholly theoretical, because the practical elements in their curriculum are a key building block. The State Boards maintain contact with representatives of industry and adapt PT curricula to the needs of employers. The problem orientation that helps diploma holders to take a practical approach to solving complex technical problems is a further aspect distinguishing them from ITI graduates, said the principals: the mix of solid theoretical knowledge and practical know-how gives them a decisive edge. This suggests some conclusions about the status of PTs within the education system: they are viewed as part of vocational training because they teach practical vocational skills but they also teach theoretical knowledge and so provide a (pre-)academic training. Most PT graduates find employment in small and medium-sized companies:

The practical part really adds to the profile of diploma holders compared to others.

(MP4: PT principal from Mumbai)

PT principals also alluded to the abilities of diploma holders to learn and adapt on the job. The assumption is that after two or three years' experience in industry, they are just as productive as college graduates. From companies' perspective, recruiting a diploma holder offers the further advantage that these individuals have lower salary expectations than degree-level engineers yet perform very well.

Functions from a stakeholder perspective:

The responses of the principals illustrate the added value for the individual of a PT training in terms of acquiring both theoretical and practical vocational skills.

Indian companies also benefit from this skills mix. This combination of high-level theoretical and practical knowledge is unique within the Indian education system (see Norric, 2006) and is a valuable resource in practice: PT graduates serve as a crucial interface within a company and bridge the gap between college graduates in management roles and manual employees

with ITI qualifications. Employers have a particular interest in PTs because these institutions equip workers with both theoretical and practical knowledge.

Systemic embeddedness:

The PTs produce graduates with both theoretical and practical knowledge, a unique characteristic at this level of the Indian education and training system. ITIs teach almost exclusively practical skills – and at a low level – while colleges teach solely theoretical academic knowledge (Mehrotra et al., 2014).

5.5.2 Graduates' skills level

Interviewees regarded the PTs as a link between different parts of the education and training system and saw their role as that of producing trainees with a competency level above that of those with ITI qualifications. ITI trainees carry out standardised craft roles or basic industrial roles, whereas the focus in PTs is on developing higher-level blue-collar skills. Once employed in companies, diploma holders can take on supervisory positions, reflecting their superior place in the hierarchy over ITI graduates. Interviewees argued that diploma holders are responsible for monitoring and supervising production processes and, therefore, the work of subordinate ITI graduates. In the internal hierarchy, diploma engineers occupy a superior position to ITI graduates but rank below college graduates, who tend to focus on planning, organisation and management roles.

In the view of the principals interviewed, the aim of the PTs is to produce employees with high skills levels. Those who have undergone PT training should demonstrate not only practical skills but also an awareness and understanding of problems that helps them critically to deploy the specialised skills required for their role. And this, the principals argued, distinguishes diploma holders from ITI graduates:

The education in an ITI is on a lower level than [in a] PT. The ITI wants to educate semi-skilled workers for the shopfloor while diploma holders work on a supervisor level.

(MP1: PT principal from Mumbai)

Nevertheless, argued the principals, Indian society persists in its view that academic training can provide high-level skills – what Indians still regard as the “measure of all things” (Jambo & Pilz, 2018). As a result, there is evidence of a push towards academic training, with PTs being regarded as second-best, especially in the area of engineering. Despite this, the competency levels of diploma holders confer a range of advantages on the labour market, according to the principals:

They work with [their] hands, which is not possible with degree graduates from College because they work as white-collar [workers].

(MP1: PT principal from Mumbai)

Functions from a stakeholder perspective:

Individuals with PT qualifications benefit by being able to select a training institution that offers them an opportunity to develop intermediate-level skills. The skills and expertise they acquire at a PT enable them to find appropriate employment in a company.

Companies' needs for employees with skills profiles tailored to their activities are, therefore, being met through the skills that PT graduates bring to the labour market. PTs supply Indian companies with mid-range skills that enable these companies to meet their production or service requirements. The companies therefore view the PTs as a source of skilled labour.

Systemic embeddedness:

Statements made by the principals show clearly that in terms of its ability to train workers for the labour market, India's VET system has three levels of skills preparation. This is borne out by the work of Rao et al. (2014). Low-level manual shopfloor roles are filled by unskilled or semi-skilled workers with ITI training, while college graduates fill white-collar roles. Bridging the gap between these two groups are those who have a PT training. No other educational or training institution within the Indian system offers training at the same specific skills level as PTs.

5.5.3 Polytechnics as a path to higher education

The principals interviewed argued that many trainees regard PTs as merely a way-stage on the path to a college education, noting that increasing numbers of young people are taking up this route:

Many students go to engineering college after they graduate here.

(BP2: PT principal from Bangalore)

The principals identify a number of reasons. First, society continues to regard academic training as the "gold standard", with vocational education viewed as second-best. The reasons for this lie in the nature of Indian society and have been the subject of intensive debate (Mehrotra, 2012).

The VET system in engineering also offers some porosity. As a result of their upward mobility, diploma holders can enter directly into the second year of an engineering degree course (MSDE, 2016b). The original pattern of 10 + 2 + 4 years (general secondary + higher secondary + college (degree)) therefore becomes 10 + 3 + 3 (general secondary + polytechnic (diploma)

+ college (degree, with direct entry to year two) as students skip the senior secondary examination, usually taken after 12 years of education, and move to a PT after 10 years and the SSC. Once at a PT, students acquire initial theoretical and practical training in engineering, preparing them better for a college course in engineering than the typical 10 + 2 + 4 year pattern (MSDE, 2016b):

I recommend to do 10 + diploma, then degree [from] second year. We give them a lot of hands-on experience which doesn't come in 10 + 2 – physics, chemistry experience in engineering and other things.

(DP3: PT principal from Delhi)

Functions from a stakeholder perspective:

The statements from PT principals show clearly that individuals benefit particularly from this approach. By attending a PT, graduates acquire not only a vocational qualification but also the opportunity to switch to a college once they have their diploma. This function of PTs also illustrates the potential permeability between training courses and routes. Smooth transitions between different types of training underpin a functioning education and training system that benefits not only the individual but also society generally (Tuck, 2007).

Against the background of institutionalism theory, the results clearly show that actors act according to their self-interest: individuals maximise benefits to themselves by achieving the highest educational attainment, which is recognised and valued within their social environment. This demonstrates that PTs are increasingly perceived as a route to higher education and less as a means of obtaining a supervisor-level job in the labour market.

Systemic embeddedness:

The responses of the principals demonstrate that successful students have the opportunity not only to access the labour market but also to move to a higher training institution (a college). This gives PTs a bridging function and enables diploma holders to go on to further academic training. Those successfully completing an ITI course can also move on to a PT.

5.5.4 Skills development for self-employment

The PT principals made it clear that alongside employment in a company or further study at a higher education institution, graduates have a further opportunity. Many PTs view their role as training students to move into self-employment. Graduates, too, see self-employment as a realistic and meaningful option on completion of their diploma. Trainees at other types of institution, and even those without formal qualifications, can of course opt for self-employment, particularly in India's sprawling informal sector, but diploma holders see this route to

running their own business as particularly meaningful because of the broad practical and theoretical training they receive (see above), which makes them highly competitive commercially and opens up long-term market opportunities:

Many students choose to be self-employed after they leave our PT. They can easily use their skills which they acquired from us on the market.

(BP3: PT principal from Bangalore)

This is particularly relevant to courses delivering skills that lead relatively easily to self-employment, such as courses at women's PTs in interior design, beauty culture and tourism:

Lot of girls want to be self-employed, because the courses they choose match well with self-employment.

(MP4: PT principal from Mumbai)

Running their own business is also, however, a popular choice for both male and female PT students. The particular emphasis of PTs, which offer a range of courses and link theoretical and practical knowledge, makes it especially attractive for PT graduates of both genders to pursue self-employment.

Functions from a stakeholder perspective:

Two main stakeholder groups benefit from skills for self-employment. The first is individual students: self-employment represents a further option on the Indian labour market, which is particularly important given the country's large informal sector (Pilz et al., 2015; Pilz & Wilms-höfer, 2015, Schneider & Pilz, 2018). The solid theoretical and practical training that PT graduates receive enables them to earn an adequate income from self-employment, unlike many who are self-employed within India's informal sector (Pilz et al., 2015).

This aspect also benefits the economy as a whole. Self-employment brings graduates onto the labour market and helps reduce high levels of youth unemployment (ILO, 2016a) as well as creating new (micro-)businesses that contribute to India's economic development.

Systemic embeddedness:

Other types of institution, such as ITIs, also claim to build skills for self-employment. However, PT graduates appear to benefit from improved prospects of success if they embark on this route. This may reflect the link between theoretical and practical skills, which is particularly important for self-employment. As noted above, this link is much less marked in both ITI and college courses.

5.5.5 A broad range of specialisation

Indian PTs offer a wide range of specialisation, including hotel management, food production, banking management and renewable energy. By providing training for staff in a range of sectors, the PTs are helping to keep the private sector flexible:

We offer courses in our PT no-one else is offering in this area.

(BP1: PT principal from Bangalore)

If the private sector has access to a pool of staff with differing areas of specialisation, it will be able to react to the changing face of the economy. The relatively short duration of courses (mostly three years) means that companies can react quite quickly to economic change, and PTs are often the only institutions to offer certain specialised training. They also specialise in target interest groups (e.g. women). Nevertheless, the most popular courses at PTs remain those in technical, mechanical and electrical engineering, although the principals interviewed alluded to a tangible change in demand for non-technical vocational courses:

We feel that there is a shift in the economy to the service sector. We [have been] offering courses in business and services for a long time and are able to widen them.

(MP3: PT principal from Mumbai)

Meanwhile, courses are now being offered in highly-specialised fields, such as ceramics technology and photography, to meet growing niche requirements from the private sector.

Functions from a stakeholder perspective:

The diverse range of course on offer within PTs benefits the private sector and employers particularly. Unlike other training institutions, PTs often operate within training niches and are an important source of skilled labour for private sector companies. Without the skills of graduates in this wide range of subjects, companies in many specialised areas would struggle to recruit trained staff. Indian employers benefit, too, from significantly shorter induction and on-the-job training times.

Systemic embeddedness:

PTs offer the Indian training system a wide range of specialised courses that are not available in other institutions. College courses, for example, are often more general and have a less specialised focus, so induction periods for college graduates are longer.

5.5.6 Integration of socially disadvantaged groups

India's PTs help to integrate a number of different social groups, such as those living in rural areas. The Community Development through PTs (CDTP) programme has set up a number of

PTs whose profile is tailored to the needs of rural populations with the stated aim of improving their skills and promoting rural development (MHRD, 2009).

The country also has many Women's PTs, whose profiles are tailored to female students and take account of gender-specific occupational profiles and needs, for example through courses in areas including early childhood education, fashion design and library sciences. As part of the data collection for the study, the project team visited a number of different Women's PTs. The individual profile of these institutions, argued the principals, promotes development among female students and helps them acquire a solid training in areas not offered elsewhere (Goel, 2011):

Our [Women's] PT helps the girls to develop sufficient skills in the fields of their own interest.

(DP1: PT principal from Delhi)

Statements by the principals make it clear that many students from the lower and middle social strata attend PTs. Many PT graduates are also the first in their family to enter higher education, which – say the principals – promotes porosity between social classes and social integration:

Many of our students are the first in their family to be at a higher education institute.

(DP2: PT principal from Delhi)

PTs therefore help to support a range of socially disadvantaged groups in their development by offering them opportunities to acquire solid vocational skills.

Functions from a stakeholder perspective:

Individuals from diverse marginal social groups are advantaged by having the opportunity to attend a training institution such as a PT.

Meanwhile, integrating diverse population groups also strengthens social cohesion. PTs enable students from a range of social classes and groups to obtain good training, helping to integrate them in society.

Systemic embeddedness:

In a fragmented society like India in particular, where membership of a particular religious group, caste or gender can result in substantial disadvantage (Bhagavatheeswaran et al., 2016), the role played by PTs in social integration is vital. There is some limited evidence that ITIs also contribute to social integration, but little evidence within colleges. Unlike these other types of institution, PTs offer particular opportunities to socially disadvantaged groups, such as through community and Women's polytechnics. Moreover, while colleges formally set out

to integrate a range of socially disadvantaged groups, this often proves difficult, for example self-selection by students (Arulmani & Nag-Arulmani, 2006).

5.6 Discussion: are Indian Polytechnics the “hidden champions” of the education system?

To systematise these findings as functions of PTs requires recapping some of the key factors of the education and employment system in India. The first is the trend towards higher-level qualifications. Completing a course of academic study enjoys very high recognition in Indian society, whereas vocational training is regarded as second-best or even discounted entirely (Agrawal & Agrawal, 2017).

Second, manual occupations are associated in India with dirty and dangerous working environments, poor pay and poor prospects (Tilak, 2002). These jobs tend to be reserved for individuals from lower castes (Arulmani & Nag-Arulmani, 2006).

Third, India has an exceptionally large informal economy, in which skills development is also often very informal (Sodhi, 2014; Sodhi & Wessels, 2016) but that, in the case of larger employers, can require a certain level of specialist expertise.

Against this backdrop, PTs fulfil a kind of “multidimensional bridging function”. Firstly, they bring together vocational training with elements of academic education, helping to reduce social stigma and signalling a valuable social reputation and recognition by companies and employers. Secondly, however, by linking practical and theoretical learning, they also meet the needs of Indian employers, who depend crucially on a supply of well trained and skilled workers with intermediate-level qualifications (Goel, 2011). Thirdly, the PT graduates themselves benefit, of course, but so too, particularly, SMEs because – unlike large companies – they cannot afford their own internal skills training systems (Mehrotra et al., 2014). The fourth and final aspect of this bridging function is that PTs offer their graduates excellent opportunities to set up a successful business within the informal economy on the basis of the skills a diploma gives them. This applies not only to young people from a privileged social background or higher castes but also to socially disadvantaged groups. By attending PTs, these groups are able to set up their own business, earn a living and rise up the social ladder. A range of stakeholder groups therefore benefit from the existence of PTs. As described in the institutionalism approach, the various functions illustrate the interests of different individual actors. However, institutional change also manifests itself when the preferences of an interest group change. From a historical perspective, it can be said that individuals are currently the dominant and

most lasting influence on the transformation of functions through their choices concerning the use of PTs as a route to higher education.

The historical development of this decision by individuals therefore means that greater use is being made of PTs as a route into academic training to the detriment of their role as providers of skills for employers and the labour market.

The demand for PT education is steadily growing, as evidenced by the rising numbers of students, but potential applicants increasingly have a different focus, and their ambitions are changing. Loftier ambitions on the part of individuals can be explained by the improvement in opportunities as a result of political reform – including for socially marginalised groups – and the rapid pace of social change as well as the strong focus on status and on an academic education as the “gold standard” in Indian society.

At the same time, there are indications that employers are seeing a decline in their influence on PTs, as they are increasingly having to compete for graduates. From the employers’ perspective, one solution to this problem is to intensify contacts between employers and PTs, e.g. through the provision of internships or the increased inclusion of compulsory internships in companies in the curricula. This could strengthen both the influence of employers on the PTs and the role of PTs as a source of skilled labour. This illustrates that the functions described from a historical institutionalism approach are constantly changing as stakeholders’ preferences evolve.

Despite the change in functions over time, the findings set out above clearly show that this kind of “multidimensional bridging functions” is confined to the PTs. Against a backdrop of systemic embeddedness on the one hand and the lack of social and academic regard for the PTs on the other, these institutions can truly be regarded as the “hidden champions of the Indian education system”. Detailed analysis of statements by PT principals shows, however, that they make no differentiation in terms of the type of skills taught. At international level, schools have the role of promoting talent and careers (Ballantine & Hammack, 2012), yet the principals interviewed did not touch on this area. The internationally recognised functions of education processes – e.g. selection, legitimation and socialisation (Meyer, 1977; Fend, 2002; Cheng, 1996) – are also missing, even indirectly, from the statements made by the principals despite the fact that the interview guidelines made provision for discussing these aspects. It also became clear during the study that principals take a very positive view of the form of their own institutions and do not mention critical aspects and problems, despite these being well

known from the literature and despite the interview guidelines offering scope for critical comments (see 5.2.2). This can be explained by the fact that the principals want to defend their own school form and therefore avoid negative statements in front of researchers in order to avoid unfavourable changes in the school form from their point of view. This paradox has already been evident in other research projects in India (see Jambo & Pilz, 2018, *inter alia*).

According to the principals interviewed, the central purpose of a PT is to provide skilled workers for the labour market. Meanwhile, before they begin their training, the majority of students want to gain rapid access to the labour market and quickly be in a position to support their families financially, while many prefer to go to college after completing their studies at a PT. The fact that the principals largely ignored the more general functions of the education system may well be attributable to the fact that their working routines require them to focus solely on the micro-level of local needs of stakeholders rather than, more abstractly, on the macro-level of the education and training system (Jambo & Pilz, 2018).

5.7 Conclusions

The findings permit some conclusions regarding the embeddedness and functions of PTs within India's VET system. It is clear, for instance, which functions PTs perceive for the actors (function), where the PTs are classified in the vocational training system, and how they are integrated into the Indian system (embeddedness).

The stakeholder model was used to provide detail in the study, to analyse, structure and attribute the findings to the relevant actors and to establish the relationship with the theoretical approach of historical institutionalism. Nonetheless, the study cannot claim general validity because of its limited sample size. The sole focus on PT principals is a further limitation: it would be desirable to survey all stakeholder groups to broaden the basis. On the other hand, the study provides valuable insights into the PTs as an institution, enhancing understanding of them by presenting their functions from the point of view of different stakeholders and their embeddedness in the Indian VET system.

Principals felt that, overall, PTs fulfil a range of functions for a range of stakeholder groups. In this regard, they are systemically unique because of the "multidimensional bridging function" they fulfil. Against the backdrop of their low social and academic status, they can then be recognised as the "hidden champions of the Indian education system".

The findings described here are of interest not only to India but also, potentially, to other countries where the education system has similar structural and/or stakeholder functions. The findings also demonstrate a need for further research, for example longitudinal studies, to

generate detailed analysis of successful transitions by PT graduates to the Indian employment system.

6 Article 3: The attractiveness of polytechnics in Delhi and Mumbai: a study on the perception from the perspective of students and parents

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Abstract

This article analyses the attractiveness of Polytechnics (PTs) in India, which are part of the country's Vocational Education and Training (VET) system, from the perspectives of individuals. PTs as institutions of Higher VET are an essential part of the Indian VET system. As no findings on their attractiveness are available, interviews based on an attractiveness model were conducted with 33 students and 17 parents. Results show that although PTs are attractive from an individual point of view and offer numerous advantages for those striving for education, like a wide range of career opportunities or a high level of job security, their attractiveness is considerably affected because of the societal perspective. However, in particular, the emphasis on the strengths of a PT diploma, like the combination of both theoretical and practical elements and the assignment of PTs to Higher VET may help to improve the rather negative societal perception of PTs

6.1 Introduction

India with its 1.39 billion inhabitants will be one of the key players on the world economic stage in the future (Organisation for Economic Co-operation and Development [OECD], 2019). India is already setting standards in several areas or is at the forefront internationally, as it has impressively demonstrated in IT and software development. It will play an essential role in the global economy not only because of its demographic figures. The successes in the aerospace industry also demonstrate the newly won self-confidence and the subcontinent's outstanding performance, despite all the challenges that still exist, which are not only to be seen in vocational training (Bisht & Pattanaik, 2020; British Council, 2014; Majumdar, 2016; MSDE, 2022; Mundle, 2017; Pilz & Regel, 2021). India is also trying to implement significant improvements in the field of education, as illustrated not least by its ambitious 'Skill India' mission (Ministry of Skill Development and Entrepreneurship (MSDE, 2015; Sharma & King, 2019). However, it still has considerable problems with training highly skilled employees (British Council, 2014;

Majumdar, 2016). These skill-gaps impede overall economic growth and lead to numerous other socio-economic problems (Mundle, 2017).

In order to overcome these difficulties, a far-reaching revision of the Indian VET system was recommended (Mehrotra, 2014; Sharma & King, 2019). The current government under Prime Minister Modi is also pushing ahead with reform efforts, such as reforming teacher training or the institutional restructuring of authorities and ministries (Ministry of Human Resource Development [MHRD], 2019a). However, an essential prerequisite for any reform effort is an in-depth analysis of the current system. One primary reason for the system's problems is the lack of attractiveness of VET and its institutions for the various stakeholders (Agrawal & Indrakumar, 2014; Pilz & Regel, 2021; Wessels & Pilz, 2018). The presumed lack of attractiveness hence needs to be investigated. Therefore, this paper addresses this issue by looking at one important stakeholder group in relation to the attractiveness of a Higher VET school form. Debates about the attractiveness of vocational training have a long tradition in India and other countries and cultures (Billett et al., 2022; Winch, 2013). Traditionally, general education has been considered more valuable than vocational education and training due to the higher value which intellectual activities in contrast to physical labour have (Atkins & Flint, 2015).

The concept of attractiveness is a complex, multidimensional construct (Billett et al., 2022; Lasonen & Gordon, 2009). Such complex constructs as attractiveness cannot be influenced normatively top-down. Even short-term exogenous changes are not possible. Therefore, sustainable changes on a broad scale are required. To accomplish this, an analysis of the attractiveness of the relevant object is necessary. This is why an approach to this construct should be taken via the stakeholders, as they have a decisive influence on the constitution of attractiveness and allow perspectives on several levels (CEDEFOP, 2014b; Winch, 2013).

The paper investigates whether the critical stakeholders, namely students and parents in this context, perceive their educational institution as attractive. Attractive in this sense means whether or not they consider the type of school to be purposeful for their (or their children's) further life and career path. To find out how they perceive the attractiveness, students and their parents are asked about the essential categories for choosing the type of school. These categories are adapted to the Indian context. As Winch (2013) described, students and their parents represent a decisive factor in the complex assessment of attractiveness. This is why the paper focuses on them (see section 3).

In contrast to the ITIs (Industrial Training Institutes), which provide vocational training at a lower level and are a far more prominent and intensively researched school type, PTs can be assigned to Higher VET. They have therefore been chosen as the object of study.

PTs are technical schools, which can usually be attended after completing the 10th grade. There are various courses on offer, which are called diploma courses. The most prominent courses in terms of numbers are in engineering, such as electrical, mechanical, and civil engineering. However, the range of courses has been increasingly expanding beyond the engineering ones (Wessels & Pilz, 2018). The basic diploma courses last three years or six semesters, and other advanced variants, such as Advanced Diplomas are also offered. The curriculum of PTs includes theoretical and practical elements so that the diploma courses can be assigned to the vocational area. The focus is on the practical application of theoretical concepts (MHRD, 2014). In the Indian education system, PTs are placed between ITIs, which only teach basic vocational skills, and universities or colleges, which offer academic education. There are private as well as state institutions. There are currently 3,440 PTs with over 1.5 million students nationwide (MSDE, 2020). According to the International Standard Classification of Education (ISCED), PTs are classified at level 4, that is post-secondary, non-tertiary education and thus in the Higher VET sector (MHRD, 2014).

The assignment to Higher VET is also clarified by functions and the systemic embedding of the institution (Schneider & Pilz, 2019). This paper therefore contributes to the international research literature by exploring how the attractiveness of PTs can be assessed, what the reasons for the perceptions of attractiveness are, and whether Higher VET can assist in lifting the status and attractiveness of VET in general. The paper is structured as follows: section 6.2 explains the research focus, section 6.3 describes the basic theoretical concepts of the paper, section 6.4 deals with the methodological concept of the research study in Delhi and Mumbai in 2019, section 6.5 presents the results of the data collection, which are then discussed in section 6.6, followed by the conclusion in section 6.7.

6.2 Research Focus

The study aimed to assess the attractiveness of this particular school type, that is, whether and why choosing and graduating from this school type is considered desirable for students. This is covered by interviews with students and parents, respectively. For this purpose, categories were developed from the theory (see section 3) with which respondents were asked. These questions come from the following categories: (1) financial rewards; (2) job security; (3)

career advancement; (4) interests and preferences; (5) costs of education; (6) historical context; (7) cultural or religious implications; (8) status and professional ethos.

The study thus focused on the goals, assessments and needs of those seeking this type of education. Developing a model for increasing attractiveness was not the primary focus of the study. Instead, analysis of the perspectives of individual actors could contribute to a fuller understanding and thus increase the general assessment of the attractiveness of the school-type PTs. However, the purpose is not to explore why a particular PT of those surveyed is attractive but to find out whether PTs, in general, are attractive as a form of schooling. The study was therefore guided by the following research questions:

- How do students of PTs and their parents assess the attractiveness of this school type?
- What reasons account for their assessment?

6.3 Theoretical concept: attractiveness

The issue of the attractiveness of VET is highly relevant in the international VET policy debate (Billett et al., 2022). Nevertheless, it has not yet been possible to establish a generally acknowledged and consistent description of the term (CEDEFOP, 2014b; Lasonen & Manning, 2001; Russo et al., 2019). In connection with the topic of attractiveness, there are numerous similar terms such as value, status, reputation, recognition, standing, prestige, acceptance or esteem. Each of these terms deals with a different facet of the topic in different conceptions. However, there are also overlaps and additions; this sometimes makes it difficult to clearly distinguish between them (Ajithkumar & Pilz, 2019; Billett et al., 2022; Winch, 2013).

In the present study, the term attractiveness has been chosen to address the underlying research questions. Attractiveness in the context of this study is taken to mean the measurement of interest of students and their parents in this type of school. Attitudes of individuals concerning this type of school were determined. The higher the assessment of their interest in the school type, the more likely they would choose this type of school for their future career. Attractiveness also has a subjective component as it strongly depends on the individual actors' assessments, which is why this definition makes sense for the question to be answered (Russo et al., 2019).

Attractiveness is a multidimensional construct. This means that the attractiveness of a school type is assessed by different actors (such as individuals, society, companies, the state, etc.). Attractiveness depends on the respective perspective and is not defined exclusively by individual attitudes but is also determined to a large extent by the social environment, such as parents or friends and peers or society in general. In this paper, the individuals, i.e. students

of PTs as well as their parents are the focus of attention. Often, little is known in research discourse about the perspectives of the various actors, especially those who demand education (Ajithkumar & Pilz, 2019).

The factors influencing the attractiveness of a school type are manifold. In order to measure such a complex concept as the attractiveness of a school type a theoretical approach is necessary. Therefore, the theoretical construction of Ajithkumar and Pilz (2019) has been chosen. Their approach is beneficial as it outlines general categories of attractiveness and has shown that it can be successfully applied to the Indian context. However, the categories have been modified and adapted for this study. For example, the factor 'costs of education' has been included because of its enormous significance in India. In India, educational costs significantly impact the decision of which educational path to choose. Unless the student's parents can afford the cost of education (school fees, etc.), this educational path is not available to the student. Additionally, with reference to Lasonen and Manning (2001) additional components like the historical context, religious and cultural implications and the status in society have been included as these aspects significantly influence the individuals' attitude towards a certain type of school and therefore their respective decision. The interviewees revealed their personal attitude, which showed their subjective perception of these components. Generally valid assumptions on how society usually views the attractiveness of PTs have not been made as this would require interviewing a wide range of stakeholders, for example principals of PTs or government representatives or policymakers.

Additionally, the study was carried out in a combined form, which involved both students and parents due to the great importance of students' family background in India, which only plays a minor role in Ajithkumar and Pilz's (2019) original model. In this way, an insight into the perspective of those demanding education could be achieved, and their needs, assumptions and goals were revealed.

Ajithkumar and Pilz's (2019) approach focuses on the actors from the individual, societal, state and company perspective. The different perspectives and intentions show different interdependencies and contexts. In this study, the focus is exclusively on the individual perspective in order to answer the research questions. This focus is particularly important because the perspective of students and parents is often not considered in studies.

In order to adapt the categories to the present Indian situation, the respective aspects are discussed and classified in the results section with regard to the Indian context. Explanations are then given on why these categories are essential to address the research questions and

why they can be applied, especially to the Indian context. It should be noted that the theory is not to be tested. The theoretical framing provides guidance to explore the topic and to classify the interviewees' responses.

6.3.1 Financial rewards

The level of remuneration for work performance traditionally plays an essential role in the choice of occupation. Financial rewards have been categorised as extrinsic motivation factors (Super, 1970). Various studies show that, among all influencing factors, perceived earning potential has had a strong influence on the choice of occupation (Agarwala, 2008; Singh, 2012).

6.3.2 Job security

Job security is seen as another extrinsic attractiveness factor. It is one of the main reasons for choosing a particular career path. This phenomenon is widespread in all branches of industry and societies (Fidan, 2019). Job security guarantees a secure long-term income, thus enabling employees to plan their career and personal perspectives more reliably (Emmenegger, 2014). While in Western industrial societies, the concept of job security may be increasingly losing importance as an attractiveness factor (Bravo et al., 2017), it continues to be of great importance in developing societies (Yadav & Chaudhari, 2020).

6.3.3 Career advancement

In the research field dealing with career choice, the opportunities for advancement and development of individuals in a job description are also a particularly important factor. So-called dead-end jobs are considered unattractive. In some cases, the importance of promotion opportunities is rated even more highly than earning opportunities. In India, the aspects of development opportunities and the chance for career advancement also play a role (Datta & Agarwal, 2017).

6.3.4 Interests and preferences

Holland (1997) puts the personal interests and abilities of individuals in the foreground with regard to their choosing a career. According to him, individuals select their professions according to their personal preferences, abilities, and attitudes to take on tasks and roles most closely attuned to their personality. For this reason, individuals regard activities as fulfilling if they are largely congruent with their personal preferences, interests and attitudes. Super (1970) categorises preferences and interests as intrinsic values. These directly influence motivation and job satisfaction and can therefore allow conclusions to be drawn about the attrac-

tiveness of a profession or educational background and thus influence the individuals' behaviour in choosing a particular career. Personal interests also significantly influence Indian youth today (Iyer & Siddhartha, 2021).

6.3.5 Costs of education

Another factor in choosing a school type is the cost of the training. This has been added to the Pilz model as it plays a special role in the Indian context. In India, fees have to be paid to attend a PT, which vary depending on the course and institution. In addition to course fees there are costs for materials and other resources. Costs influence the choice of course and thus the attractiveness of the training measure (Hoeckel, 2008; Ray et al., 2020).

6.3.6 Historical context

The historical context can influence individual career decisions. As shown in historical institutionalism (e.g. Thelen, 2004), the embedding in the education system and functions of an institution are the result of numerous negotiations between stakeholders. They are sometimes subject to path dependencies and critical junctures. This is particularly noteworthy with regard to India, especially in relation to its colonial past.

6.3.7 Cultural and/or religious implications

Religious and cultural conditions can significantly influence educational decisions (Bayly, 1999). For example, in the Indian context, the caste system, which is imbedded in Hinduism, is deeply rooted in the Indian society and has an impact on individuals' decisions, especially in the field of jobs and careers as the caste system used to play a rather decisive role in the job market as it dictated the type of occupation a member of a certain caste could pursue (Bagde et al., 2016). M. Singh (2001) underlines the strong connection between religion and individual career decisions within the Indian context. Because of the significant interdependence of religion, caste and choice of career, this aspect has been included in the system of categories.

6.3.8 Status and professional ethics

Vocational education and training generally have a low attractiveness in various societies (Russo et al., 2019). Most commonly, academic education has a higher social status than vocational education (Young & Raffe, 1998). Especially this aspect must be addressed in order to reliably assess the attractiveness from an individual perspective as the choice of a certain course of education is greatly influenced by its status. In India, the value system considerably influences decisions concerning one's educational path.

In the present study, the individual attractiveness is examined from the perspective of PT stu-

dents and their parents. It should be mentioned that the students and parents are not considered separately but integratively. The students' parents were interviewed since the family background plays a decisive role in the choice of school type (e.g. Trice & Knapp, 1992). This is further reinforced by the socio-cultural background in India. Students feel the need to fulfil their parents' dreams, and they tend to follow the career paths of their parents' generation (Gupta, 2020; Trice & Knapp, 1992).

These two groups of actors are direct demanders of the PT type of school, which means that PTs are viewed from within the system. This enabled respondents to draw direct conclusions about the choice of school and the attractiveness of the school form they had selected and to explain the reasons for choosing PT. It should be noted, however, that the needs of the group of actors under consideration can be highly diverse as expectations are multidimensional and individually different, so the results represent a rather generalising assessment (Ajithkumar & Pilz, 2019; Regel et al., 2022).

6.4 Methodological approach

In order to address the issue of the attractiveness of PTs from the perspectives of students and their parents, data were gathered in India in the following ways:

- focus group discussions with the students in PTs;
- semi-structured single interviews with students selected from the focus group discussions;
- semi-structured single interviews with the parents of PT students.

Although various training courses are offered at PTs, engineering degrees are the most numerous. Therefore, the study focuses on this field of education. The students attended a three-year full-time course and were in the final phase at their PT.

The interviews were conducted in Mumbai and Delhi in March 2019. The two major cities were chosen because the educational infrastructure was available so that a certain number of PTs could be interviewed. The local selection of PTs was determined by the willingness of the institutions to take part and was organised in cooperation with local partners. In the PTs, scrutinised private and governmental institutions are represented. A total of ten focus group discussions were held in nine PTs. Each focus group consisted of about 20 to 35 students so a total of between 180 to 315 students participated in the phase of data gathering.

The focus groups interviewed consisted of class cohorts. The classes were to be at an advanced stage of their time at PTs so that their choice of school and the attractiveness of PTs could be more accurately reflected. The focus group discussion served to get a first overview of the topic. The interviews were held, recorded and transcribed in English. The group discussions

took place without the presence of the principals or teachers so an influence of these or negative consequences for the students can be excluded or they can express their opinions more openly.

The gender composition of the study is identical to the general gender ratio of PTs. Due to the largely technical educational background, a large proportion of respondents were male. From the focus groups, 33 students were then selected for individual interviews in order to focus in greater detail on important aspects those interviewees mentioned in the group discussions in one-on-one interviews (Caillaud & Flick, 2017). The students interviewed were between 16 and 19 years old. Participation in the individual interviews was voluntary, so that the observation group cannot be described as random.

However, care was taken in the selection of volunteers to include different spectrums of opinion from the group discussion in order to negate the limitation of non-randomised group selection.

In addition, the parents of the students in the individual interviews were interviewed, so a total of 17 interviews were conducted with one parent each. The parents were selected voluntarily after consultation with the students. Most of the parents interviewed did not benefit from higher education, so they often do not have their own personal experience with higher education. The data collection with students (focus groups and individual interviews) was done in English. The interviews with the parents were conducted in English whenever possible or with the help of interpreters. The interviews were recorded electronically. Partial transcripts of the focus group discussions were produced in order to be able to absorb the wealth of information fully.

For organisational reasons, the interviews with the parents had to be conducted at the students' parents' homes. This explains the relatively small sample size, as it is a relatively high hurdle for the respondents to accept an international researcher and translator from a different cultural background into their home for a scientific interview. The interviews with the parents lasted between 15 and 40 minutes. During the interview, care was taken to ensure that the children, i.e. the students of the PTs, were not around the room, so as to avoid influencing the answers.

The parent respondents were mainly male. Their age range was between 40 and 60 years. The occupational groups of the parents interviewed are mixed, e.g. from the retail sector, small business owners, cab drivers, Delhi metro company employees or self-employed. However, some parents also have an engineering background or are teachers themselves. In general,

the respondents are middle class. Some of the respondents did not go through higher education, so they have no personal experience of PTs from their school careers. However, few of the parents interviewed also have academic degrees from colleges, while others have only gone through schooling up to 10th grade. Thus, the parents' educational backgrounds are mixed.

The guidelines for the interviews were set up based on the theoretical foundations discussed above. The categories covered the factors of attractiveness explored from scientific treatises e.g. economic aspects, personal preferences, future plans, family back-ground etc. (Datta & Agarwal, 2017; Emmenegger, 2014; Fidan, 2019; Holland, 1997; Singh, 2012; Super, 1970). To guide and direct the interviews and discussions a semi- standardised set of interview guidelines was drawn up in line with theoretical models, enabling interviewees to speak openly on the areas under discussion but also to expand to areas they considered important (Flick, 2014). Individual interviews with students and parents were fully transcribed and evaluated by using MaxQDA software. The analysis was based on the content structuring qualitative content analysis according to Kuckartz (2014). The categories were set up mainly using the deductive method but were enriched by aspects established inductively.

The results are presented in an order according to the deductively determined categories. Exemplary characteristic statements of the respondents serve to illustrate the results.

This study has certain limitations regarding the low number of participants and their positive self-attribution, which is quite common in India (Jambo & Pilz, 2018). The innovative research topic for India and the personal nature of the questions related to the respondents' life choices clearly make it challenging to obtain a large number of respondents. However, the present study is a first exploratory attempt to address the topic. In further studies, the sample size in particular needs to be broadened.

The individuals interviewed had already made their choice of school. Research shows that a critical reflection of the decisions made by students and parents may not occur (Jambo & Pilz, 2018; Regel & Pilz, 2019). An attempt to minimise this risk was to place special focus on mirroring the answers through targeted question techniques ('What do your friends think about your choice of school?'). Despite these known limitations, students who already attend the school form are the appropriate sample group since many students who do not attend the school form have no or only superficial knowledge about the design of the school form. The questioning techniques and method triangulation and the interviewing of individuals in differ-

ent settings (focus group, interviewing students, and interviewing parents separately) minimised the critical aspect of positive self-attribution as much as possible, although this must be kept in mind when interpreting the research results.

Selecting Mumbai and Delhi as locations for the study, both major metropolitan and economic centres, means that only limited conclusions can be drawn about PTs in rural areas.

In the next section, the attractiveness factors referred to earlier have been illustrated with examples from practice as well as typical statements by the interviewees.

6.5 Findings on attractiveness

6.5.1 Financial rewards

The interviewees considered financial aspects a very important factor. When choosing a certain career and educational paths connected to it, people usually want to ensure a fair balance between work and pay. This aspect was regarded as the most important criterion by almost every single respondent and therefore was a relevant factor of the attractiveness, which the following statement illustrates:

Most important factor I would say [...] first would be paycheck, obviously.
(Student S10)

Earning opportunities are always compared with possible alternatives. Graduates from PTs can expect an average income according to the rank of this school type in the educational system. Their earning potential is limited in comparison to graduates from colleges, which accounts for a lower level of attractiveness of PTs compared to institutions offering academic education. Generally, pursuing the best possible economic options is widespread.

To get a better job with a better salary. I should go for degree [...]. I think the salary package is 15.000 INR per month for a diploma student and for degree it starting 40.000–35.000 INR.
(Student S30)

Also, conclusions can be drawn regarding the relevance of the monetary aspect in society. Most interviewees claimed that income opportunities played an important part in the social discourse and that one's status among family and friends was based on one's income. The following statement shows that the decision for a certain school type and job career is strongly based on this factor.

Monetary aspects seemed to be especially important in connection with the financial situations of families. Direct entry into the labour market is usually preferred when students seek financial independence from their parents or have to support their families financially.

Two things, first of all will be the salary, because of my weak background [...].

(Student S30)

Financial rewards are rated high among parents, too. In their view their children's income reflects their success, and they compare it with that of people from their immediate social environment. The higher the income the higher the attractiveness and the prestige of the job, which is underpinned by a parent's comment:

Income opportunities is major criteria, because they measure the prestige also by the income.

(Parent P11)

Financial aspects play an essential role concerning the attractiveness of school choice, with students and parents carefully considering whether a future job they can obtain with a diploma will guarantee an adequate income.

Indian workers are sensitive to income issues. Even minimal salary differences can cause Indian workers to change jobs. This is why employee poaching is common in India and indicates how important financial rewards are within the Indian context (Kumar et al., 2015). In addition, one's social status is highly connected to one's income (see 6.5.8). Graduates from PTs usually seek an intermediate position in a company, which corresponds with an average salary. Bearing this in mind, one can note that striving for the possibly highest pay corresponds with the attractiveness of PTs.

6.5.2 Job security

Job security also had a high priority for the interviewees. Next to financial rewards, this was seen as a highly significant factor in the choice of training or career. The economic conditions and financial uncertainties in the Indian labour market serve to reinforce the importance of this. The competitive situation is also of particular relevance in the Indian context, as several million young workers enter the market every year (MSDE, 2022), which is underlined by this statement:

Currently speaking there is a lot of unemployment in this country, and job security is on the top of the list, because you literally have to fight for your job.

(Student S29)

The importance of job security can be observed among parents as well as students. They want a secure job for their children, guaranteeing a regular income.

Good job means that job security is there first of all [...].

(Parent P11)

Particularly in the Indian context, job security is seen as crucial since precarious employment relationships are commonplace, for example, in the informal sector (Mehrotra, 2019; Regel & Pilz, 2019). Nor is the right to terminate employment comparatively less employee-friendly in the organised private sector. A job with long-term prospects of secure employment and livelihood is therefore highly attractive in India. This is reflected in the high demand for government jobs in India as they guarantee a high level of job security and stability (NCAER, 2018). After graduation, students can enter a company where they can hold a kind of supervisor position. There is an increasing demand for these positions by Indian companies (Schneider & Pilz, 2019). For this reason, training at PTs can be regarded as attractive given this company a demand for PT graduates and after graduation a secure job can usually be found.

6.5.3 Career advancement

Many students regard graduating with an academic degree as the best chance to achieve advancement in their future job. Since they have already acquired theoretical and practical knowledge in their field of study, e.g. engineering, in the diploma courses, this knowledge can later be used in studies in the same field. For these reasons, it is systemically possible to enter the second year of college, provided that a diploma in the same subject area has been acquired. Many students see the pathway via PT as the ideal way to enter college because they acquire subject-specific knowledge before they start their studies (Wessels & Pilz, 2018) as one student concisely remarked:

Because after diploma it is easier to do B.Tech.⁸

(Student S11)

However, promotion prospects are not only available about taking up a course of study. Furthermore, there is the possibility of working out an internal promotion by entering the labour market early. Nevertheless, many students at PTs preferred the option of taking the direct route to academic education after obtaining the diploma. The students believed they could have better career opportunities by obtaining a college degree. PTs were seen as a bridge on the way to academic education, or as one student put it:

I will study hard in diploma and then I can go into engineering college.

(Student S18)

⁸ B.Tech. (Bachelor of Technology) is an undergraduate academic degree, which is usually directly done after higher secondary school, and which is mainly application- and skill-oriented. Access is granted based on entrance examination. The degree is similar to a Bachelor of Engineering (B.E.), though the latter focuses more on theoretical knowledge.

PTs are of interest to these students insofar as graduation from them opens a way to universities and colleges. Therefore, many students take advantage of the opportunity to complete a PT course in which they already acquire knowledge in their later field of study, for example engineering, to then expand this knowledge in the academic field at college. The attractiveness of PTs is increased by the possibility to enter academic education. However, a direct entry into professional life can also offer various ways of advancement by using internal promotion opportunities. Due to the expanding Indian industry, PT graduates for so-called intermediate positions are being sought after by employers and lured with incentives (Schneider & Pilz, 2019). Since many graduates are the first in their families to obtain a higher education degree, one can also speak of social advancement. Attending PTs offers many career and promotion opportunities and is therefore an attractive option for individuals.

6.5.4 Interests and preferences

Students find a type of school or course attractive if it matches their interests. Many interviewed students considered it essential to take a course that offers pleasure and fulfilment. The respondents indicated that their choice also depended on how their professional interests were matched. With their wide range of courses, PTs provide a good opportunity for this matching. This was confirmed by several students, for example:

You know, I had interest in machines and all since my childhood [...].

(Student S15)

Both students and parents mentioned specific interests and preferences as a criterion, but the students considered this aspect more important as they mentioned it much more frequently. For parents, interests were considered as a secondary factor.

Since PTs offer a wide range of further education courses, including artistic and design courses. In addition to traditional studies such as mechanical and electrical engineering, students can choose a course according to their preferences and interests (Schneider & Pilz, 2019). Many courses in the Indian education system are even exclusively offered at PTs.

6.5.5 Costs of education

Costs influence the decision about what training pathway is chosen. This was evident in the interviews, as most students and parents mentioned cost as a factor. Their frequent reference to this aspect allows to draw conclusions to the current economic situation in India, which was highlighted by this student's remark:

I must say that cost it is a crucial part of education in India. Because most of the people in India, you can say, the economic background of the people is not good [...].

(Student S8)

PTs have a relatively moderate fee structure. However, this depends on whether these are private or governmental, whether the student receives a scholarship or whether financial benefits can be claimed through the reservation system.

After three years of diploma they start earning so that is a very big part for the Indian family. If he is very interested, he can get along with a job first and then go for a degree course. An earning member is very important.

(Parent P2)

Especially given the Indian socio-economic background the cost factor is a substantial component. Costs have a limiting effect on the choice of an educational course. The costs of the children's education represent a considerable amount of the parents' expenses. Due to the lack of a social security system, investment in the education of children is seen as an investment in the future and as a pension guarantee (Gupta, 2020; Bisht & Pattanaik, 2020). However, for some families, the possibility of financing any educational path is limited. The costs of education can therefore be a criterion influencing the attractiveness of a particular educational pathway. The costs of most PT courses are low compared to those of academic courses (Wessels & Pilz, 2018). In addition, there is direct access to the labour market after finishing PT, which means that salary acquisition is possible in the foreseeable future. The fact that the costs for attending PTs are considered moderate according to the respondents and an entry into professional life via a diploma is possible in the near future makes PTs attractive in these respects.

6.5.6 Historical context

British colonial rule in India from 1858 to 1947 significantly impacted the Indian educational landscape (Bellenoit, 2007). Academic education, in particular, is still strongly based on the British model (Singh, 2001). However, the effects of colonial rule are also present in vocational education, albeit not as strongly as in academic education (Lokanadha Reddy et al., 2013).

I think awareness is needed. People in this country are more with the past culture.

(Parent P5)

This factor influences the attractiveness of educational courses since, for example, the pursuit of academic education in India has grown historically as a result of colonial influences (Ahmed, 2016b). As a result, the structure of the education system has been geared toward academic education, while VET has received only marginal attention. In the post-colonial period under Mahatma Gandhi, there were calls for vocational education and training to be given a higher status (Nayana & Kumar, 2019). These factors, which are also strongly related to status and

professional ethics, negatively influence students and parents' views of the attractiveness of PTs.

6.5.7 Cultural and/or religious implications

The caste system in India, although formally abolished by the 1949 constitution, is still present in the minds of the population, as this unique social system has been handed down from one generation to the next for hundreds of years (Bayly, 1999). Activities within the lower occupational spectrum are traditionally assigned to the low castes, while intellectual or academic activities are carried out by Brahmins in the high castes (Singh, 2001). Accordingly, the performance of manual activities in the occupational spectrum is not considered attractive. Caste thinking restricts individuals in their choice of educational opportunities. The resulting self-concepts created and reinforced by the caste system have a self-limiting effect (Singh, 2012). So-called blue-collar jobs enjoy little prestige in Indian society (Jambo & Pilz, 2018). The view of one parent exemplifies this fact:

*In India the people are forced to do engineering.
Family want their sons to be either engineer or doctor [. . .]*
(Parent P5)

PTs, however, because they are designed to combine both practical and theoretical elements, are a middle ground between vocational and academic training, which is why the implications mentioned here only partly apply to PTs. It is clear that religious and cultural implications are strongly related to the status of occupations and tend to dampen the attractiveness of PTs.

6.5.8 Status and professional ethics

The social status of PTs becomes evident in considering the future career plans of graduates. A large number of them expressed the desire to go on to a college or university after graduating with their diploma rather than starting a career immediately. This can be attributed to social and peer group pressure, which one student's statement clearly shows:

Sir, actually I want to do higher education, as some of my friends [are] saying that higher education or a bachelor course is more valuable in our society
(Student S9)

This is particularly the case when the formally requirements for the path to academic education have already been obtained.

Some of my in-laws scolded me like 'Why he has such a nice percentage then why you send him through diploma'.
(Parent P3)

The traditional opinion of the status of VET compared to academic education is strongly anchored in society. There is enormous social pressure, which reinforces the urge towards academic education, as one parent powerfully expressed:

*Another aspect is also there, generally the decisions are crowd-driven. The decisions are not individual [...]. If my neighbour son is doing graduate engineer, that my son also should do graduate engineer. Most of the decision are society-driven.
I tell you that is the crux of the problem [...].*

(Parent P11)

Another indicator of the lack of status is that many people in the general public are unfamiliar with PTs and lack awareness of the options available in the education system, as one student confirmed:

They basically, most of them, most of the people don't know about Polytechnics.

(Student S28)

Social status and social environment are essential aspects influencing career choice in India. Many respondents claimed they had perceived negative reactions from peers and their social environment. This relates to the fact that academic education is still considered the 'gold standard' (Wessels & Pilz, 2018). VET programmes, on the other hand, are seen as a 'second-choice option'. This is also, by association, true for PTs although they are institutions of higher VET education and can be placed between vocational and academic education.

6.6 Discussion: the attractiveness of PTs from the individual perspectives

The paper has shown that individuals consider PTs an attractive option because of factors like job security, career advancement and a wide range of possible specialisations. Nonetheless, there are areas for improvement like teacher training, outdated curricula and the equipment and maintenance of their laboratories (Majumdar, 2016; MSDE, 2022). The lower attractiveness is mainly rooted in society's assessment of PTs, which is determined by factors like historical context, status and cultural implications, by which parents' and students' subjective perception is strongly influenced. These categories are deeply embedded in the society's collective consciousness and can only be altered in the long run. However, some possible steps could be taken to lift the attractiveness of Higher VET and PTs.

What needs reconsidering is India's alignment with the British educational system for historical reasons. A look at other countries, which also have a colonial past and a growing young population, may prove useful. The findings from South Africa suggest that foreign alternative models or policies that can provide solutions to a country's specific problems may prove help-

ful as long as country-specific characteristics are considered. One suggestion here is the introduction of effective governance and administrative systems (Akoojee, 2016). These would be particularly suitable for addressing the structural challenges that reduce attractiveness, such as deficient teacher training. The Indian government has made several efforts to modernise the formal VET sector. The focus has been on quantitative challenges and qualitative problems (British Council, 2014; Pilz & Regel, 2021). The first National Skills Development Policy was the starting point. Various other initiatives, such as the Apprentices Amendment Act followed this. In addition, the Ministry of Skill Development and Entrepreneurship (MSDE) was established, which took over the responsibilities of the former Ministry of Labour and Employment (MoLE) (Pilz & Regel, 2021). The current policy focuses on the Skill India Initiative (Sharma & King, 2019). Skill India integrates various initiatives. Key initiatives include the promotion of public-private partnerships, the National Skills Qualifications Framework and programmes targeting informal institutions (Pilz & Regel, 2021; Sharma & King, 2019). However, various problems such as the complicated governance system, the autonomy of the states with regard to education policy and inefficient administration make it difficult to enforce many of the measures efficiently (Pilz & Regel, 2021).

As to India's religious and cultural background, it is evident that the caste system, officially abolished in 1949, has steadily been losing its importance in Indian society (Bayly, 1999). This was confirmed in this research, in which participants placed little value on this category, which may be at least one indication that the influence of the caste system is naturally fading over time. Nonetheless, it is essential to note that the caste system may continue to play an important role in school choice and evaluation decisions. This may have a stronger influence, particularly in rural regions with more traditional lifestyles, than in the metropolitan cities observed in this study. Thus, social norms such as caste do not have to be the only and decisive factor for the rating of attractiveness, but they can certainly play a role in interaction with other factors and social norms (Singh, 2012).

On the other hand, pursuing higher education has a high potential for motivation (OECD, 2012), not least because the interviewees intended to achieve a higher social status. This aspect has proved to be crucial for the participants in this study and strongly determines the attractiveness of PTs. This may also be related to the fact that the students interviewed were often the first in their families to enjoy higher education. This correlates with the parents' desire for the social advancement of their offspring. Attending higher education is expected to give children competitive advantages in their later educational and professional careers

(Gupta, 2020). This is another reason why classifying and broadly promoting PTs as part of higher vocational education may make them more attractive from the perspective of those seeking education. The reason for this is that some aspects that foster attractiveness are seen as an essential part of Higher VET, like easier access to academic education, which was very frequently mentioned by the students interviewed as a reason for choosing PTs. In addition, a balanced mix of theoretical and practical elements at a reasonably high level, as well as the prospect of direct access to the labour market with favourable career prospects are perceived as signs of attractiveness (OECD, 2012; Ulicna et al., 2016). In particular, the link between increasing the attractiveness of vocational education and training and the expansion of Higher VET should be given more research focus in India. This paper serves as an initial thought-provoking impetus for further research in this regard.

Furthermore, there are signs that the demand for academic jobs, which many respondents had in mind, is becoming saturated. In some cases, college graduates, particularly in engineering, have had difficulty finding a suitable place of employment because there is an oversupply of graduates from these courses (WENR, 2007). On the other hand, there is an increasing demand by the industry for applicants with more practical qualifications. This is the area in which PT graduates can push into, as PT education gives them theoretical and practical experience. This mix, which is an increasingly important factor due to the development of the national economy, is also perceived as important by the interviewees and thus increases the perception of PTs.

Another explanation, besides the cultural and historical implications, for the divergent views – positive perception of this school type from the individual perspective and the somewhat negative opinion from society – is the general public's limited knowledge of the role in the education system and the opportunities that they can offer. Lack of awareness about the design of vocational education programmes is a common condition in India (Pilz & Regel, 2021). Students and parents are often unaware that their interests and preferences are reflected in programmes at PTs. This is especially true for practical interests such as working with machinery, but also in the field of arts, e.g. in the Arts and Design programme. PTs have a wide range of course programmes with different variations. Schneider and Pilz (2019) have comprehensively discussed the functions of the PTs, like offering practice-oriented skill development on an intermediate level or the wide range of possible vocational specialisations, and the embedding of PTs in the Indian VET system. However, access to professional and nationwide career guidance is limited for students and parents in India (Agrawal & Indrakumar, 2014). This is a

key reason why students often take the path they are familiar with and which is socially most accepted, even though alternative options may offer numerous other advantages (Sharma & King, 2019). Therefore, large-scale awareness campaigns and career guidance provisions in schools are essential. By emphasising the opportunities that PTs can offer, the traditionally limited historical and cultural view of VET may well be changed more quickly.

Therefore, PTs can be regarded as a key for increasing the attractiveness of the VET in India if the strengths of the institutions are emphasised more compellingly and if authorities focus more intensely on this school type, thus raising the general awareness of alternative non-academic paths in the field of education. The present study provides a first exploratory insight into this and identifies areas for further research.

6.7 Conclusion

India's socio-economic future is closely linked to its ability to create a competitive and attractive vocational education and training system to skill its large pool of workers and harness its demographic dividend (Mehrotra, 2014). This is necessary to decrease the much-discussed skill gap, which decisively inhibits economic growth. An efficient VET system would offer numerous opportunities to improve the socio-economic situation of the young population, who enter the labour market in large numbers every year. The statements made by students and parents in this study give indications of the factors that are important to students in terms of their educational careers and that PTs can be one of these attractive options; however, only if the various challenges previously mentioned are addressed. Possible strategies to increase the PTs' attractiveness will only produce considerable effects if all key stakeholders cooperate actively, as attractiveness is a multidimensional construct. As a pilot study, this paper provides starting points for improvements by looking at the categories of attractiveness from the perspective of the most important stakeholders from the demand perspective.

So far, there has been little profound scientific discussion of the attractiveness of vocational education within the Indian context, especially none that examines its attractiveness. This study contributes to filling this gap by providing substantial findings, which have been discussed above. However, these findings are only a first exploratory attempt to bring the topic of the attractiveness of vocational training programmes into research focus. In particular, the integrative consideration of parents and students, and thus the demand perspective of educational activities, which is still too little researched in India shows the importance of the present study. The findings from the different categories of attractiveness considered provide

essential insights for reforming and improving the PT school form and the entire vocational education system.

The findings also show that Ajithkumar and Pilz's theoretical construction (2019) needs to be expanded by financial aspects like costs of education or cultural and religious implications as they all have a decisive influence on how individuals assess the attractiveness of a certain type of school. However, its validity may be affected by the participants' potentially overly-positive self-attribution, which is commonplace in India. This could be counterbalanced by surveying actors from other relevant fields. Therefore, in future studies, companies, government representatives, and the various education institutions should be included to validate the assessments of all relevant actors. Additionally, another set of inquiries on how the attractiveness of PTs is viewed in rural areas of India could be established, as the present study was conducted only in the metropolises of Mumbai and Delhi. This shows that this explorative study, which initially brings the topic into the research focus, needs to be expanded in the future. In particular, even larger sample sizes should be considered, and more regions and socio-cultural spheres should be integrated. Despite these limitations, this study can provide a conceptual frame for international vocational education research regarding the evaluation of the attractiveness of vocational education institutions. Finally, its focus on higher VET can be used as a reference in discussing the possibilities of increasing the attractiveness of vocational education in societies facing similar challenges.

7 Article 4: The attractiveness of Indian Polytechnics graduates—An analysis from the (demand-side) perspective of companies and colleges

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Abstract

The paper examines the attractiveness of graduates from Indian Polytechnics (PTs). The attractiveness is examined from the perspective of actors who have a demand for the graduates, namely companies and engineering colleges. To understand the reasons for their assessment of attractiveness, this study uses the concept of institutional logics (ILs) to unveil the inherent reasons behind the stakeholders' perception of attractiveness. To understand the stakeholders' ILs, interviews were undertaken in nine companies and 10 colleges in Mumbai and Delhi. The findings make clear that the companies' and colleges' assessments of the attractiveness of PT graduates are very different, reflecting their own ILs. Companies assess the attractiveness as limited due to the lack of employability of PT graduates. In contrast, colleges view graduates far more positively, as the weaknesses described by companies have less of an impact on them.

7.1 Introduction

In India with its 1.39 billion inhabitants, an enormous workforce is available (UNESCO, 2020). Every year about 15 million people enter the job market, while at the same time many companies look for sufficiently qualified employees, who are needed because of the high growth rate of the economy (International Labour Organization [ILO], 2016b). However, employers cannot unconditionally rely on the potential of the young generation to satisfy their demand. Paradoxically, companies cannot fill their vacancies as many applicants do not have the skills they need (Agrawal & Agrawal, 2017; Majumdar, 2016; Rao et al., 2014). These so-called mismatches are due to the fact that the Indian education system fails to provide its graduates with specific qualifications, which results in their lack of employability. The phenomenon of mismatch can be observed in the academic and vocational education and training (VET) sectors alike (Khare, 2018; Sathiya et al., 2015; Sinha et al., 2019). Several studies have highlighted

the negative connection between the unsatisfactory outcome and attractiveness of education systems. As educational institutions only partly fulfil the expectations of the various actors and stakeholders regarding their ability to develop employability, this can cause their reputation and attractiveness to decrease or be subject to debate (Leney & Green, 2005). This applies both to those demanding qualified employees as well as to students considering further education. In India, research findings on attractiveness are available for Higher Education as well as the VET sector, especially for the Industrial Training Institutes (ITIs) (Agarwal, 2006; Ajithkumar & Pilz, 2019; Jambo & Pilz, 2018; Ratnata, 2013). ITIs offer vocational training in various trades. Students who have completed class 8 of school education, are entitled to enrol for vocational training courses in ITIs (Wessels & Pilz, 2018).

But in contrast to ITIs and academic education little is known about Polytechnical Colleges (PTs), especially about their degree of attractiveness, although they are the second most important sector after the ITIs within the VET system (British Council, 2016). While ITI courses are designed to provide basic knowledge and to get graduates on the labour market fast, the PTs offer much more complex and theory-based courses that qualify graduates for supervisory jobs.

India's education system is—roughly speaking—structured as follows: Primary and secondary education is compulsory for children aged 6–16 (years 1–10). Students taking the exam after year 10 (10th pass) are entitled to doing grades 11 and 12 or enrolling at vocational schools like Polytechnics (PTs). Those taking the 10 + 2 exam (12th pass) can pursue higher (or tertiary) education studies at universities or (engineering) colleges and graduate after further 4 years. Students having successfully finished their 3-year education at a PT can also enter higher education at engineering colleges as so-called lateral entrants, being exempted from doing the first year there (10 + 3 + 3 path). Engineering colleges can either be independent colleges and those affiliated to universities. Technically, engineering colleges do not fall within the ambit of the UGC (University Grants Commission) but the AICTE (All India Council for Technical Education), which is responsible for university education (Wessels & Pilz, 2018). In the future the Higher Education Council of India (HECI) will serve as the single regulator for higher education, as proposed in the National Education Plan (NEP) 2020. All regulatory bodies, including AICTE and UGC will be merged into HECI, which then will act as a single overarching umbrella body (MHRD, 2020).

There are 3.440 PTs with more than 1.5 million students enrolled (MHRD Ministry of Human

Resource Development, 2019b; Schneider & Pilz, 2019). Technically, PTs belong to the post-secondary sector and offer a wide range of training programmes, with the engineering courses (like civil, electrical or computer engineering) being the most popular ones. Admission to the PTs requires the completion of the tenth grade, for certain programmes the completion even of the 12th grade is required. In addition to the most sought-after engineering courses, there are a number of other courses, for example, in management, agriculture or arts. Most courses last 3 years and graduates receive a diploma. Graduates from the engineering course are therefore often called 'diploma engineers'. The courses offered by PTs are based on theoretical training supplemented with practical elements so that graduates are often employed as shop floor supervisors, as they have acquired both theory and practice-based expertise (MHRD Ministry of Human Resource Development, 2019b; Schneider & Pilz, 2019; Wessels & Pilz, 2018).⁹

Attractiveness of VET institutions (e.g., ITIs) from the point of view of students and their parents have been studied before (Ajithkumar & Pilz, 2019). However, what remains a research question is, whether stakeholders of PTs who associate quality mainly with the degree of output and outcome view PTs as attractive, and the reasons for their perception. The recruiters of graduates have a decisive impact on how the attractiveness of a particular educational institution type is generally perceived (Pilz & Ramasamy, 2022). PT graduates either find employment in the general labour market or seek further education at engineering colleges, whose importance has been increasing as an alternative to finding immediate employment (Schneider & Pilz, 2019). Engineering colleges, along with companies, as the main demanders of PT graduates, are key actors in the way the attractiveness of PTs is established. Hence, this paper focuses on the criteria they use to form their assessments. The topic of attractiveness of educational institutions is being widely discussed in education policy in India and has been a longstanding debate. The Indian government has tried to improve the vocational training system in terms of quality and quantity since the first Skill Development Policy in 2009. However, these attempts have failed so far for several reasons. Lack of attractiveness of the VET system has been identified as one of them (Pilz & Regel, 2021). As a result, increasing the attractiveness of the VET sector is one of the main goals of the National Education Policy (NEP) of the Ministry of Human Resource Development (MHRD¹⁰), therefore a scientific examination

⁹ For a detailed portrait of PTs cf. Schneider & Pilz (2019) and Wessels & Pilz (2018).
<https://www.bibb.de/veroeffentlichungen/de/publication/download/9574c>

¹⁰ The name of the Ministry of Human Resource Development (MHRD) was changed to Ministry of Education (MoE) in August 2020 (MHRD, 2020).

of the attractiveness and the factors which constitute it is necessary (MHRD, 2020).

The paper presents findings from a survey with interviews of experts of nine companies and ten colleges in Mumbai and Delhi. In the second section the conceptual framework for the paper including the various stakeholders' understanding of attractiveness and the idea of institutional logics (ILs) will be described. The methodology for the research is outlined in the third section (methodology) and findings concerning the attractiveness of PTs are presented in the fourth section (results). The results are evaluated in the context of the attractiveness discourse in India (discussion), while the last section (conclusion) provides concluding remarks. The paper argues that the two stakeholder groups (engineering colleges and companies) have significantly divergent views on the attractiveness of PT graduates which strongly result from their different ILs.

7.2 Attractiveness and ILs

As mentioned above, the controversy about the attractiveness of vocational education plays an important role in policymaking and is being intensely debated on an international scale (cf. among others Billett, 2020; Lasonen & Gordon, 2009; UNESCO-UNEVOC, 2018; Winch, 2013). The perception of attractiveness influences companies' and students' decisions whether or to what degree they are prepared to get involved in the VET system. To increase the attractiveness of vocational education it needs to be thoroughly analysed with regard to the different stakeholders, individuals, companies or the general public. Although the topic is hotly debated, there is no standardised terminology so that the terms 'attractiveness', 'standing', 'image', 'parity of esteem', and so forth are being used simultaneously (UNESCO-UNEVOC & BIBB, 2014).

Researchers tend to agree that attractiveness is a multidimensional construct, which may be perceived differently by different stakeholders (cf. among others Billett, 2020). Therefore, in this study the concept of attractiveness will be approached via the individual stakeholders' views and opinions. Based on their model of analysing attractiveness, Ajithkumar and Pilz (2019) have examined the perspectives of the most decisive groups (individuals, education institutions, state and society).

This study builds on previous research about Vocational Training Institutes in India (Ajithkumar & Pilz, 2019; Pilz & Ramasamy, 2022) and focuses on actors, namely companies and colleges that judge PTs by their output, that is the capacity of PT graduates. This comprehensive insight is necessary as attractiveness is defined as a multi-perspective construct which is constituted through all the various actors' perspectives. The perception of different actors can

have a significant effect on the evaluation of attractiveness, especially as the different stakeholders' assessments influence each other (Billett, 2020). The (positive and negative) perception of the different actors then influences society's view and the state's willingness to get involved.

The attractiveness of PTs perceived by stakeholders' correlates with corresponding logics which influence and form their assessment. The model developed by Ajithkumar and Pilz (2019) defines terms and categories of attractiveness for different perspectives and attributes them to the various stakeholders. However, it does not provide an analysis of why stakeholders associate their perception of attractiveness with the VET system and its subunits (in this case PTs). But a one-dimensional examination of attractiveness without an analysis of the actors' reasons and needs is not sufficient for this research strategy. Therefore, the above-mentioned model will be extended to investigate whether actors perceive their educational institution as attractive and reveal the logics of their assessment. Thus, the interdependence between attractiveness and logics becomes transparent.

To analyse and empirically examine these logics and their effects, the concept of ILs, which is considered to be the theoretical basis of neo-institutionalism, was used. Friedland and Alford (1991) claim that behind every activity of an individual or organisation there is a central logic like cognitive schemes, routines or scripts which causes the activity and legitimises it. By describing the ILs, which show a specific effect in certain contexts like colleges and companies, patterns of identity, actions and strategies among actors can be identified (Thornton et al., 2012). By correlating institutions, actors and activities, ILs are suited to unveil the inherent logics behind the stakeholders' perception of attractiveness.

With reference to Friedland and Alford (1991) Thornton et al. have defined seven idealtypical categories of institutions: 'corporation', 'society', 'market', 'state', 'profession', 'religion' and 'family' (Thornton et al., 2012, p. 52ff). According to ILs institutions act to secure their legitimation and resources resulting from it to guarantee their existence (Meyer & Rowan, 1977). It should be noted that several logics can occur within an organisation, which can complement or modify or even oppose each other (Zoellner, 2019). Besides, ILs are not fixed but can change in the course of time. So ILs influence the actors' personal perception of the attractiveness of PT graduates.

The companies discussed in this paper generally base their activities on a market logic, that is they strive to maximise their activity and minimise the costs. This logic influences the compa-

nies' procedure regarding recruiting of workforce and therefore their perception of the attractiveness of graduates of certain educational institutions. To secure their competitiveness, companies need employees who are qualified and fit to work in different fields and display a great deal of competences and knowledge. To achieve satisfactory sales returns, their goods and services need to meet a certain quality standard (Wiemann & Pilz, 2020). If PTs can offer graduates who are highly qualified and can be employed in different fields, their attractiveness rises in the companies' view. Quantity is also an important factor, hence companies try to recruit a sufficient number of employees with the qualifications needed to run their specific operational processes to avoid a qualitative mismatch (Pillay & Ninan, 2014). Equally important is the aim to bind the specifically qualified personnel to the company as long as possible, especially if there is a high demand for them among competing enterprises due to their low number (Khare, 2016). Naturally, loyal employees are an important factor for fulfilling the companies' economic targets. Pursuing a cost–benefit policy according to a market logic, companies try to minimise costs in general and wage costs in particular without risking a negative effect on productivity. In terms of that market logic, demand for relatively cheap labour is high (Agrawal & Agrawal, 2017).

To summarise, one can note that companies legitimise themselves by following the rules of the market and striving to realise profit, observing the cost-benefit-maxim. Because of these principles companies are especially interested in staff that can offer a high educational standard, have a good wage-productivity-ratio, show high organisational loyalty and are available on the labour market in sufficient numbers—factors which constitute their attractiveness in the VET sector.

Most PT graduates are taken on by companies and colleges with the latter acting according to their own ILs, of which governmental requirements (state logic) are the most important ones. The state logic aims at increasing prosperity of the citizens and keeping the regulations which are to help fulfil this aim. Providing adequate education is one means to achieve this goal, and educational institutions do that by enrolling and educating students including guaranteeing transition and permeability. Students having a PT diploma, for example, are entitled to continuing their academic studies at a college (so-called 10 + 3 + 3 system), a fact which increases the attractiveness of PTs. The common standard route to college in India is through completion of general secondary education and higher secondary education, which can then be completed within 4 years (10 + 2 + 4). But colleges in India also follow the logic of the market. They try to perform as well as possible in the different rankings to increase their own attractiveness.

As one ranking factor among others is the students' performance, colleges try hard to attract high-achievers (Tilak, 2016), which then leads to a higher attractiveness. Additionally, excellent rankings and certification of educational schemes of colleges enable them to extend their autonomy rights and allow them to act more independently (e.g., in setting up their curricula), which is desirable in the logic of the market (Sancheti & Pillai, 2020). Good rankings also positively affect the race for students, who are an important resource in the highly competitive education sector (Tilak, 2016). Another aspect when it comes to recruiting new students is a high placement rate with companies, which is important for students choosing an appropriate college (Raya et al., 2015).

Competing for students is based on market- or resource-oriented logics. In India tuition fees are common practice, with the number of students correlating with the colleges' revenues. And colleges get financial support from the state for every student enrolled to maintain the teaching infrastructure (Carnoy et al., 2014). At least publicly funded and aided educational institutions receive this kind of financial support from the government, while private institutions are not eligible for state funding. Because of the validity of the formula that a high number of students generates more financial resources one could expect colleges to take on as many students as possible (including PT graduates), with the quality of teaching becoming less important. This would have negative consequences for PT graduates concerning their future employability. This exclusively market-oriented logic would however be balanced by the above-mentioned factors like ranking, placement rates and state regulations. Colleges in India pursue both the specific logics of the state and of the market to legitimise their activities and secure their future existence. These are the reasons why they attach great importance to performance and flexibility when admitting students, and make sure that they fulfil state regulations like permeability.

The logics described are eminently important how demanders view attractiveness. However, some other factors which have not been elaborated here like logics in the field of religion and profession can play a role as well, especially as ILs can complement and influence each other. By describing the actor-oriented ILs the model of Ajithkumar and Pilz (2019) could be significantly extended as the ILs of the receiving side have been worked out within the Indian context. Thus, the interdependence between the factors ILs and attractiveness will be highlighted.

7.3 Methodology

To establish how demanders of PT graduates view their attractiveness experts of nine companies and 10 engineering colleges were interviewed in Delhi and Mumbai in March 2019. The

focus of the interviews was on engineering (like civil, electrical, mechanical or computer engineering) since this branch is the most important and most popular at PTs. Other less essential courses offered at PTs, such as Arts, Design or Business were not considered in this study. On the employers' side companies were selected which recruit PT graduates in the field of engineering. These enterprises represent different sectors like automobile and civil or electrical engineering and have all a long experience in employing PT graduates. Another characteristic is that all companies except one have a workforce of more than 500 employees. Due to their large number, there is a correspondingly high diversity of educational qualifications, which enables them to classify and evaluate the qualities of PTs graduates against the background of employees with other qualifications. The colleges interviewed represent the three different institutions (governmental, private and private-governmental-funded)¹¹ and offer courses which can be directly chosen by PT graduates and which are compatible with their diploma (Wessels & Pilz, 2018). The interviews with both target groups were conducted in Mumbai and Delhi and their surrounding areas as these cities are the most important urban centres in India and therefore have a sufficient number of colleges and companies. Consequently, the findings cannot unconditionally be transferred to rural areas. The sample was put together with the help of local partners from educational institutions in Mumbai and Delhi, who were able to initiate contact with the interview partners. Due to specifically local difficulties finding adequate interview partners, a random-sampling-method could not be used so that they were addressed through a snowball system. The interviews were taped and carried out face-to-face in English apart from one which was conducted via telephone. All interviewees had been informed about the background of the research work and assured that confidentiality and data protection were guaranteed. In the companies, the interviewees were all in senior roles, either managing directors or HR managers, while at colleges, the interviews were conducted with members of the management or senior teachers experienced in the procedure of admitting PT graduates. In cross-cultural research projects the problem of social desirability can occur. This potential bias was counteracted as much as possible by choosing interview partners who did not have a direct connection to PTs and by using an indirect questioning technique (Johnson & van de Vijver, 2002). The interviews were conducted by using semi-structured, theory-based interview guidelines (Kuckartz, 2014). The interview guideline had been devel-

¹¹ The sample contains governmental as well as private and private-governmental PTs. Due to their different ownership structures, they follow different logics, for instance regarding realising profit, which is more distinct in private organisations (Tilak, 2018a). Because of legal regulations in India (Shah, 2015) the methods of realising profit are limited and have to fulfil certain conditions. Therefore, all three types of PTs are regarded as an entity.

oped on the basis of the theoretical concepts described above (Attractiveness, IL). The questions covered the stakeholders' motives to recruit or admit PT graduates and their views of the attractiveness of PTs. The transcription of the audio files was done with the help of the software 'f4transkript' to produce a verbatim manuscript by using basic transcription rules (Dresing et al., 2015). For two interviews where the Indian partners declined to have the conversation recorded detailed manuscripts produced from memory are available. The evaluation of the manuscripts was done with the software 'MaxQDA' and the qualitative text analysis according to Kuckartz (2014). The main categories were determined on the basis of the theories regarding the discussion about attractiveness and later complemented after inductively analysing the material. Then these categories were tested and modified if necessary. Due to the exploratory nature of the study and an open and therefore less standardised form of data presentation was chosen (Lueger & Hoffmeyer-Zlotnik, 1994; Maxwell, 1996). The following part presents the central findings from the interviews.

7.4 Results: Attractiveness of PTs from the perspective of companies and colleges

The categories correspond with the ILs, which are described in the second section (Attractiveness and Institutional Logics). It has become clear that companies and colleges use different logics for their activities so that they need to be presented separately. The factors determining the companies' perception of attractiveness on the basis of market logic are explained first. The following sections (Colleges' perspective) then deal with the attractiveness factors relevant for colleges.

Companies' perspective

Quality of training

For companies the quality of training is a decisive aspect concerning the attractiveness of a specific educational institution. That is why several items have been addressed with regard to this topic. They refer to the discrepancy between the qualifications required and the de facto output provided by PTs:

So there is a big mismatch of what is being taught and what is actually required.

(Interviewee C4)

Companies expect their future employees to have specific qualifications and skills, which are based on market logic because well-trained staff is necessary to successfully put goods and services in the market. The PT graduates, especially those from the field of engineering, are

expected to have a wide range of skills, for instance excellent skills on the machines and processes used on the shop floor. Furthermore, problem solving and communicative competences are needed as PT graduates are primarily employed on the shop floor and in supervision, where they are faced with manifold social interaction. Companies, however, complain about a qualitative mismatch on different levels, which affects the employees' employability:

... if you are asking me as an employer, as an industry, how are they industry ready, I like to say their industry readiness is not much [there] sadly.

(Interviewee C6)

Companies address graduates' qualitative deficits both on the technical and the communicative level and point out the necessity to set up training and induction course to compensate for them:

The amount of education they train at PT is not much industry ready and therefore, that is the problem, so we as industry have to work a lot to make them industry ready.

(Interviewee C6)

These measures are organised by the companies themselves and therefore put a strain on their resources:

So that is my investment, you know cost investment, the time investment and everything the guy gets ready in six months.

(Interviewee C5)

Effect on attractiveness

Due to market logic companies depend on well-trained labour force and therefore expect PTs to graduate their students with similarly high qualifications. If graduates do not meet the companies' expectations, the particular educational institution is rated as not attractive. Especially a lack of communication skills and outdated knowledge are frequent reasons for diminishing the attractiveness of PTs. Then employers do not see in them a suitable chance of finding qualified staff and turn to other ways of recruiting. As in India a high number of degree engineers is available, usually those having a higher qualification take over the tasks of PT graduates and demand a higher salary, which corresponds with their university degree (Choudhury, 2016). If PT graduates are employed, they usually belong to the class toppers, and yet even they need to be trained in terms of work readiness to meet the employer's business needs. Due to the market logic which requires minimising wage costs unskilled workers instead of PT graduates have increasingly been hired, which, however, has affected the quality of products and services. In India the poor quality of the VET sector is a recurring topic (Regel et al., 2022). The opinion poll among entrepreneurs and colleges has shown that these deficits are not only seen with regard to the ITI but also to the PTs and their graduates. (cf. also Pilz & Regel, 2021).

Company loyalty

Company representatives have emphasised the importance of their staff's loyalty to the employer, which therefore affects their view of attractiveness of PT graduates:

I will say relatively diploma holders once they are recruited they will not switch jobs.

(Interviewee C6)

Because of the difficulties for Indian entrepreneurs to recruit qualified workforce the length of their staying with the company is important, especially if the company has invested resources into training and induction programmes. But what is also relevant in this respect is the comparison with graduates from other institutions, mainly with degree holders:

'They loyalty compared to the degree holders is relatively higher, I can say that'.

(Interviewee C6)

Company representatives believe the mainly modest socioeconomic background of their staff is decisive for their higher degree of loyalty because they are forced to work hard to support their families—a factor which is of high relevance especially in India:

'They are loyal because they have a humble background. They need a job and therefor they need to perform'.

(Interviewee C6)

Yet, many PT graduates are inclined to move on to a new job when they have received a better wage offer. Another motive for leaving is the general tendency to acquire higher education, for example by obtaining a college degree if the economic conditions are met:

And after PT they want to [...] go for degree.

[But] only those parents that can afford the degree education post PT'.

(Interviewee C6)

Effect on attractiveness

According the market logic loyal employees who stay longer with a company are an asset for it, which is especially true for a labour market like the Indian with its high competition for qualified workers. Therefore, poaching is widespread (Kumar et al., 2015; Pillay & Ninan, 2014; Pilz, 2017).

A PT diploma has only indirect influence on staff's loyalty towards their future employer. As PT students tend to come from middle-class families or have a modest socioeconomic background (Schneider & Pilz, 2019), they usually depend on the wage from their job and are therefore considered to be more loyal than degree engineers, for example, who more frequently change their jobs. But the tendency to acquire higher qualifications is beginning to weaken

job loyalty and shorten the length of stay with a company. Many graduates see PTs as a stepping stone on their way to college, especially as their diploma guarantees them direct access to the second year at college. Many PT students choose this path either immediately after graduation or after having gained some work experience, unless family or financial reasons do not allow them to realise their ambitions.

Adequate remuneration and productivity

Due to market logic monetary factors are of great importance to entrepreneurs and therefore affect the attractiveness of PTs and their graduates. Employers compare applicants on the basis of different qualification criteria:

[...] the salaries are not as high as that of [degree] engineers.

(Interviewee C8)

Often diploma engineers and degree engineers are compared, with the first-mentioned getting a significantly smaller salary because of their low-value degree. Furthermore, payment is not seen isolated but linked with productivity:

The ration of turnaround will be a little lesser and they will work well, with less salary. In comparison to the degree engineers.

(Interviewee C9)

Another factor is the applicants' qualification profile:

*Why did I prefer a diploma [graduate]?
As I said I wanted somebody with a skill, again together with the package.*

(Interviewee C5)

Effect on attractiveness

In accordance with the logic of the market, labour costs must be adequate in relation to employees' performance to make them attractive for companies. Diploma engineers are usually employed on the shop floor as supervisor and their status within the company's salary structure and job hierarchy is located above unskilled workers and ITI graduates but below degree graduates. Because of the large reservoir of workers entering the labour market in India, companies are in a comfortable position with regard to wage costs (Kumar et al., 2019). And they can easily recruit unskilled workers, who have low salary expectations, and offer them a training on the job to meet the firm's special requirements (see above) (International Labour Organization [ILO], 2016b). For PT graduates the logic of the market means an increasing pressure to lower their financial expectations. Otherwise their attractiveness — regardless of their performance—would decrease and they would be replaced by cheaper workforce. This must be seen in connection with their qualification profile.

Satisfying demand with qualified applicants

Companies hire PT graduates to get employees who meet their expectations regarding specific job profiles:

Now the job of a diploma engineer normally is on the shop floor to control the workers, to give them the needed job and to take the output, the job of the degree engineer is more into planning, quality, R&D such ...

(Interviewee C4)

PTs provide their students both with theoretical and practical knowledge so that they can be employed at the interface where both skills are needed, holding a bridging function between ITI graduates (and unskilled workers), who mainly do manual work, and white-collar degree engineers. This profile, which involves theoretical and practical know-how on a relatively high level, is unique in the Indian educational system. Because of their specific profile they have advantages but also disadvantages in comparison with other employees in the company:

Whether it is maintenance, whether it is manufacturing or something on the shop floor, diploma guys I'm sure that they will outrange the degree guy. No problem there. But if it is a theoretical job, say like design, you have to design a boiler, then the degree guys will outrange the diploma guy'.

(Interviewee C4)

There is a high demand for PT graduates in Indian economy as it has been focussing on developing high quality production processes, and this development requires a larger number of highly qualified people like PT graduates (Pillay & Ninan, 2014). However, there are not enough qualified applicants available. This incongruity is a result of the relatively low number of graduates and the increasing demand. Although PT graduates are considered to be relatively loyal (cf. 4.1.2), companies find it difficult to recruit them in satisfactory numbers as PTs do not qualify enough students who have a specifically needed profile (cf. 4.1.1). Besides, an increasing number of graduates tend to move on to colleges rather than seeking employment immediately (cf. 4.2.1).

Effect on attractiveness

There is both a significantly quantitative and qualitative mismatch in Indian economy concerning demand and supply of a certain kind of employees. In accordance with the logic of the market, companies try to fill vacancies with staff members who have the qualification required and are expected to work efficiently. These people can be found among PT graduates as the PTs provide their students with theoretical knowledge and practical skills at very good standard, which is a unique feature in the Indian educational landscape. This fact is often highly valued by entrepreneurs and classified as attractive. But the VET sector frequently fails to offer

the economy enough applicants, which leads to a decline of attractiveness among demanders, although PT graduates would be attractive for many companies due to their unique qualification profile.

The colleges' perspective

Fulfilling state requirements, especially guaranteeing permeability

Because of regulations of the education system PT graduates are entitled to entering academic courses at colleges. While the classic path to college is still via the 10 + 2 system, which is widely accepted in society, entrance via PTs is gaining importance. Permeability in the education system has become an important issue. Therefore, fulfilling state requirements regarding admitting applicants who did not graduate at a Higher Secondary (12th pass) has become a main concern. Colleges often offer this option to students who had poorer marks in the 10th standard or who did not have the financial resources to pursue an academic career:

[...] now what is happening is, 80% of the guys who do diploma, want to do degree, because human aspiration has changed.

(Interviewee C4)

Because of the state logic and the official requirements, especially permeability, colleges are supposed to admit PT graduates. The latter either apply directly after having received their diplomas or enter the labour market until they have a sound financial basis for continuing with their further education. Some college courses can be done part-time, which usually diploma graduates prefer who used to work full-time or are still working alongside (Wessels & Pilz, 2018). Due to increasing academic ambitions of diploma graduates these are not available on the labour market, which leads to a quantitative mismatch as companies cannot cover their need for qualified staff with PT graduates:

Students have started taking interest in sitting in degree after diploma, the same trend you say last ten years or so, more are going to the higher education other than going to the supervisory level.

(Interviewee ECOL5)

The permeability of the system increases the value of a PT diploma. For instance, some places in the degree courses are reserved for diploma holders. Moreover, diploma holders have the late entrants' status, which means they need not do the first year at college since they are considered to have acquired some basic knowledge in the field of engineering at their PT (UNESCO, 2020).

Effect on attractiveness

The logic of upward permeability in the education sector increases the attractiveness of a PT diploma. Besides, in India, too, the tendency to acquire academic education has become significant, while VET is seen as 'second choice' (e.g., Ahmed, 2016). The reasons for this trend are the chances of a higher income and social standing, better career opportunities and the pressure exercised by the society in general and one's own family in particular (Schneider & Pilz, 2019). For them, the PT degree serves as a bridging function to higher education and is thus attractive to them.

Attractiveness is also given from colleges' perspective. When admitting 12th pass students and also PT graduates, they meet state targets concerning the permeability in education. And they act in line with the logics of the market: bigger numbers of students entail higher financial contributions from the government and higher tuition fees. Finally, the more students there are enrolled at a college, the better its influence and standing within the education system. By meeting the state's requirements, which are based on the colleges acting according to the state's logic, the attractiveness of admitting PTs graduates by colleges is given.

Performance and adaptability

Before PT graduates are admitted to college, they have done 10 years of primary and secondary education and a 3-year course at a PT in contrast to those students who have completed 12th class and can directly enrol at a college after passing an entry test. Diploma holders from PTs have already finished a course in engineering and therefore can rely on basic knowledge relevant for their college studies:

They already learned the technology for three years, so they are technically sound.

(Interviewee ECOL2)

On the other hand, PT students have missed classes 11 and 12 of secondary education, which proves disadvantageous in Mathematics, which is eminently important for engineering students. College representatives also regard them as less competent in the field of language skills like communication abilities than the students having completed 12 years in secondary education:

They do good except for subject like mathematics. Because at diploma level they don't study the mathematic subject in detail which we study at degree level.

(Interviewee ECOL2)

But because of the PT students' high level of motivation and work ethics they manage to make up the leeway:

The [diploma] students, [...] we identify every year that they are more hardworking, because what they have in their mind, we have to compete with these group of students who directly come into engineering and we have come from the diploma, so they have to prove themselves, so they are more hard-working.

(Interviewee ECOL3)

And colleges often offer tuition courses to bridge the gap mathematical skills:

[...] because they miss out these maths basics, so we usually conduct those bridge courses for them, so that helps in building their basics in mathematics subjects.

(Interviewee ECOL2)

All in all, colleges regard the performance of students with a PT background as satisfactory, especially as they successfully compensate for their deficits through accompanying measures. And there are no differences between the two classes of students concerning drop-out rates and graduation grades, which shows that PT students have a high performance and adaptability capacity.

Effect on attractiveness

High achievers are attractive for colleges since they have an impact on their ranking and because they easily find employment. After all, high referral rates and top performance by students considerably contribute to the college's reputation and constitute a striking advantage over competitors in the market. PT graduates, who initially have some lower knowledge in certain fields than 12th pass students, are supported through college-funded tuition courses to enable them to catch up with their peers.

Advantages students from PTs have, are their technical knowledge in engineering, their readiness to work hard and their adaptability. Besides, weaknesses identified by companies like a lack of work readiness are irrelevant at colleges because of the academic nature of the courses. All these factors make PT graduates an attractive target group for colleges.

7.5 Discussion: The attractiveness of PTs and its logics from the demand perspective

The paper examines the attractiveness of PT graduates. The attractiveness is studied from the perspective of the stakeholders who have a need for the PT graduates, namely companies and engineering colleges. For this purpose, experts from nine companies and 10 engineering colleges in Delhi and Mumbai were interviewed in 2019 to assess the attractiveness of graduates. The interviews provide interesting insights to the effect that companies and colleges assess the attractiveness of PT graduates very differently. There are several reasons for this, which are based on the IL of the companies and colleges. Due to the lack of employability of PT

graduates, companies rate the attractiveness as rather low. In contrast, universities view graduates much more positively, as the weaknesses described by companies are less important to them. These observations are discussed in more detail in the following section.

Demanders have developed a varied view of the attractiveness of PT graduates. Companies seeing them as little desirable as employees. The latter do have an interesting qualification profile and could be of additional value for companies because of their theoretical and practical knowledge. However, they are deemed to be little attractive by enterprises as there are some serious quality problems and work readiness deficits, which prevent them from being employed in certain fields. Consequently, and in accordance with the logic of the market, companies are not prepared to offer them high wage packages, which in turn affects the individuals' decisions. They then rate PTs only as a second choice, choosing the direct way to college, which is more promising in terms of salary and social prestige.

According to the logic of the formal education system, diploma graduates are given the opportunity to transfer directly to college without having to complete the 12th class beforehand. The trend towards higher education is also very clear for PT graduates in India, partly because colleges consider graduates to be much more attractive than companies do. While companies often criticise the quality of PT graduates, this is only partly the case in colleges. This is also related to the different logics of the two actors. Colleges assess the attractiveness of PTs more positively, since the weaknesses described by companies, such as a lack of communication skills, have less influence in colleges than in companies. In addition, attempts are made to compensate for the academic deficiencies (such as the less well-founded knowledge in the area of mathematics) through special courses, while this is associated with high costs for the companies according to market-based understanding. By acting according to state logic and fulfilling state requirements, the admission of PT graduates is attractive for colleges, as they can expand their relevance and legitimacy in the education system through an increased number of students and, moreover, can only survive in market-based competition with other colleges if their graduates (incl. PT graduates) achieve positive results.

Competition in the education sector has significantly increased in recent years, especially as much more private institutions have been offering their services on the basis of market logics (Choudhury, 2016). The tendency to take up degree studies after graduating from PTs also has had an effect on teaching methods and contents at PTs. As many graduates want to move on to college, the focus has been shifted to providing more theoretical knowledge, which is of better use at college. So teaching practical skills has decreased, which in turn diminishes the

attractiveness of PT graduates further, as companies rate practical elements especially high for fulfilling their expectations regarding quality. This shows clearly how the stakeholders' different logics and ratings of attractiveness influence each other.

But there is also a downside for college graduates. Because of their high number, especially in the engineering sector, they are increasingly forced to fill job vacancies which used to be taken by PT graduates. Also the unemployment rate among degree engineers has been increasing (e.g., Khare, 2018; Kumar et al., 2005). And because of the oversupply of college graduates a decline of their wages may set in. This in turn could lead to a more positive perception of the attractiveness of PTs for two reasons. Their general concept is highly valued by entrepreneurs, and an increasing number of better qualified employees like supervisors will be needed because India's national economy is undergoing a structural change which will involve more knowledge-based occupation.

7.6 Conclusion

The analysis of attractiveness of PTs from the demanders' perspective appears useful as it reveals how the relevant actors/stakeholders rate them and identify which areas need to be improved to increase attractiveness. This paper shows that the focus on logics is vital to understand stakeholders' perceptions. The various logics of the two actor groups—companies and colleges — underpin their different views concerning the attractiveness of PTs. As attractiveness is a multidimensional and interdependent concept, the actors on the demanding side have a strong influence on how this educational institution (here PTs) is generally perceived. Particularly in the Indian context these actors are highly relevant because the VET system aims at offering a larger number of qualified staff to the labour market. And also, the historic closeness between VET systems and labour market makes the employers' view important (King, 2020). The theoretical exploration of the ILs has revealed that the various logics considerably influence the stakeholders' view of attractiveness (Zoellner, 2019). How the various activities, strategies and identity patterns affect the rating effectiveness has been shown in this study.

The findings show that attractiveness from the colleges' perspective is clearly very strong in contrast to companies, which esteem it significantly lower due to their activity logics. For this reason, attractiveness particularly for this group of stakeholders should be increased. A decisive factor in this respect is enhancing the quality of PTs. The topic of poor quality within the VET sector in India, especially features like outdated curricula and unsatisfactory infrastructure, has been exhaustively discussed (Pilz & Regel, 2021). To improve quality a reform of

teacher training is a prerequisite. Competent teaching staff that have both practical skills, didactic competence and technical knowledge are eminently important (Pilz & Regel, 2021). The quality and attractiveness could be increased if teachers were obliged to regularly gain practical experience in industries matching their subjects, thus learning more about new technologies. Further key elements are introducing employment-oriented curricula and modernising the educational infrastructure.

These improvements would also affect other stakeholders involved as they would, for example, lead to higher wages for graduates and a better social standing, which in turn would influence their choosing a particular type of educational institution. The Indian government has identified vocational training as a key factor for the positive development of the country's economy and taken steps to increase the position of this education sector and its institutions. However, India's entrepreneurs should get much more involved in this process as companies are particularly interested in having their future staff trained according to their needs. Measures like well-structured internships for students on the basis of problem-oriented, hands-on projects and involving industry in developing new curricula would help increase the attractiveness of PTs.

Despite the PTs' obvious quality deficits, companies have a demand for graduates from PTs because of their curriculum, which comprises practical and theoretical elements on an intermediary level. This demand may even rise in the near future. This development has also been considered in the recent international scientific discussions about Higher VET. In several countries schools whose profile is similar to PTs are promoted and considered to be a solution for the skill mismatch (e.g., Canada). PTs have the potential to take over this role if they manage to sharpen their profile, focussing on their original role in the education system, that is, training students on an intermediary level and providing them with employable skills (Schneider & Pilz, 2019). Currently, PTs rather have a bridging function for those seeking academic. This trend makes the graduates attractive for colleges as these students contribute to meeting their logics regarding student numbers and financial resources.

Finally, some limitations of this study need to be pointed out. Apart from a larger set of samples an extension of the area in which the surveys were carried out would be desirable as significant differences between urban and rural regions are likely. It is very likely that PTs play a different role in rural areas, which usually lack bigger industrial companies, and that businesses there pursue different logics. A detailed breakdown of the data of the trades surveyed would be valuable as different lines of business may rate attractiveness differently, depending

on their specific logics. Finally, an analysis of the views of all actors involved, that is, companies, colleges, individuals and the general public, would be useful to reveal and compare interdependencies between the different stakeholders' perception.

8 Article 5: Perceptions of Teachers in Indian Polytechnics: an exploratory Study of the Attractiveness in India in the Higher Vocational Sector

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Abstract

India's (vocational) education and training system is a strategically significant factor in India's social and economic development. As part of the (higher vocational) education and training system, Polytechnics (PTs) are scarcely explored in research. Nevertheless, they represent a fundamental part of the system and can provide particular insights, since they can be assigned to the Higher-VET sector, unlike other school forms of the VET system such as Industrial Training Institutes (ITI). India faces a mismatch situation concerning the labour market and its VET system is intended to address the shortage of skilled labour, but it is only seen as a second-best option, so the assessment of attractiveness and the reasons for the assessment is an important issue. Consequently, this study aims to shed light on the attractiveness of PTs in India. In this context, the paper presents a theoretical foundation by providing an overview of the broad topic of attractiveness regarding different stakeholders (individuals, employers, society and the government). To gain an insight into the perceived attractiveness semi-structured interviews were chosen as the method of data collection, through which 17 interviews with teachers at PTs in Delhi were conducted, as they play an essential role in the VET system. In addition to the general assessment of attractiveness, this also allowed insights into the personal self-assessment of teachers in the VET system in relation to their own situation. The research reveals contradictory findings regarding different stakeholders. The interviewed teachers believe that general education is perceived as more attractive than vocational education and training in society. Teachers believe PTs are attractive regarding the career options, which is also the case for employers, the economy and the government.

Keywords: Polytechnic, Attractiveness, Skill Development, Perceptions, Higher VET, Teacher

8.1 Introduction

Although India has a large workforce available due to its young population and the demographic dividend, the so-called skill gap remains a major problem in the Indian employment market. The skill gap hinders the Indian growth, which is why political actors have recognised the need to solve this problem in order to catch up with other international economies (Badri-nath, 2016; Pilz & Regel, 2021). In order to tackle the so-called skills gap, the Ministry of Skill Development and Entrepreneurship (MSDE) aims to reinforce VET in India. Education and economic performance show a dependence in terms of new economic opportunities as well as improved performance (Tara & Kumar, 2016). Consequently, the training of skilled workers is a high priority for the Indian government to integrate young adults into the labour market (Maitra et al., 2022; Wessels & Pilz, 2018). Despite the great shortage of skilled workers and the resultant opportunities for demanders, India is often said to have a low attractiveness of vocational education and training. This contradiction draws attention to the attractiveness of the VET and its institutions and the reasons for the assessments from the perspective of the people involved. The present study will therefore explore the attractiveness of Polytechnics (PTs). The investigation is to be conducted from the teachers' point of view, as they play a decisive role in the system and can therefore provide a deep insight into the subject matter. In addition, the teachers' self-concept is investigated and how they perceive their own role in the system.

Thus, the paper is structured as follows. The first section introduces this topic, while the second section presents the research focus and provides an overview about the relevant objects of the study like PTs, Higher VET and teacher education. The construct 'attractiveness' as well as the stakeholders of VET are introduced and defined in more detail in the third section. As special attention is drawn to teachers' perceptions, the conclusion has been made to proceed with a qualitative research method, which is introduced in the fourth section. The fifth section then covers the findings of the qualitative interviews, in which the central research results are presented regarding the perception of teachers concerning the attractiveness of PTs, while those results are discussed in the sixth section. Lastly, an outlook is given on the results of this study in a broader context of VET in India.

8.2 Research Focus

Jambo and Pilz (2018) have examined the perceptions of teachers regarding the attractiveness of VET at Industrial Training Institutes (ITIs) in India. Their research concludes that the perception of teachers differs mainly from a broader perception in India's society, which highlights

the different influences and awareness of VET by different stakeholders. As mentioned before, next to ITIs, PTs are also part of India's VET. Whereas a lot of research has been done on ITIs, the research on PTs is scarce. As part of VET in India and as a potential provider for India's demanded workforce, light has to be shed on the attractiveness of PTs. In this paper, the consideration of skills refers to the intermediate level. These include, for example, application-oriented knowledge and problem-solving skills that are taught to PTs. These intermediate level skills are necessary in companies such as supervisor positions, which are often held by PT graduates.

Due to the limited scope of this study, not all the stakeholders (like companies or society) can be brought into the centre of attention. As important actors of school systems such as VET, teachers can provide first-hand information from the schools. Consequently, this paper chooses to further elaborate the perception of teachers in this regard. Thus, the following research question will be examined within the scope of this paper:

How do teachers perceive the attractiveness of Polytechnics in India's education system?

Since, as described above, there are already findings on the attractiveness of ITIs by teachers, these findings need to be compared in order to investigate whether there are differences between the two types of schools in VET and whether the assignment of PTs to the Higher VET has an impact on the differences. Particular attention should be paid here to whether PTs are subject to a different assessment than ITIs due to their assignment to the Higher VET. This leads to the following research question:

Are Polytechnics more attractive than ITIs?

For a theoretical understanding, this paper deals with the concept of the attractiveness of VET and how it is perceived by teachers. In order to be able to evaluate a complex issue such as the assessment of attractiveness, it makes sense to interview experts from the system (Hargreaves et al., 2006; Jambo & Pilz, 2018). Therefore, teachers as mediators between different stakeholders (e.g. between individuals and government) are a good way to approach the question of attractiveness. Teachers play an essential role within an education system such as VET. Several studies show this, for example, Dawson and McLendon (2000) examined the involvement of secondary vocational school teachers in the school-industry link between activities and their changing role in Australia by interviewing 32 vocational school teachers about their perceptions. Harris et al. (2005), also in Australia, conducted 64 interviews, which helped them to analyse how the changing environment affects the work of practitioners in the VET system (Jambo & Pilz).

The influence of teachers on the institution of school and their position as mediators of interests are of great advantage for the investigation of the research question, which is why teachers were chosen as the unit of analysis for this research. In addition to the teachers' general assessment of the attractiveness of VET, the surveys can also provide insights into how they see themselves and how they perceive their role as part of the system, which leads to the following research question:

What is their self-concept concerning their role as a teacher?

The answers to these research questions help to gain an overview of the attractiveness of PTs. In order to make the type of school PTs and the background of teacher training clearer, some selected information about the Indian education system should be given here.

Education has a great status and is perceived as a privilege in India (Singh, 2007). But next to the vast ethnic diversity, a differentiation can be made between the informal and formal sector of education as well as different types of schools, which consist of state, semi-state, and private schools. One part of the education system is the VET-system, in which PTs play an important role alongside ITIs.

Historically, PTs focused on supervised technician training programmes. However, over time they have begun to offer VET courses and programmes that lead to degrees (Norric (Nordic Recognition Information Centres) 2006). Especially the implementation of the National Vocational Education Qualifications Framework (NVEQF) has reinforced access to vocational courses and diploma programmes at a higher level for vocational students at the +2 level.¹² These diplomas can be obtained at PTs, which enables a pathway up to the higher education such as colleges (MHRD (Ministry of Human Resource Development) 2019c). One of the aims, for instance, is the provision of a closer integration of learning and work as well as the encouragement to continue an up-gradation of knowledge and skills (ibid.). There are currently 3,440 PTs with over 1.5 million students nationwide (MHRD, 2019b), providing technology and services not only for people from urban areas but also for people from rural areas. Generally, PTs are approved by the AICTE (All India Council for Technical Education), if they are well equipped with, for instance, lecture halls, laboratories as well as qualified staff. Moreover, these institutions render vital help in developmental work in communities (MHRD, 2019d). After grade 10, students can attend a PT and undergo a three-year diploma programme in disciplines like Civil Engineering, Mechanical Engineering, Electrical Engineering, Computer Science, Medical

¹² Vocational students at +2 level refer to students who have passed 11th grade (MHRD 2019d).

Lab Technology and more. Next to the mentioned disciplines some institutions offer non-engineering disciplines such as Leather Technology, Printing Technology and Sugar Technology. Moreover, PTs exist that exclusively address women. These women's PTs include areas such as Garment Technology, Beauty Culture and Textile Design (Khare, 2016). As mentioned above, the goal of PT intends to create a pool of skill-based manpower to support shop floor and field operation (ibid.). Medium-sized industries prefer these diploma holders for their skills in reading and interpreting drawings, costing and billing and supervision, for instance (ibid.). Next to the generalised 2-year courses, students can additionally obtain a post-diploma. This description of the PTs makes it clear that there is a difference in content to the orientation of the ITIs. While ITIs cover basic training at a lower level, e.g. in the craft sector with 6-month to maximum two-year training courses and are classified at ISCED (International Standard of Classification of Education) level 3, PTs move to a higher level within the VET system. In addition to practical parts, education is also provided at pre-academic level, including theoretical concepts with considerable depth in some areas, which is why ISCED level 4 is applied. Thus PTs, unlike ITIs, can be described as Higher VET. Higher VET programmes offer the opportunity to acquire skills and competences and work related qualifications at a higher level. A degree in the Higher VET offers the possibility to find a more advanced position in a company, e.g. in the intermediate and supervisor area. However, there is not yet a generally valid definition of Higher VET. The classification of PTs as Higher VET and thus the difference to ITIs is of interest because it creates different conditions that can significantly influence the assessment of attractiveness (MHRD, 2014).

In the PTs teachers play a fundamental role, as they have to provide the education to the demanders and must meet the needs and requirements of the education system. In this regard, the Second International Congress on Technical and Vocational Education and Training (TVET) states that the bridge from economic growth to human development needs to be built by qualified teachers (UNESCO, 1999). Ajithkumar (2016) states that the quality of training relies on the quality of the trainer. Consequently, the quality of training impacts the attractiveness of VET. Therefore, teachers are an essential agent in an education system. As the exploration of the role within the whole education system would exceed the topic of this paper, the analysis focuses on the training of VET teachers with regard to PTs. Wessels and Pilz (2018) differentiate between two areas of teacher education which constitutes of general and vocational education. Teaching staff in general education as well as in pre-vocational education needs a Bachelor of Education (B.Ed.) or a Bachelor of Teaching (B.T.). Teachers at the upper secondary level obtain a master's degree in the teaching area they have specialised in.

Teachers at colleges must hold a Master of Education or a doctorate (PhD). For PTs, in particular, the government suggests that teachers participate in short-term training of ten days (Haryana State Board of Technical Education, 2012). The participants may complete the courses in two to three slots. One block has to concentrate on the teacher's field of expertise, and the other slots have to be interdisciplinary, such as management areas (ibid.). Newly hired staff at PTs are either in possession of a master's degree in Humanities or Applied Science, or a bachelor's degree in Engineering Technology. Generally, they have not received training in teaching. In this case, the government suggests training for the faculty in fields such as pedagogy, classroom management or lesson planning (ibid.). Nevertheless, some of the teachers at vocational schools have obtained training in Central Training Institutes (CTIs). Graduating with an Instructor Training Certificate, teachers have undergone one-year courses providing training in skills development and principles of teaching (Norric, 2006). Furthermore, faculty members have to participate in annual seminars, conferences or workshops, which are supposed to be organised by every affiliated institution once a year. If seminars or short-term courses are not funded through AICTE, the schools mostly cover the costs (Haryana State Board of Technical Education, 2012). Moreover, it is relevant that teachers have not only an academic education but also knowledge of the working systems and processes within their field of expertise (Ajithkumar, 2016). In the case of India, this would suggest that India's VET teachers need to be aware of the labour market situation in their domain. Furthermore, they need to train students accordingly to the needs of the labour market in India. Despite the required level of qualification that the government foresees for teachers, empirical findings show that not all the teachers are as qualified as required. Only 40% of 55000 instructors at VET schools have undergone professional training (ibid.).

8.3 Theoretical Approaches and existing studies on Perception of Attractiveness

Since a brief overview of the relevant objects in the Indian VET system has now been given, the attractiveness as a central aspect of the study will be defined below and it will be explained why the investigation of the attractiveness of PTs has a high relevance and why stakeholders and the self-concept of the teachers are important for the consideration. The concept of attractiveness is a complex and multidimensional construct and therefore, challenging to define. There is no integrated model for the VET sector, although the issue of attractiveness is highly

relevant and recurrent (CEDEFOP (European Centre for the Development of Vocational Training) 2014b). However, several scholars have dealt with partial aspects of attractiveness research.

First of all, it becomes clear that the consideration of attractiveness must be multidimensional, i.e. via different stakeholders, since different groups perceive attractiveness differently. Consequently, it can be summarised that the attractiveness of VET lies in the eyes of the beholder and is, therefore, subjective. Berger and Pilz (2009) and Winch (2013) on various stakeholders of VET who perceive and influence the attractiveness of VET differently. Whereas Leney and Green (2005) focus on the way how VET is designed to meet the stakeholders' needs, the benefits of VET regarding different stakeholders is elaborated in the research of Berger and Pilz (2009). Within their study they presented (1) benefits of companies, (2) social and public benefits, (3) economic benefits and (4) individual benefits for participants of VET (Berger & Pilz, 2009). The model explicitly portrays the benefits of a range of target groups specifically in the context of vocational training. It has no specific country focus but can be adapted to local conditions. This stakeholder model makes it possible to assign respondents' statements to stakeholders and facilitates the evaluation of the collected data and that is why it was used in this study. The teachers as internal actors of the school or PT have an overall view of the various stakeholders and can therefore give a realistic assessment of their perception.

A countries' government mostly finds VET attractive at an economic level as it is the case for the Indian government. VET could reinforce positive outcomes on wages and employment opportunities and, as a result, reduce unemployment (CEDEFOP, 2011a). However, a government needs to analyse and weigh the benefits and costs in an economic and social sense as well as in a political context (Winch, 2013). A government can influence VET through various instruments that give them the possibility to positively influence the supply such as suitable investments in buildings and equipment, curricula and comprehensive governance. Furthermore, trusted qualification structures as well as qualified teachers can be provided in this regard (ibid.). The actions of the government can then influence the stance of employers, whose lack of request for VET graduates is one of the barriers of the attractiveness of VET according to Winch (2013). Even though there is a demand of skilled workers in countries like India, mostly the inadequate return of investments is one of the barriers that hinders companies from employing VET graduates. Consequently, it is more likely for employers and organisations to invest in their own employees if a positive outcome is guaranteed (ibid.). Even though different stakeholders exist, they cannot be perceived separately from one another. Thus,

companies' perceptions on VET influence potential VET candidates and vice versa. Winch (2013) states that there is a natural relationship between the employer demand for VET qualification and the individual demand for VET courses.

Nevertheless, the attractiveness from an individual point of view mostly relies on the desired qualification and the chance whether one can find a well-paid job and prospects for the future (CEDEFOP, 2011b). This, on the other hand, is simultaneously influenced by the perception of families and society itself (Winch, 2013). Parental influences have a significant impact on children's career choices (Tuli, 2012). Parents, for instance, who participated in a VET programme are more likely to influence their children towards VET compared to parents who were not involved with VET (CEDEFOP, 2011a). It can be stated that general education has a better status in society than VET, which is underlined by empirical findings. An explanation could be drawn onto India's historical development, in which only the higher castes had greater access to general education than others (Bayly, 1999). The way VET is perceived depends on the individual's environment, which is influenced by religious affiliations, historical as well as cultural influences such as India's caste system (Singh, 2007).

The way VET is perceived by an individual depends on the individual's environment, which is influenced by religious affiliations, historical as well as cultural influences such as India's caste system. Furthermore, institutions such as schools and their teachers are categorised as stakeholders. According to Winch (2013) the attitudes of schools play a major role in terms of the attractiveness of VET. Especially, the schools' knowledge and awareness of the labour market can be linked to the attractiveness of VET. Schools in countries like Germany or France, for instance, have secure connections to the labour market and therefore an implemented vocational orientation in secondary education.

Little research exists concerning the attractiveness of PTs and VET in general. In India, most of the research focuses on quantitative data, such as drop-out rates or enrolment rates. Jambo and Pilz (2018) explored teachers' perception of the attractiveness of ITIs in India, which offer a more fundamental kind of VET compared to PTs. Their findings conclude that VET in India does not have a good reputation in broader society (Jambo & Pilz, 2018). However, most of the interviewees perceived it as a convenient alternative to general education for students, especially in terms of starting their own business. Moreover, some teachers also stated that the job opportunities for ITI students are better than for University graduates (*ibid.*). In this case, the main problem is the employment of temporary teachers, who are less qualified (*ibid.*). Okada (2012) additionally states that general education is perceived higher in society

and that VET is perceived as the second choice. This perception is also underlined by Agrawal and Agrawal (2017), who state that poor labour market outcomes are associated with VET within the Indian society. Their research examined VET from a labour market perspective, which poses that even employers think that they would be better off by recruiting young individuals from a non-vocational stream (Agrawal & Agrawal 2017). Schneider and Pilz (2019), on the other hand, state that the broad range of specialisations at PTs benefits companies as they do not have to invest a significant amount of time on newly recruited diploma holders regarding their on-the-job training. Their research on the embeddedness of PTs in the Indian education system shows that jobs such as supervisor positions are typical for diploma holders and in demand in the labour market (Schneider & Pilz, 2019). Furthermore, their findings show that PTs offer the possibility to pursue a higher degree or become an entrepreneur (ibid.). Most of the results of previous studies on the attractiveness of vocational education and training relate exclusively to the perception in relation to ITIs. Since PTs, as explained above, are part of the Higher VET, it is important to check whether the findings on attractiveness found for ITIs also apply to PTs. Therefore, this study focuses on the perception of PTs itself and explores its attractiveness in the Indian education system.

Besides the attractiveness of the school form, the self-concept of the respondents, i.e. the teachers, also plays a role in the assessment. Just like attractiveness, self-concept is a complex construct that has approaches from various sciences such as sociology, philosophy and psychology. Self-concept is about how individuals describe, evaluate and understand themselves. However, self-concept is also related to the social environment, because this is constituted by interactions with the environment since early childhood. Moreover, the idea of self-concept is contextualised by various social and historical dimensions such as caste or class (Dyer et al., 2004; Joy & Kolb, 2009; Nissilä et al., 2015; Pilz et al., 2022). Furthermore, the expectations of society with regard to self-concept are important, as well as how the teacher sees himself as part of the school organisation (Baumeister, 1987; Mead, 1934). As is the case for other stakeholders, teachers' assessments are strongly influenced by their personal backgrounds, their own educational histories, their family relationships, their origins, and their religion or caste. These personal backgrounds can strongly influence their assessments and self-perceptions.

8.4 Methodology

A qualitative research approach has been chosen for this study as it aims to reveal detailed descriptions of the attractiveness of VET regarding the stakeholders, teachers' experiences and their perception of PTs and their self-concept. The teachers in India were recruited

through local partners in Delhi. In the course of the research, 17 interviews were held at four different PTs in Delhi. Three government institutions and one private PT were visited in two weeks in January 2020. Since this work is an explorative analysis of perceptions of PTs from the perspective of teachers at Indian PTs, no nationwide total survey was intended. Accordingly, the field of inquiry is limited to Delhi. Delhi, as the capital, represents an industrially developed and metropolitan region of India. However, it must be noted that India is a heterogeneous country due to its size in terms of territory and population. English language was used for the medium of communication. Semi-structured interviews suit this study as the interviewer gains insight into individual perceptions. The semi-structured interview questions were included in an interview guideline. The guideline included 28 questions with categories like the general perception of VET, the reasons to become a teacher or the perceptions with regards to different stakeholders. The categories related to the stakeholders were deductively derived from the model of Berger and Pilz (2009) and constructed in such a way that teachers can adopt the different perspectives of the stakeholders like society, companies or individuals (see section 3). In order to examine teachers' understanding of the attractiveness of VET in relation to their own situation as teaching staff, the categories were structured in such a way that the individuals' point of view, self-concepts and attitudes, could be worked out. The data was transcribed and analysed by using qualitative content analyses according to Mayring (2014). Since the interviews dealt with attitudes and personal insights to the attractiveness of PTs, particular care had to be taken not to question or evaluate the professionalism critically and the opinion of the teachers interviewed. Furthermore, additional methodological and ethical considerations were used by conducting interviews for a cross-cultural environment (Peters & Giacumo, 2020). For example, the questionnaires were pre-screened by local researchers for cultural sensitivity, special consideration and respect was given to cultural beliefs, the researchers' own cultural experiences and expectations were reflected upon in advance, and culturally sensitive interview techniques were used.

8.5 Findings

In the following section, the results are examined by interpreting the interviews according to the research questions mentioned above. The findings are divided into two parts. The first part refers to the attractiveness of VET in India and is structured by the four analytical categories that are derived from Berger and Pilz's model (2009), namely Companies, Role of Government, Individuals and families and finally Society. The second part then refers to the teachers' self-concept and their individual status.

Companies

Teachers think that the way and quality of their teaching, as well as the reputation of PTs, contribute to the perception of companies and society.

It depends on the name also. Some institutions have been in demand. It also depends on the placement if they have a good placement (rate and connections).

If they have a good name in society; otherwise, society does not generally consider their child to get (an) education at a Polytechnic.

(Interviewee A2)

Companies are interested in PTs as they require qualified workers which PTs provide. The findings suggest that the job opportunities for diploma holders are perceived as positive. The reasons for this are, on the one hand, the practical knowledge that PT students have acquired through their training at PTs. On the other hand, companies find the lower wages of diploma holders attractive compared to those of degree graduates.

Because they are in between worker and higher level, they are intermediate level. They can work as (a) supervisor and junior engineers. So, they are (a) lot of vacancies. Industries also like the diploma students, because industries can pay them less compared to graduates or M.Tech students.

(Interviewee P3)

The interviewed teachers, however, stay in close connection with companies and former students and receive positive feedback from both sides.

For the diploma courses, companies are satisfied because they need (a) technician. And for being a technician, the basic requirement is (a) diploma. [...] They are well equipped.

They gain a lot of knowledge and precision.

(Interviewee A3)

Nevertheless, some companies invest in newly recruited students as they train them for their own needs. Some of them even established their training institutions which could be an indicator that they are not as satisfied as some teachers believe them to be.

It can thus be assumed that a connection exists between the quality of PTs and the companies' satisfaction.

Role of the Government

Although the theoretical research shows that the government is interested in VET in order to meet the country's needs in qualified workers, the results pose the opposite. Besides the fact that the government tries to reinforce students to attend PTs, which can be assumed by the

high number of students in a class, the lack of teaching staff and the need of more space suggests that the government could spend more monetary resources on the development of PTs in terms of buildings and qualified faculty.

Because our government is focusing too much on structural aspects. Now we are floating too many courses. [...] We are running three sections. The market demand (of skilled workers) is higher. So, the government pushes (our institution) to take more students on. We are running two shifts in the morning, one shift in the evening and one shift in part-time also. [...] So, we are providing courses from 6 am to 9 pm in the evening. So, they are also older persons 40 years or 50 years. Because we have an incapacity (of space and teachers).

(Interviewee P4)

Numerous political initiatives also illustrate that the focus of government agencies is increasingly directed towards the VET system and its institutions, which shows the growing appreciation for VET within the government (MSDE, 2019).

Individuals and families

According to the teachers the families and students were perceived as happy and satisfied with the education in the PTs, which has several reasons. PTs seem to enjoy a high reputation due to the existing job opportunities for students in the PT field in India. Also, the skill training that is part of the PT education is valued by the individuals as it makes them stand out in the labour market. However, the perception of students and their families stands in a discrepancy with the general perception of PTs. The general societal perception of PTs will be pointed out later in the chapter.

The length of the diploma courses, as well as the cost, seem to be suitable factors for students and their families. According to the responses, the students mostly come from low class and middle-class families, who cannot afford to send their children to colleges in order to pursue a degree. Additionally, a PT is preferred as the students get a diploma at a young age and can, consequently, start working at a young age to support their families. Most of the teachers do not interact with the students' families. Nevertheless, some of them mentioned that families feel satisfied with the education and jobs that their children attend. Other teachers, on the other hand, mentioned that aspects such as poor infrastructure and the lack of equipment lead to dissatisfaction among students and their families. Additionally, some teachers pose that self-employment is an additional reason why students perceive PTs as attractive. Nevertheless, some students want to improve their knowledge and want to pursue a degree. However, some teachers pose that diploma holders find a job quicker as they are cheaper for the companies. One teacher even referred to her situation as she explained:

I had also struggle to get a job and I have seen it. I am a degree holder and those who were diploma holders were getting jobs earlier.

(Interviewee A2)

This shows that teachers believe, that there are more job opportunities for diploma holders than for degree holders, which has a positive influence on the attractiveness of PTs.

Society

Within the Indian society, VET and their institutions like PTs do not enjoy a high reputation according to the results as well as previously explored studies. It should be noted, however, that the view of society presented here is a very condensed and generalised view due to the narrow focus of this study. Indian society is very heterogeneous in terms of religion, caste, education level, levels of wealth, and so on (Singh, 2001). An explanation could be given by examining the people who visit PTs. The target population at PT refers to students from rather poor socio-economic backgrounds, who might set their surroundings as a benchmark when assessing their career opportunities. Furthermore, India's profoundly rooted history might still influence the perception of VET, which is still perceived as a second-best choice. According to the responses of this work VET enjoys a low reputation in society.

Society has a very basic opinion, not a very good opinion on Polytechnic.

They think Polytechnics degree is not enough for student's career.

(Interviewee A4)

Consequently, it can be concluded that general education has a better status in society than VET, which is underlined by empirical findings.

Teacher's Self-Concept and Individual Status

In addition to the teachers' assessment of the various stakeholders, light will now be shed on their own assessment of the PTs, their background and their role in the system.

Concerning the teachers' personal education the degrees of the interviewees range from a bachelor's degree to a PhD. Some of the teachers also visited a PT to obtain a diploma and used the pathway to higher education. It can be concluded that some of the interviewees had worked in different jobs before they became a teacher at a PT. Most of them worked within their field of interest, in which they also obtained a degree. The jobs mentioned range from technician, chemist to an office worker or science assistant. As a result, some of them gained work experience in relation to their subjects. Regarding the preparation as a teacher, different perceptions can be observed. Some teachers claim that they receive mandatory short-term courses each year, which address their subject as well as teaching methods. Others, on the other hand, say that no training is provided. At this point, it needs to be highlighted that those

who mentioned that no training was provided belonged to the private institution that was visited, which underlines a difference between private and governmental PTs. Nevertheless, most of the teachers said that no specialised training was provided at the beginning of their teaching career except one. One of the teachers studied a Bachelor of Education, which included one month of practical training at a school in general education.

As reasons for the choice of school the teachers feel that they are addressing the country's needs by training the workforce that the market requires. Some of the teachers mentioned that the interaction improves the knowledge of the students and vice versa. Moreover, the working hours and the time for leisure activities are additional aspects that teachers described as attractive.

Next to all the mentioned benefits there are also some challenges according to the interviewees. Some teachers mentioned that due to the high number of students and the lack of teaching staff, the quality of teaching suffers. The number of regular teachers is a problem that most of the institutes face. Some teachers complain about substitute teachers who do not take their work seriously. Therefore, teachers wish to have a higher number of regular faculty. Next to the low number of teachers stands the high number of students. The overcrowded classrooms were mentioned as challenging by most of the teachers. Furthermore, the equipment was another aspect of improvement. The latter can be underlined by the empirical findings which note that the lack of equipment and the lack of qualified teachers are commonly found at vocational institutions (Okada, 2012). For some of the interviewees, it was the first job so it could be possible that they could not compare it to other institutions that are well-equipped.

The teacher's status is generally perceived as positive and valuable. They feel that they are respected in the Indian society. Nevertheless, this does not only depend on PTs, specifically. Most teachers believe that a teacher is highly valued in Indian society regardless of general or vocational education.

When my mother in law tells [other people at a gathering] that her daughter in law is a lecturer at Polytechnic. They are happy with it. I get positive responses. And most of the times they do know about Polytechnics; that there are Polytechnic courses.

(Aidtya: Interviewee 2)

In general, a teacher is perceived as pure and honest according to the responses. Nevertheless, some teachers are convinced that a technical teacher is more respected while others believe that a teacher in general education is more respected.

However, the methodological approach has to be born in mind as solely teachers at PTs were questioned within the scope of this research. Some of the interviewees became teachers due to different conditions other than the pure conviction to become a teacher. Nevertheless, some teachers came from teaching backgrounds and have also obtained a diploma and have actively chosen to become a teacher at a PT. Thus, it can be assumed that the attractiveness of PTs influences this. Furthermore, being in a government job secures safety and benefits as the unemployment rate in India remains high.

Regarding their situation, teachers perceived PTs as attractive. Furthermore, they perceived VET as an essential system for the society and the labour market. Nevertheless, only a few actively chose the path as a teacher at PT. For others, it was at first solely the decision to be employed as no other option was in sight. However, all the interviewees enjoy their job as a teacher, which is a promising outlook for the future development of VET.

8.6 Discussion

The study on the perceptions of the attractiveness of PTs among PT teachers in Delhi aimed to shed light on the perceived differences between different stakeholders as well as on the self-concept of the teachers. Furthermore, the available results can be compared with already existing studies on ITIs.

One of the most important findings concerns the general perception of PTs from society. Based on their personal experiences, teachers believed that VET, including PTs, is not highly valued in broader Indian society. General education still perceives a higher reputation within Indian society as vocational education is mostly perceived as craft and physical work, which does not enjoy a high reputation. This perception is still deeply rooted in the Indian society. This assessment of low attractiveness expressed by teachers is remarkable as it is contrary to the opinion of other stakeholders. Furthermore, no differentiation between VET and Higher VET can be identified, although this could have been expected, since education at Higher VET institutions offers more chances and opportunities for graduates. In particular, participants in PT courses and their parents consider PT education to be attractive and conducive for finding an adequate job. Notably, the good placement opportunities and the chance of adequate self-employment are a decisive factor for the attractiveness for parents and students. According to the respondents, companies also share this positive assessment, as they value the employability of graduates and their practical knowledge. Nonetheless, the assessment would depend substantially on the quality of the educational institution. In relation to the government, aspects such as the provision of guidelines and equipment were mentioned. These aspects,

however, do not yield information on the government's perception regarding the attractiveness of PT. As the government aims to meet the mismatch situation through VET, it can be presumed, on the one hand, that VET is regarded as attractive by the government. On the other hand, the overcrowded classrooms and the lack of a certain amount of qualified faculty propose that the government could invest more effort regarding PTs. Here, the Indian government in particular must proceed with caution, as many approaches introduced in the past were not sustainable and the will to invest in TVET was not strong enough (Schneider & Pilz, 2019). In particular, care must be taken to ensure that the government's focus is not only on quantitative benchmarks, but also specifically on advancing the qualitative component of skill training to increase the attractiveness of PT education (Ramasamy et al., 2021).

Moreover, the perception of each stakeholder influences the other, and therefore they cannot be looked at separately but must instead be set into context (Berger & Pilz, 2009). As stated in the literature review, the concept of attractiveness is perceived and influenced differently, which can be underlined by the results of this paper.

A comparison of the teachers' self-perception as opposed to the stakeholders' external perceptions is also of interest. As described in the results, the teachers are largely satisfied with their work in the Polytechnics and feel acknowledged, this also applies to the satisfaction of the students. What is most significant is that both actors are in direct contact with the PT, i.e. they experience the advantages and disadvantages of the institution directly and personally. While the critical assessments of the attractiveness of the PTs come mainly from society, which to a large extent has no direct contact with the PTs and only reflects traditional opinions without knowing the possibilities of the PTs in detail. This shows that only marginal distinctions can be made between VET and Higher VET in this regard, as the above facts also apply to ITIs.

Another key finding refers to the institution. Although the teachers were highly qualified, the overcrowded classrooms, the maintenance of equipment as well as the outdated curriculum prove to be quite challenging in their everyday life. Nevertheless, due to close contact to former students and companies, teachers perceived their students' career opportunities positively especially in comparison to students from general education, which depends on the reputation of the institution as well. The conditions and offered programmes were perceived as useful and attractive for young people. This view stands in discrepancy to the literature (e.g. Ajithkumar, 2016; Majumdar, 2016; Okada, 2012; Pilz et al., 2022; Pilz & Gengaiah, 2019), which possesses that VET in India suffers from outdated equipment and insufficient teaching

quality. Furthermore, the shortage of instructors is a significant influence on the quality of teaching.

Of particular interest are the available results on estimates of the attractiveness of PTs against the background of existing surveys on the attractiveness of ITIs. As mentioned, both institutions are part of the VET system, although PTs can be added to the Higher VET (see above). Compared to the findings of Jambo and Pilz (2018), similarities can be analysed towards both school forms regarding the interviewees' perceptions, skills-development as well as job opportunities. Both studies pose that the institutions in question are perceived as attractive by the interviewees (Jambo & Pilz, 2018). We can also note some differences between vocational training in ITIs and higher vocational training in PTs in terms of the programmes and certificates awarded by the institutions. Whereas with the ITI degree a certificate is obtained which entitles the holder to move directly to the labour market or to register at the PT, with the Certificate Polytechnic, which is widely known as a diploma, it is also possible to enter the job market, but in a higher position (e.g. supervisor level) or even to transfer to the engineering college.

It is evident from the results of this research project that some students visited an ITI before pursuing a diploma, which indicates a close connection of both institutions. Based on the findings provided, it cannot be stated whether a PT is perceived as more attractive than an ITI. This seems remarkable, as PTs generally provide higher educational qualifications and should therefore be more attractive. There can be various reasons for this. For example, studies have shown that informants rate their own institution, either ITIs or PTs, and their individual position in such research more positively (Joshi et al., 2014). The situation is similar when respondents are not familiar with research approaches. They tend to give more positive answers, assuming that this is what field researcher from abroad would like to hear (Ritchie & Lewis, 2003).

8.7 Conclusion

An analysis of all mentioned stakeholders' perception on the attractiveness of VET would exceed the frame of this work, but closer look at any educational system reveals that teachers are important actors within school systems. Therefore, they play a significant role in terms of the attractiveness of VET as well. The present study provides a clear statement from teachers about the attractiveness of PTs. VET is a strategically significant factor in India's further social and economic development.

Results show that skill training is still not seen as a desirable solution by society and various stakeholders in India and is therefore not considered very attractive. Theoretical and academic education is still considered the gold standard (Wessels & Pilz, 2018). Skill training, which is possibly still related to manual activities, is mainly attributed to lower social classes (Singh, 2001). This assessment is made especially from the point of view of society, in which vocational education or skills training enjoys a bad reputation, although skills training offers young people more and more opportunities for the future. As a result, skill formation has long led a backseat, as it has not received much attention from government authorities. Accordingly, the quality of skill formation institutions was also negatively impacted. This shadowy existence is slowly changing, which is reflected in the assessments of the business community and families of students.

As mentioned, PTs are part of the Higher VET sector. This sector in particular can play an important role in India's future development. This is shown by the international trend, according to which Higher VET is becoming increasingly important in many countries, including the United Kingdom. There are several reasons for this for example to ensure connectivity to academic education. PTs as links between VET and academic education are of great importance from a systemic point of view and have numerous international role models, such as the *Berufsakademien* in Germany or the Higher Diplomas in the UK (Deißinger et al., 2013; Young & Raffe, 1998). Good permeability and well-linked connectivity to education programmes enables the targeted training of skilled workers and the efficient use of opportunities for those who need education. Moreover, it is clear that economic progress in India is leading to a slow but steady transformation of the national economy. Therefore, from an organisational and technical point of view, an upgrading of the skills of the workforce is necessary, as more complex and versatile work is required. Here the PTs provide many opportunities for upgrading skills and act as a link between VET and academic education (Raffe & Howieson, 2013).

In this respect, recommendations for future studies could be conducted regarding different perspectives. A focus could lie on more stakeholders like companies for instance, after which a comparison could be drawn onto existing studies to see if and how the perceptions of the different stakeholders vary. In a further step, former PT students could be interviewed to reveal their experiences in terms of job opportunities as well as on-the-job training when in employment. In addition, the attractiveness of PTs could be examined in pilot studies to see if it can help to make the education system in India more inclusive in terms of gender, class, and castes (Bagde et al., 2016).

At this point, it has to be noted that the results have to be carefully interpreted. The study solely focused on a small sample of teachers at PTs in Delhi. Due to the small sample focusing on teachers only and just in one region in India, the interviews offer a very restricted insight into the perception of attractiveness. For future data collection, which will extend the exploratory character of this study, further regions (urban vs. rural, industrially developed vs. less developed) in India have to be included in order to get a broader picture of the perceptions of the teaching personnel in Indian PTs. In the scope of stakeholders, it is evident from the results that families, companies, the society and the government perceive the attractiveness of PTs differently. Moreover, it can be concluded that they influence the attractiveness in different ways, which stands in alliance with the concept of stakeholders of VET.

9 Article 6: Theory and Practice of Teaching and Learning in the Classroom – Lessons from Indian Industrial Training Institutes

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Abstract

In India, the Industrial Training Institutes (ITIs) are a vital part the Vocational Education and Training (VET) system. Previous research reveals that in addition to some other problems, it is the strongly theory-based training that impedes the transition of VET graduates into the labour market, and leads to a lack of work-readiness in young graduates. Since there is still little empirical evidence about the actual forms of teaching and learning in Indian vocational schools, this paper will examine how the learning processes in ITIs in Delhi, Coimbatore and Mumbai take place. To identify the relationship between the theory and practice of training, teacher interviews were conducted, in order to specifically examine the teacher's beliefs and behaviours as well as classroom observations to supplement the interviews. The evidence gathered supports the thesis that ITI training is theory-driven and teacher-centred, that training is very often not practical and application-orientated, and most ITI teachers in the examined institutes have limited knowledge in the field of micro-didactics. Content knowledge and repetition of facts are more common than problem-based and learner-centred teaching.

Keywords: Vocational Education and Training (VET) – India - Industrial Training Institutes (ITIs) - Teacher's perspective - Student-centred learning - Problem-based learning

9.1 Introduction

High expectations are placed on Vocational Education and Training (VET) institutions (CEDEFOP, 2011b). Individuals expect an education that promises them good opportunities on the labour market, while companies are asking for qualified employees who can productively implement their business processes. Moreover, a functioning VET system can combat social inequality and be central to a country's social and economic development. If those expectations are met, VET institutions can be of benefit to all actors involved; however, in many coun-

tries VET does not meet these demands, and often the central point of criticism is that potential candidates are perceived to be unemployable due to the lack of practical experience (Blom & Saeki, 2011; Bhandari, 2021; Pilz et al., 2020). Discussion about this has not only been gaining importance in Western countries and international research for years, but is also a relevant topic in developing countries like India. In many countries, we have evidence that there is an expectation that instruction will be less teacher-centred and more student-centred in order to achieve better learning outcomes (Chanchalor & Chomphutong, 2004; Hua et al., 2011; Jalaria & Sern, 2014; Suarniati, 2019). In India in particular, the need to reform learning processes in the VET sector is clearly evident (Pilz & Regel, 2021). However, the lack of quality in teaching, and ineffective learning outcomes, are frequently mentioned and have become more obvious (Tilak, 2018b). This could be related to the strongly theory-centred teaching, which lacks practical relevance and does not place the learner at the centre of the learning process. As a consequence, the required knowledge, skills and competencies cannot be acquired, resulting in graduates who are unemployable (Neroorkar & Gopinath, 2020), and leading to a significant mismatch, with negative consequences for many stakeholders (Anikin, 2021). To counter these challenges in India, a rethinking of the delivery of knowledge, skills and competencies is often proposed, with a shift from teaching to learning and a more student-centred focus (Pilz & Regel, 2021). This way of thinking, arising from a constructivist approach, which puts situational and self-directed learning in the foreground, is being examined and discussed in the field of education, and especially VET, all over the world, and also in India (see Theoretical Background section).

Although the claim that teaching and learning in VET in India is theory-driven is frequently and strongly made, little data supporting this assertion could be generated, due to lack of empirical research (Mehrotra, 2014). However, a screening of the curricula shows that they are not competence-based in the VET sector, but that teacher-centredness is dominant (Zenner et al., 2017). Furthermore, curricula cannot always give indications on how teaching is implemented in the professional field (Zenner et al., 2017). Therefore, this paper will examine the teaching and learning, which is why the focus is also on teachers; in particular, the teachers' behaviour and conception of teaching is crucial in the transfer of knowledge in the education processes (Kaymakamoglu, 2017). There is evidence from research that teachers, as promoters of innovation, can drive change, for example, in the way teaching is delivered, even if it is not yet embedded in the curricula (Nissilä et al., 2015). The students' perspective is not a focus in this paper, but it can be assumed that the quality of teaching and learning in VET influences the

attractiveness of the educational programmes and the institutions offering them (Ajithkumar & Pilz, 2019).

Industrial Training Institutes (ITIs) are the largest and most important institutions in the VET sector in India, and are thus the focus of this paper (Agrawal & Agrawal, 2017; Wessels & Pilz, 2018). There are a total of about 15 thousand government and private ITIs in India, with a capacity of around 2.7 million training places (MSDE, 2020). Of a total of 126 training courses, 73 are technical and 48 are non-technical (plus five training courses for visually impaired people). Depending on the occupation, training can start at the earliest after the eighth, tenth or twelfth grade (Wessels & Pilz, 2018), and the duration of the training varies between six months and two years, depending on the training course (Wessels & Pilz, 2018).

To answer the question whether teaching and learning in ITIs in India are highly theory-driven, the following research questions are raised:

- What is the understanding of teaching and learning among Indian teachers in ITIs?
- How is the transfer of knowledge, skills and competencies implemented in the ITIs examined?

In the following section, the state of the art of research on the concepts and modes of transmission of knowledge, skills and competencies in the international and Indian context is presented, while the third section presents the methodology on which the research is based. This is followed by the presentation and discussion of the findings, which aims at answering the research questions. In the concluding section, an outlook on the topic in the all-Indian and international spectrum is presented.

9.2 Theoretical background

As described above, overly teacher-centred and theory-driven education is recognised as a problem in the delivery of VET in India. The alternative is action-orientated and student-centred learning, which is intended to overcome the problems of theory-heavy teaching, such as the lack of practical relevance and the low level of application orientation (Mulder, 2017). The increased interest in, and importance of, student-centred learning can be attributed to the greater influence of the constructivist approach in instructional design (Savery & Duffy, 1996). Constructivism, compared to traditional approaches to instructional design, assumes a different set of learning assumptions, and proposes new instructional principles. These elements are the basis of student-centred learning, described by Collins and O'Brien (2003) as "an instructional approach in which students influence the content, activities, materials, and pace of learning." In addition to the focus on the learner as a subject, an orientation toward action

as a learning medium, is also essential in order to achieve training that is closer to practice (Cimatti, 2016; Maitra & Maitra, 2021).

The creation of actual action situations in class, with authentic and practical tasks, plays an important role in this. What is important here, is the creation of complete practical actions, which means a combination of “acting, thinking and doing.” This is expressed in the individual steps of the action-orientated tasks such as analysing, planning, deciding, implementing, controlling and reflecting, which should not be taught in isolation, but in combination (Pilz & Fürstenau, 2019).

However, in student-centred learning, in addition to the type of delivery (“How is it taught”) (Billett, 1996), another point is important, which is the content (“What is taught”). Theoretical content is important in order to become familiar with the basic structures of the subject; here, the teacher is guided by the scientific structures of the specific discipline when selecting the teaching content, although, this is often not sufficient to achieve adequate employment-orientated learning outcomes (Sturing et al., 2011). Rather than purely declarative and isolated knowledge, practical, application-orientated content should be taught, which promotes competencies that are needed later in everyday working life (Dehnbostel & Dybowski, 2001; Oser et al., 2006). The focus on teaching competencies instead of isolated theoretical knowledge, increases the students’ ability to act in practice, and thus their employability, as this creates a link between science and profession (Eraut, 2002). This is necessary in order to avoid the need for on-the-job training after leaving school, as a result of theory-orientated content knowledge being taught in school, instead of content combining professional practice. In this respect, competencies can be understood as skills, methods, knowledge and attitudes that can be achieved through different types of student-centred learning (Dehnbostel, 2009).

Competencies can refer to subject-specific competencies and skills, but also to methodological, social and personal competencies, such as independence, flexibility, the ability to work in a team, problem-solving skills and a sense of responsibility (Maitra & Maitra, 2021; Sturing et al., 2011) have discussed principles that are necessary in implementing such competence-based teaching in vocational education. The principles refer to the competence discussion, and are based on a constructivist approach, which is why these authors see the importance of competencies, flexibility, complexity and authenticity as well as situational orientation as central aspects for the successful implementation of VET programmes. Referring to this, de Bruijn and Leeman (2011) look at the challenges, dilemmas and practical tensions in introducing competence-based VET, and provide insights into how these can be avoided.

This way of imparting knowledge, skills and competencies, with a focus on learning and action-orientated teaching, thus also has an influence on the role of the teacher. In the student-centred and action-orientated approach, instruction is actively shaped by the learners and is not transmitted by the teacher (Tam, 2000). The teacher is seen more as a facilitator, who should promote self-directed learning and active construction of educational content by the students. According to Hativa (2000), typical methods for implementing student-centred instructional designs are summarised as discussions, group work, role plays, experiential learning, problem-based learning and case studies. The teacher should, for example, encourage the initiative and activities of the students and allow them to create their own understanding of concepts in relation to their foreknowledge and individual experiences (Brooks & Brooks, 1993). Central to how learning is actually realised in practice, is the teacher's conviction and understanding of didactics (Staub & Stern, 2002); their perspective is decisive in determining whether teaching is student-centred or theory-based (Choy et al., 2011). Various studies suggest a connection between a teacher's individual beliefs and his or her teaching actions (Brinkmann, 2015; Kaymakamoglu, 2017; Lee et al., 2017), which is why this research uses interviews with teachers and observation of actual teaching, to find out how teaching is organised in Indian VET institutions. Fuller and Unwin (2003) relate the previously mentioned aspects, and develop a framework that deals particularly with the learning environment and the organisational context in VET. These categories are explained in more detail and differentiated in "Study Design" section, as they are of particular importance for the present research question.

Against the background that in India various quality problems, and labour market mismatches, are related to the lack of student-centred and practice-orientated teaching, it is obvious that these international approaches could at least be taken into account in the Indian context (for critical reflection, see the conclusion). Of course, adaptation to the specific type of school, especially vocational education in India, is necessary (Friedlaender et al., 2014). But there is also some evidence that attempts at more student-centred teaching, are failing in India because of opposite teachers' beliefs (Clarke, 2001; Dyer et al., 2004; Brinkmann, 2016).

Because, although there is still no extensive empirical research on how knowledge, skills and competencies are taught in reality in the VET sector in India, the literature indicates that more practical elements are required (Bhandari, 2021; Neroorkar & Gopinath, 2020). A detailed em-

irical data is the crucial basis for reform and adaptation of vocational learning. This is particularly evident in relation to the existing studies on the low level of employability of graduates of vocational education programmes (Agrawal & Agrawal, 2017; Khare, 2018).

9.3 Study design

9.3.1 Analytical Framework

In order to answer the research questions, and with reference to the theoretical background, the interviews and observations were analysed using the model of Fuller and Unwin (2003), which was adapted to derive the categories for the analysis. Fuller and Unwin transfer the approach of Engeström (1994) to instruction and working life, into VET, and identify two characterisations that help to describe learning environments: expansive and restrictive (Fuller & Unwin, 2003). They conclude, that expansive learning environments achieve better results in creating more effective learning opportunities. Fuller and Unwin assume that educational programs that offer a comprehensive approach to training and teaching are more likely to generate learning opportunities for all learners that create investigative learning at a deep level (Engeström, 1994; Fuller & Unwin, 2003).

Fuller and Unwin's model, looks primarily at workplace learning in relation to apprenticeship reform efforts in Europe and the UK; however, the approach can be broadened and applied to other areas as well. Although the model is initially designed for workplace learning, it can also be adapted to the school-based VET, especially ITIs, as it was explicitly designed for the VET sector in general. Regardless of the place of learning, many aspects are similar in these areas.

The prerequisites, ideas and objectives of vocational schools like ITIs, are conceptually closer to workplace learning, which is why the model by Fuller and Unwin is more suitable here than, for example, a model from general didactics that does not explicitly refer to the VET sector. Their model is adapted to the learning processes in the school, while aspects of the model that explicitly refer to the workplace and cannot be adapted are excluded. The expansive-restrictive framework, can thus help to examine the learning culture and environment in other organisational contexts. Fuller and Unwin suggest that expansive learning environments, as opposed to restrictive learning environments achieve the broader goals that affect learning in vocational education. In Fuller and Unwin's concept, learning environments are considered in particular in terms of the role of teachers, the way they teach, the methods of learning, and the communication between teachers and learners.

Therefore, the questionnaire (e.g., “What are your teaching strategies?”; “Which learning approaches do you use?”; “What types of media do you use during a lesson?”; “How does your classroom look?” etc.) and the structuring of the results in this study also refer to these categories.

This model is complemented by the approach of de Bruijn and Leeman (2011), who address the practical tensions and challenges in the implementation of competence-based VET. They state that competence-based VET is promoted through self-directed learning, and through authentic learning situations and environments. Their model of powerful learning environments is based on this assumption, which focuses on the two aspects of self-directed and authentic learning, as well as the learning environment. Their approach of powerful learning environments shows what characteristics vocational courses should have in order to educate people and give them the opportunity to acquire understanding, flexibility, and job-related skills. This approach is based on sociocultural theories (including Billett, 2001) and focuses particularly on the elements of reflective, authentic, and constructive learning from a situational perspective. These aspects were also explored during the interviews and observations and therefore examined whether knowledge transfer in Indian ITIs occurs in an authentic, constructive, reflective and situational manner and whether they thus represent a powerful learning environment according to De Bruijn and Leeman.

The two models, by Fuller and Unwin (2003) and de Bruijn and Leeman (2011), serve as the basis for this evaluation. With reference to the question at hand, five categories were derived, which provide the structure for the evaluation.

With regard to the teacher’s role (see 9.4.1), Fuller and Unwin consider the supervisor as an enabler in the expansive approach, in line with the constructivist approach (Dehnbostel & Dybowski, 2001; Kaymakamoglu, 2017); while, in the restrictive learning culture, the supervisor is seen as the controller, in line with the teacher-centred approach. In the school context, the supervisor is the teacher, which makes it clear that in both contexts the role of the teacher or supervisor is important to look at, thus, both are included as categories of the evaluation. The role of the teacher and the role of the learner, influence each other and are interdependent, which is why the role of the learner, from the teachers’ perspective (see 9.4.2), will be considered in detail, in comparison to the role of the teacher. Teachers are centrally responsible for shaping instruction, especially in highly hierarchical contexts such as India. The learner is thus always perceived only in the context of the teacher.

De Bruijn and Leeman note that students gradually develop an autonomous work attitude and professional habitus through reflection on their learning and work experiences (along with teachers). This is another reason why it is important to consider the role of the learner. Closely related to the teacher's role, is his or her own understanding of teaching and learning, and his or her self-image (see 9.4.3). Since the beliefs of the teachers play a special role in the implementation of learning (Brinkmann, 2015; Hativa, 2000; Jambo & Pilz, 2018; Lee et al., 2017; Staub & Stern, 2002), they should be included in the analysis as a supplement. The models of Fuller and Unwin and de Bruijn and Leeman both address the forms of learning (see 9.4.4): In the expansive culture, these are open, self-directed and geared towards communication and the acquisition of widely varied skills in cross-disciplinary groups with authentic and situative tasks (Dehnbostel, 2009; de Bruijn & Leeman, 2011), while the forms of learning in the restrictive area are strongly limited and content-related. The authentic form of teaching, with authentic tasks performed in realistic contexts, is of particular importance. Constructive learning is stimulated by authentic learning situations that demand problem-solving learning. De Bruijn and Leeman note that these authentic tasks should come from professional practice and that constructive learning is stimulated by authentic learning situations that demand problem-solving skills (de Bruijn & Leeman, 2011). Both de Bruijn and Leeman (2011) and Fuller and Unwin (2003) point out the importance of the learning environment, as it has a decisive influence on the design of effective learning processes, and is thus included in the analysis (see 9.4.5). The analytical framework will therefore include the categories 9.4.1 Role of the teacher; 9.4.2 Role of the learner from the teachers' perspective; 9.4.3 Teacher's beliefs and self-image; 9.4.4 Forms and methods of learning as well as the 9.4.5 Learning environment.

9.3.2 Sampling and Methods

Face to face interviews with teachers, and live observations of the teachers' lessons were conducted and recorded. A total of 25 teacher interviews and 25 observations, were carried out at three different locations in the North (Delhi), South (Coimbatore) and West (Mumbai) of India, in order to reflect a differentiated picture of teaching at ITIs. Since this work is an explorative analysis of teaching from the perspective of teachers at Indian ITIs, no nationwide total survey was intended. Accordingly, the field of inquiry is limited to three sites (plus preliminary study in the north-east).

Considerations at the preliminary stage resulted in a selection of major-cities which, due to their geographic location as well as their structural conditions allow at least a partial consid-

eration of the various contextual conditions of different regions in India. The regional distribution of the data collection is intended to reflect a differentiated picture of teaching at ITIs despite its limitations. However, the survey only took place in urban centres with comparatively good infrastructure, meaning that, direct extrapolation to ITIs in rural areas cannot be assumed. Although the locations considered in the main study are all large urban centres in India, there are major disparities between the locations in terms of language (Hindi Tamil, Marathi), regional identity, ethnic composition of the population, and the shape of the local economy. These differences, however, are reflected in the entire Indian society, which is why a consideration of the different places is regarded as reasonable.

Two schools were visited per site where the survey took place. A preliminary study was carried out in the north-east of India to test the design of the data collection. The north-eastern state of Meghalaya with its central city of Shillong was selected because there is a support network of researchers and the research topic is also recognised and promoted by the local education authorities. Contact with the schools was established through the local cooperation partners at universities.

The target group of the study was teachers who teach technical subjects. In selecting the interview partners, the following points were taken into account: consideration of teachers in technical training occupations; consideration of heterogeneity with regard to length of employment; consideration of heterogeneity with regard to gender affiliation. The selection criteria of the training occupations are derived from two conditions: occupations within the occupational fields that are particularly strong in terms of training; occupations from craft and industry (as also subdivided by DGET). In total, teachers from ten different training occupations were surveyed, including Mechanic Motor Vehicle, Electrician, Fitter, Turner, Welder, Mechanic Refrigeration, Mechanic machine tool maintenance, Mechanic Auto Electrician, Electronic Mechanic, Draughtsman Mechanic).

Interview guidelines include categories on the teachers' personal educational background and their professional qualifications; in addition, their previous teaching experience and principles are addressed, as well as their own conception of the role of the teacher in the classroom, and learning approaches, learning strategies and methods. The interview guidelines were developed on the basis of a selection of theories on teaching and learning, including student-centred learning (see in detail the analysis section below). The interviewees were selected by the head teacher of the respective ITI, and the guided interview was conducted at the premises of the respective school. The teachers' statements were anonymised so that no conclusions

can be drawn about the individuals, although the headteachers know the identity of the interviewees through their pre-selection. However, a comparison of the teachers' statements by the headteacher did not take place. The interview was recorded in its entirety; the duration of an interview varied between 24 and 46 min, depending on the participant and with or without translation into English, the average being 33 min. The interviews were fully transcribed and anonymised. The transcriptions and content analysis were carried out according to Kuckartz (2014). The research data was stored and archived in a data-protection-safe manner. After each interview, the identification number of the teacher interviewed was noted, and an appointment was made to observe the teaching of the previously interviewed teacher. Classroom observations were carried out in order to check, substantiate and reinforce the content of the statements (de Bruijn & Leeman, 2011). This is done to minimise the cultural bias that can occur when interviews are carried out by international research groups (Jambo & Pilz, 2018). Furthermore, the observations can provide an even deeper insight into actual teaching behaviour (Guo & Pilz, 2020; Hilberg et al., 2004). The observation focused in particular on the following elements to assess how instruction is structured in Indian ITIs: Role and attitude of the teacher during the lesson; interaction between students and teachers; forms and methods of learning; physical aspects and infrastructure of the classroom; learning activities; the teaching methods and the media used in the lessons. These elements are based on the analytical framework (see 9.3.1) referring to the approaches of Fuller and Unwin regarding a comprehensive approach to learning and to de Bruijn and Leeman and their reflections on powerful learning environments. For the observation, a proven and tested instrument was used which deals with the same topics (Guo & Pilz, 2020). The instrument was adapted and adjusted to the present context and the analytical framework. All observation elements were detected and documented in an observation sheet. The duration of the 25 lessons observed was between 30 and 60 min due to unforeseen interruptions. Observations were conducted by only one researcher to ensure minimal impact on the instructional process. For the observations mainly school lessons were selected which were held in English, for observations of lessons in Marathi, Hindi or Tamil the help of translators was resorted to in order to be able to capture the content components and to avoid that side effects are lost. All observation results were individually compared with the teachers' interview outcomes, and also analysed in an aggregated format.

9.4 Results and Discussion

The results of the data collection from the ITIs in Delhi, Coimbatore and Mumbai are presented below. These are composed of the interviews with the teachers, and the observations, which can be used to supplement the interviews. The following section presents particularly powerful quotes from teachers that are typical of the research data and reflect individual aspects of the data as a whole. The categories of the evaluation, are based on the research questions, and refer to the theoretical background including the analytical framework, with the concepts of Fuller and Unwin (2003) and de Bruijn and Leeman (2011).

9.4.1 Role of the Teacher

The interviews and observations show that the teacher has an active role in teaching in the observed ITIs, and directs and controls the instruction process:

He [the teacher] wants to give his 100% through his eyes, through his voice, through his board, through his knowledge.

(TD9)

The teacher is at the centre of the lesson, and learners are visually focused on the teacher. The voice, the appearance and the teacher's personality are of great importance, due to the strong centring of the lesson on the person of the teacher:

I am active in classes. Means first I maintain peace in each and every class. I write on board. I go to this board and pick the chalk and any topic given to me I will teach them directly by writing on this board (...).

(TD10)

The content of the lesson is reproduced by the teacher, and captured through media such as the blackboard. Apart from oral processing and written recording by the teacher, there is usually no further participation by the students, as was made clear through the observations. This is even the case when practical elements are to be taught:

[...] he [the teacher] told that suppose this is the machine then he will take the machine to classroom and he will open it and he again assembled it and like that he will give the knowledge to students.

(TM4)

The steps in the practical exercise are taken by the teacher, while the students adopt a passive and observing attitude. There is no active participation and independent involvement of the pupils:

So, his learning approach is motivational approach in nature. So, he [the teacher] teaches and tries to bring out their talent by telling them what to do.

(TC7)

There is a strong imbalance of competence and power between the actors involved. The teacher is the mediator who prescribes the content to the learners, which clarifies the active-passive construction of the transfer of the content. There is no provision for a critical appraisal of the content, or for the students to construct their own knowledge. The observations show, that the students are merely recalling content taught by the teacher, by being asked to repeat it aloud. In this form of teaching, the teacher often also takes on the role of motivator, but also preserver of discipline. The teacher is perceived as the authority; a role which he also uses and enforces. Along with imparting knowledge, skills and competencies, this is often seen as the main task of the teacher.

As illustrated, in the student-centred approach, students should be at the centre of the learning process, while the teacher plays the role of a coach or facilitator who promotes self-directed learning (Tam, 2000). The interviews and observations make it clear that this is not implemented in the ITIs under consideration; in fact, the exact opposite prevails, as the teacher takes a central and dominant role in the teaching process. This form of lecture is only supplemented by the interspersing of questions or the development of a student-teacher discussion. The strong position of the teacher consequently pushes the students into a passive position; thus, no critical questioning is promoted or encouraged, and own construction of knowledge and skills are non-existent. Competencies, except for the subject-specific one, are not developed or encouraged, so that the subject-specific knowledge remains static and isolated. Due to the strong focus on the teacher, his or her individual characteristics such as the teacher's personality, the teacher's self-motivation and professional competence and knowledge, have a considerable impact on teaching and learning. Thus, the implementation of the teacher's role as a central factor in the teaching and learning process, is strongly related to beliefs and self-image (see 9.4.3), and the limited knowledge about alternative methods and possibilities of teaching implementation (see 9.4.4). In terms of Fuller and Unwin's approach, this is considered a restrictive type of teacher role.

9.4.2 Role of the Learner from the Teachers' Perspective

The teacher and learner's role influence each other within the context of the teaching action, thus being interdependent. Therefore, the role of the learner, from the teacher's perspective, has to be seen against this background, and in contrast to, the role of the teacher:

Precision is important for a learner they should try to grasp whatever the professor says, they should listen to the teacher and try to grasp whatever he/she says.

(C7)

Due to the strong focus on the teacher in ITI, the students take on a passive role, whereby they are predominantly required simply to be receptive. From the teachers' perspective, the students are recipients of knowledge and therefore passive learners:

First of all is motivation, he [the student] must be motivated, he must grasp knowledge and then discipline. He must be disciplined, must come on time, and must be in proper uniform, well behaved, healthy.
(D3)

The teachers' expectations of the students are shaped accordingly, and relate in particular to discipline and behaviour, rather than to qualities such as their self-involvement or ability to work in groups or with partners. In addition, the unreflective copying of the blackboard picture, and the taking of notes, is regarded as the student's central task. Application, interrelationships and practical use of the taught content, are not discussed further:

Actually, it's like if the learner is willing to learn something he should focus on the teacher's speech or voice whatever he says. If he keeps his ear to that teacher, he can do well. He can learn.
(TD4)

From the teachers' perspective, the most important factor in ITI's lessons, is passive and attentive listening by the learners; dialogue or discussion with the teacher or classmates is rarely encouraged, and the only factor for learning success is often defined by the teacher as the student's motivation and willingness to learn.

It became clear from the interviews and from the observations, that the role of the teacher has a direct influence on the behaviour of the students, and that centrality of the teacher places students in a passive role in ITIs. The pupils are dependent on the teacher both in terms of method, and in terms of content. Due to the lack of prior knowledge and competencies, and the lack of support for independent knowledge acquisition, the ability to reflect and criticise as well as to deal with the subject matter, is severely limited. Participants are not encouraged to take responsibility for, and reflect on, their own learning. Furthermore, they have no opportunities to reflect on their own learning progress. The teaching shows no sign that the students themselves could control the transfer of knowledge and actively shape the learning process. The individual learner's personality is not addressed, so there is no construction of their own understanding of concepts in relation to their prior knowledge and individual experiences. The very pronounced passivity of the students, which is related to the teacher-centredness, prevents a more action-orientated transfer, and can be seen as a major reason why

students do not acquire employable skills at ITIs. Especially with regard to the aspects of construction and reflection in the sense of De Bruijn and Leeman's approach, our data show at first that a powerful learning environment cannot be assumed with regard to the learning role.

9.4.3 Teacher's beliefs and self-image

To understand how the process of teaching takes place in Indian ITIs, it is essential to look at the beliefs of the teachers (Brinkmann, 2019), which mainly became evident through the interviews:

[...] from my point of view writing on the board or writing in the notebooks is the best method how to teach the student. [...] some students are having their [own] memories which are not sharp enough.

(TD2)

Great importance is attached to teacher-centred methods. In order to impart the educational content, it must be brought to the student by the teacher or via the textbook. The students' own construction of skills, competencies and knowledge development plays no role. This is justified by the supposedly low performance of the learners:

Maximum content knowledge should be known by the student to pass the exam.

(TM6)

The teacher places great emphasis on the theoretical content of the syllabus, and sees it as his main task to cover this; thus, the exclusive focus on the subject content of the specific area becomes clear. De Bruijn and Leeman in particular, however, point out the importance of situational and practical learning situations as opposed to pure theory-based knowledge transfer. An orientation to professional practice and the reference to the future professional working sphere of the students is not the focus:

Yes they have to pass it [the exam] is very important then only they get placement and all.

(TC6)

Due to the significance of exams, these take the spotlight; thus, performance in exams is seen as an important factor in measuring learning success. Good performance in exams alone leads to the possibility of getting lucrative, high-status jobs, while other contents, that and are not tested in the exams, are accordingly neglected:

I don't have that much of experience [...]. I have sit with other seniors [...], I just observed how they teach and how they tackle the students. Because from the starting time it was quite difficult for me to adjust with the all the students but when I sit with my seniors and [observe] how they teach, how they tackle the students, I learn

(TD1)

A preference to stick to the traditions can also be observed in the presentation of lessons. The teachers take their older superiors as role models, whereby old-established and supposedly proven methods and behaviours are passed on and handed down without, however, reflecting on their usefulness and efficiency.

The teacher's belief and self-image are an important aspect in determining whether student-centred learning can be implemented (Brinkmann, 2019). In the Indian ITIs in the examined areas, as revealed by the interviews and observations, it is clear that the teachers' preferences are not conducive to student-centred learning. Brinkmann (2015) discusses various factors that influence teachers' pedagogical beliefs, and thus the structure of their lessons. The personal experiences of the teachers must be addressed. like the professional training of teachers (Ajithkumar, 2016; Pilz & Gengaiah, 2019; Pilz et al., 2022). If teacher education does not include concepts of how student-centred and action-orientated learning is structured, and what advantages it promises, then the foundational knowledge and practical skills to apply it in the classroom will be lacking. Due to the lack of balanced pedagogical-didactic training, the young teachers orientate themselves towards older colleagues. However, since the older colleagues themselves teach mainly in a traditional theory-based and teacher-centred way, the young teachers lack innovative role models. In addition, the educational (see 9.4.5) and the sociocultural context, with societal norms and cultural characteristics (see 9.5), have a strong influence on the teachers and thus on the shaping of classroom action.

9.4.4 Forms and Methods of Learning

The variety of methods and forms of learning can be found in Indian ITIs in Delhi, Coimbatore and Mumbai in a limited way, which is made clear by the teachers' statements, and is equally directly reflected in the observations:

All students can't be active all have different minds and so that's the main problem, we are trying to give them knowledge on the boards on the notebooks so that they can revive it again and again and again, the written knowledge.

(TD2)

The major form and method is frontal teaching, with the blackboard as the medium; the student's action is to copy the blackboard picture and take notes. This is complemented by questions from the teacher and the development of a teacher-student conversation. To a lesser extent, practical examples are given by demonstrating, for example, electrical circuits and switching systems. However, here too the students take a passive role and observe the teacher handling the practical objects. The same applies to the display of tools.

Yes, it always active and we giving them a lot of learning methods like black board and all others, like power points. We use both the methods for giving the knowledge to the students.

(TD3)

As a variation to frontal teaching, often only a change of media is offered, while the method remains the same. Due to the mostly very limited equipment, however, the variation of the media also takes place only to a very limited extent:

Deductive learning because you need to know the theory before you go into practice right, you need to have the theory first, so deductive.

(TC7)

Often the deductive learning approach is preferred by teachers. The content information flow of the deductive method moves from general to specific and focuses more on the teacher, which in turn indicates a teacher-centred approach.

Although the importance of the practical components is repeatedly mentioned in the interviews, this is not reflected in the observations. In addition, the practical components mentioned only relate very vaguely to later professional situations.

The forms and methods give a good insight into how learning is implemented in practice. Static and less flexible forms of teaching, little variety of methods, and the limited use of different media, make it clear that a less student-centred approach is being followed. In the student-centred approach, ideally students should independently develop meaningful, flexible knowledge and skills required for competent professional behaviour (Sturing et al., 2011).

The transmission of static knowledge with a passive student role, giving no opportunity to construct knowledge and competencies independently, where no exchange with fellow students is encouraged and no reflection and evaluation of the state of knowledge takes place, has a significant influence on the lack of employability and practical competence of the students. The methods of student-centred instructional design such as discussions, group work or case studies, which are typical of Hativa (2000), are not in the teachers' repertoire of methods, and are consequently not used in the ITIs. Furthermore, the courses provide little room for cooperative learning, and exchange between students is hardly promoted or initiated. The construction of authentic learning situations (Sturing et al., 2011) is also largely missing, as often only the theoretical elements (such as formulas) are regarded as important, but the application in realistic contexts, and practical use in professional practice, are not considered. Due to the absence of complex, problem-orientated learning situations, the content taught at ITIs seems to be static, inert and not application-orientated. However, it is precisely these

elements that De Bruijn and Leeman as well as Fuller and Unwin consider to be important in order to be able to implement action-oriented vocational education.

9.4.5 Learning Environment

The environment in which teachers operate influences their practice of teaching (Brinkmann, 2019). Aspects such as low pupil-teacher ratio, or adequate space and equipment, as well as solid infrastructure, can positively influence or enable the implementation of student-centred learning:

[...] working environment I was feeling active because environment of our college is quite good, they will provide quite good classes, neat and clean classes in which you get to know like, get motivate to teach a student.“

(TD1)

In the general discussion of Indian vocational education and training, the inadequate infrastructure and obsolete equipment are often mentioned. The training infrastructure is in many cases not geared to meet requirements (Tilak, 2018b). However, in this study, the teachers are satisfied with the equipment and infrastructure in the ITIs, as their statements show. However, they often have relatively low expectations, for example, basic cleanliness is already perceived as a positive aspect. Overall, the learning environment and infrastructure in the ITIs is in line with a teacher-centred form of instruction, and is consistent with the aspects discussed earlier such as the role of the teacher and the methods of learning. The room structure is centred on the teacher giving the instructions; it is static, mostly with fixed chairs, which severely limits the possibilities for group work or alternative room layouts. The arrangement of the room symbolises teacher-centredness, and makes it clear that there is no provision for exchange between pupils. Collaborative processing, construction or reflection is not guided by the use of media. Workshops are available for practical learning, but they are often poorly equipped. Teachers use wall posters to illustrate theoretical relationships or to visualise formulas. If original parts such as circuits, light bulbs, tools or models of machines are available, they are normally used exclusively by the teacher. The pupils will often repeat activities demonstrated by the teacher, but without a specific problem or practical and realistic activities being associated with them. The observations show, that the pupil-teacher-ratio is between 15 and 35 pupils per class, and therefore quite suitable for methods such as group work, which would enable an exchange among the pupils and an independent construction of knowledge, skills and competencies. However, these possibilities are not taken advantage of: the learning environment in the ITIs makes it explicitly clear that the infrastructure is not designed for student-centred learning, which is in line with the results from the other categories

considered and other findings (Ramasamy et al., 2021; Tara et al., 2016). The results described in “Results and Discussion” section relate strongly to the observed ITIs in Delhi, Coimbatore and Mumbai. Nevertheless, despite the comparatively small sample, these results also provide implications for the overall VET sector in India. These implications for India and the international context are discussed in the following section.

9.5 Conclusion

The numerous advantages of student-centred learning in the field of vocational education and training, have been intensively discussed (de Bruijn & Leeman, 2011; Mulder, 2017). However, critical reflection is also necessary, because findings also show that student-centred learning does not always automatically lead to better learning outcomes for students (see e.g., Vermunt & Verloop 1999). For example, a meta-study of student-centred learning, specifically in German VET, did not find sufficient evidence of generally better learning, and these findings did not only refer to the teaching of subject-specific competencies but also to others (Nickolaus, 2000).

Another critical strand of discussion must also be outlined here: it must be stated that this is a model that originates from the Western cultural sphere (Joy & Kolb, 2009). The adoption of such concepts as policy borrowing in other contexts, is only possible if local conditions are taken into account (Steiner-Khamsi, 2014). Thus, the socio-cultural context has a decisive influence on whether the transfer of concepts, such as student-centred learning, can succeed. Aspects such as religion, political system, or world views differ significantly in different countries, and accordingly influence whether cooperative concepts that require an open learning atmosphere, can be implemented. For example, Schweisfurth (2011) reviews a variety of studies of learner-centred education implementation that suggest that cultures which tend towards “high power distance” or “collectivism”, tend to find it difficult to implement aspects of learner-centred pedagogy such as democratic teacher-student relationships, or focus on individual learners’ interests. The hierarchical society and view of Indian society, promotes authoritarian, hierarchical and teacher-centred teaching (Schweisfurth, 2013). In this context, Brinkmann (2019) likewise concludes: “The high disjuncture between the ideals of LCE (learner centred education) and the physical constraints of many classrooms in the developing world has led several authors to suggest that perhaps LCE is simply an unrealistic policy option that may be feasible for high-resource classrooms in the West but not for the global South.”

For India specifically, it should be questioned how students in vocational education, who have previously only known teacher-centred learning for years in general education, deal with student-centred learning, or react to it. In this context, it should not be ignored that pupils, in the domestic environment, are also strongly socialised culturally with regard to obedience, and the experience that manual or practical work tends to be regarded as inferior in contrast to white colour work (Ajithkumar & Pilz, 2019). Furthermore, in the context of VET, the needs of employers must also be taken into account. Findings indicate that employers are not satisfied with the quality of ITI graduates; however, this criticism primarily refers to basic knowledge (reading, writing, literacy) as well as subject knowledge, punctuality and discipline (Ajithkumar & Pilz, 2019). Detailed empirical studies conducted among employers, however, document less of a need for complex skills such as in-depth application knowledge, independence and problem-solving skills for ITI graduates, as they are often only employed for simple, supervised and largely tailorised work processes in industry (Neroorkar & Gopinath, 2020; Pilz, 2016).

If, however, changes are to be made in Indian VET, in the sense of the modernisation discussions outlined in the introduction, there are two approaches in particular that are repeatedly discussed internationally:

On the one hand, modern curricula could be developed that adequately reflect student-centred learning, and serve as a guideline and basis both for teaching and for the subsequent examinations. As an example, reference can be made to China, where comprehensive competence-orientated curricula have been implemented in recent years (Chen et al., 2021). With the introduction of the learning field approach, Germany has also embarked on the basis for more LC teaching by means of orientation to work processes and the solution of complex practical problems. At the same time, the examinations were thus also more specifically orientated towards professional reality, and no longer exclusively focused on subject knowledge replication (Pilz & Fürstenau, 2019).

On the other hand, the present study also makes clear that adaptations in teacher education can be a particularly important influencing factor in initiating changes.

The study shows that teachers in the Indian system predominantly rely on traditional learning concepts, with a strong theory-based and teacher-centred approach. It can be assumed that many teachers have very limited previous pedagogical-didactic experience, and that innovative methods such as problem-orientated and student-centred methods, are not yet part of their experience (Dyer et al., 2004; Pilz & Gengaiah, 2019; Pilz et al., 2022). Due to the lack of

pedagogical training and limited practical experience in the pedagogical field, teachers draw on their own experiences from their personal school life (Oser et al., 2006).

Previously I never teach to anybody but here I have the opportunity. In the paper I read this and I join this [ITI]. I never before in my school days I never say a single word in my whole life in front of a class, but here I can.

(TM7)

The lack of knowledge about didactical concepts, becomes clear through the significant discrepancy between own perception from the interviews, and the reality assessed through the observations. Basic didactic concepts, contexts or methods are not known and thus cannot be sufficiently reflected, articulated and evaluated. Brinkmann (2016) clearly shows that the concepts (and their benefits), must first be brought into the teachers' area of experience in order to influence their beliefs; therefore, new forms of teacher training could be a promising starting point in initiating change. The political will to amend this is present, at least in India, which represents the first step towards implementation in the VET sector (MHRD, 2019a). The more it is possible to induce a change in teaching concepts, the easier it will be to achieve the "shift from teaching to learning" on an individual basis. However, unless the other conditions are also favourable for student-centred learning (such as class size, examination system, textbooks, school head), implementation will only be successful to a limited extent (Brinkmann, 2016).

It should also be noted that colonial rule has had a profound impact on the Indian educational landscape. The effects of colonial rule are also present in vocational education. This has resulted in the structure of the education system being focused on academic education, with less attention paid to vocational education (Singh, 2001). It can be stated that general education has a better status in society than VET, which is underlined by empirical findings. An explanation could be drawn onto India's historical development, in which only the higher castes had access to general education (Bayly, 1999). The way VET is perceived depends on the individual's environment, which is influenced by religious affiliations, historical as well as cultural influences such as India's caste system. Given the sensitive colonial history, care must be taken not to merely replace old approaches with new international approaches without paying attention to local conditions and needs (Ramasamy et al., 2021). Here, the Indian government in particular must proceed with caution, as many approaches introduced in the past were not sustainable and the will to invest in TVET was not strong enough (Schneider & Pilz, 2019).

The lack of knowledge of didactic concepts of the ITI-teachers, only became apparent through the combined survey method via interviews and observations, which is why this survey

method proved to be successful in determining the teaching methods and teacher's beliefs. Of course, cultural bias cannot be excluded in a complex intercultural survey, conducted by an international team of researchers. Another limitation is the small sample size of the study, and an extension of the sample to other ITIs is recommended, as well as the consideration of other school types in the Indian VET sector, in particular PTs, in order to check whether the findings are mirrored in other school types, or even higher education programmes (Schneider & Pilz, 2019). In addition, it would be of interest to examine the processes of the transfer of skills, competencies and abilities from the students' perspective, in order to determine how they perceive teaching at the ITIs, and to be able to reflect the findings of the present study. In addition, the student-centred approach could be examined in pilot studies to see if it can help to make the education system in India more inclusive in terms of gender, class, and castes (Bagde et al., 2016).

10 Contribution and outlook

10.1 Academic contribution

The aims of the dissertation are wide-ranging, with the attractiveness of PTs from the perspective of various stakeholders taking centre stage. The central element of the dissertation is to analyse the attractiveness of PTs from the perspective of the various key actors in the Indian VET system and to determine whether PTs are an attractive option for the actors in the Indian VET system. In addition, other important concepts that influence the attractiveness, such as the role and function as well as the embedding of the institution of PTs in the Indian VET system, the way of knowledge transfer and the employability of workers in the Indian labour market were presented and analysed, as these constructs have a strong influence on the attractiveness of PTs. The results are summarised below and the insights derived are elaborated. An overview of the constructs can be found in figure 1, on the basis of which the implications are derived in chapter 10.2.

Findings on employability

The employability of workers in the Indian labour market is often critically assessed in research (Khare, 2014; Mitra & Verick, 2013; Neroorkar & Gopinath, 2023). However, there is a general lack of information on how employability should be organised in order to match the requirements in India and what role the VET system plays in this. This thesis provides answers to this question by analysing the elements that are necessary to achieve employability in India, namely subject-specific knowledge, person-centred skills and the environment. The analysis shows that the employability of workers in the Indian labour market is impaired in all three areas.

In the first area – subject-specific knowledge – the challenges include outdated curricula, little industry involvement, few practical elements and the low qualification of teachers, which makes it difficult to acquire the required subject-specific knowledge in the vocational training sector. The second important element to achieve employability in India are person-centred skills such as language proficiency, communication techniques or problem-solving skills. These are also difficult to achieve in the VET sector because teacher-centred and theory-centred teaching with little practical activity on the part of the students has a negative impact on the development of communication skills. As a third aspect, the environment plays a central role in the acquisition of employability, which includes the economic context, the institutional environment and the social situation of the learners. Here, too, it can be seen that the acquisition of employability in the VET sector is more difficult because, for example, low wages are paid

in the vocational sector and companies do not participate significantly in training programmes.

In principle, it can be stated that in all three central areas that are necessary for the acquisition of labour market skills, hardly any can be acquired in the VET sector. This makes it clear that the problems of mismatches originate in different areas of the VET system. By analysing and detailing the levels of employability in India and the associated challenges, implications arise (see Implications in 10.2) from which targeted measures can be derived to improve the system in these areas in order to enable employability for employees in India.

Findings on the functions, role and embeddedness of PTs

With regard to the role of PTs, it is clear that they fulfil a number of important functions in the Indian VET system. The imparting of both theoretical and practical knowledge at a high level is a unique selling point in the Indian system. This is particularly important as this skill level and skill mix will become increasingly important in the future due to the transformation and change in the Indian economy (see 4.2.2).

It also becomes clear that the combination of theoretical and practical knowledge can be very important for achieving employability, which is why the functions of PTs are one way of meeting the challenges of the lack of employability in the VET sector. The function of promoting disadvantaged groups is also increasingly becoming the focus of public attention in India, and here too PT can play a pioneering role, especially in the promotion of women. However, the results also show that, contrary to their original purpose, namely to educate students for the labour market, PTs are increasingly seen as a pathway to higher education and therefore represent a bridging function. This is related to the possibility of social advancement, i.e. graduates want to maximise their individual benefit by seeing PTs as a bridge to higher academic education. This means that companies are competing with colleges to attract suitable PT graduates, which has several implications for the players involved.

Findings on attractiveness of PTs

A well-founded scientific analysis of the attractiveness of PTs has not been carried out yet. This study provides key insights into the attractiveness of the school form from the perspective of the various key stakeholders. The different interests of the stakeholders become clear, as do similarities and differences in the assessment of attractiveness. An overall conclusion can be drawn from the totality of all assessments of the attractiveness of PTs.

The results show that individuals view PTs as an attractive option due to factors such as job security, career advancement opportunities and a wide range of possible specialisations.

Nonetheless, it is clear that individuals often see PTs as a stepping stone towards academic education and therefore rate them more highly in terms of their attractiveness. One of the reasons for the low assessment of the attractiveness of PTs is society's general view of VET, which influences various stakeholders, but especially individuals. Cultural implications, such as VET being seen as fundamentally inferior, clearly influence the attractiveness of PTs, although these are located in the Higher VET sector and are in a kind of hybrid function between VET and academic education. In the social environment, academic education is still seen as the gold standard, which means that individuals strive for opportunities there, although PTs can also offer them attractive individual opportunities.

In addition to society, companies also see limitations in the attractiveness of the PT school form. This is not due to social and historical circumstances, but is primarily connected to the fact that the quality of graduates is not considered sufficient for the provision of services and does not fulfil the expectations of companies in this respect. As companies rate the attractiveness of PT graduates as relatively low, there are effects that influence each other. Companies offer graduates correspondingly low salaries or lower-ranking positions, which in turn reduces the attractiveness from the point of view of individuals to choose a PT and increases the effect of favouring the college route. Despite the qualitative problems, however, the companies also see individual functions of the PTs, such as the qualification profiles and the combination of theoretical and practical knowledge, as attractive.

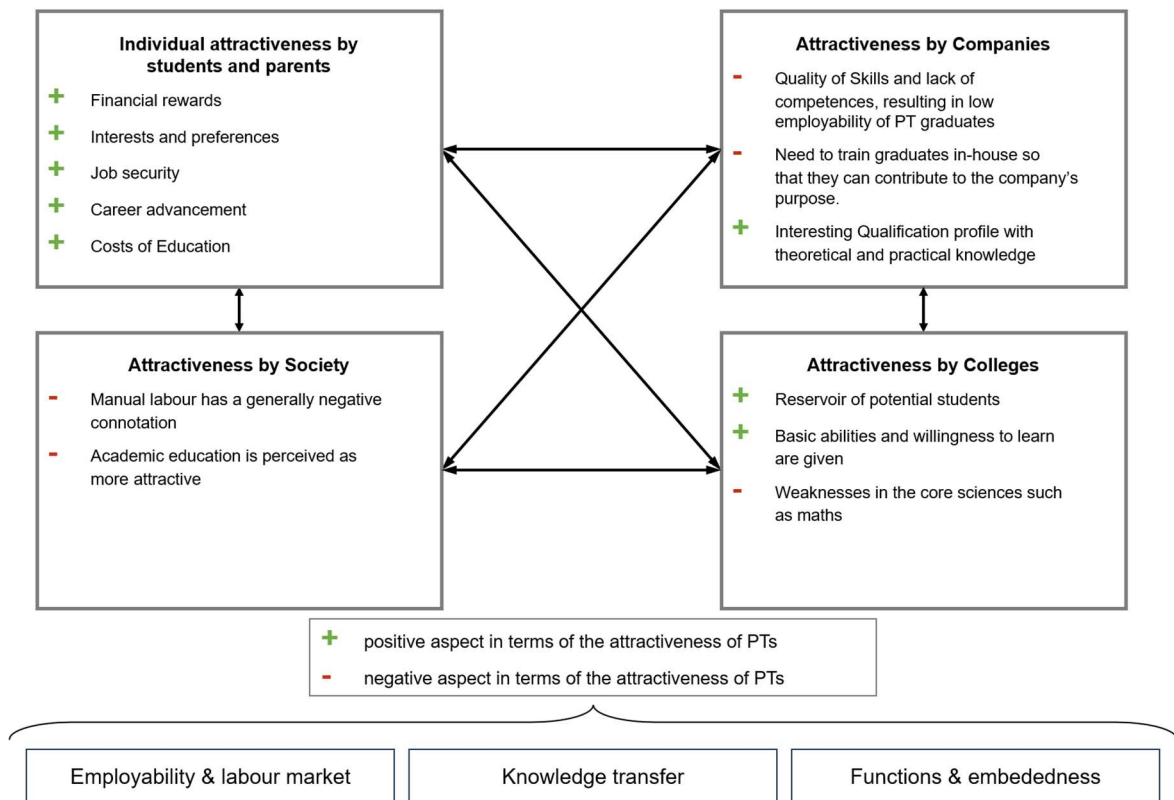
In contrast to the companies, the colleges, as a further demand actor, see the attractiveness of PTs and their graduates as far more positive. The qualitative weaknesses are less decisive there or are attempted to be compensated for by additional courses. In addition, the colleges see PT graduates as a further pool of potential students, enabling the colleges to strengthen their individual legitimacy. The fact that, on the demand side, companies tend to categorise attractiveness negatively and colleges are inclined to view it positively and therefore tend to idealise PT graduates, in turn strengthens the effect of graduates moving towards college.

Accordingly, the quality of education at PTs is seen as a clearly limiting factor for attractiveness. This finding emerges from the interviews with several stakeholder groups. The lack of quality masks the often positively perceived functions of PTs and therefore has a negative impact on attractiveness. In order to increase the attractiveness, measures must be taken to improve the quality of training at PTs (see 10.2). This is particularly important with regard to companies, as they have perceived the quality as particularly detrimental and companies want to cover their need for skilled labour with PT graduates.

Although the school form has the substantial potential to be attractive, depending on the consideration of the respective stakeholders, there are various restrictions that limit the attractiveness. If these limiting aspects such as quality or cultural aspects are addressed in the future the attractiveness of PTs can be increased in the long term.

Figure 2:

Overview of the attractiveness perception of the individual stakeholder groups



Source: author's illustration

Findings on knowledge transfer in Indian vocational schools

The results of the previous articles indicate that the way in which knowledge is imparted could be a reason for the moderate employability and poor quality of Indian VET graduates. This clearly influences the attractiveness of the school form. The analysis of knowledge transfer in Indian ITIs provides detailed insights in this regard. Knowledge transfer is very teacher-centred with a clear focus on frontal teaching, static knowledge, passive student role, few practical elements, limited methodological variation and limited infrastructure and learning environment. The specific analysis was carried out at ITIs, but conclusions can be drawn here for the entire VET system. The results make it clear that the way in which knowledge is imparted is a central starting point for meeting the challenges and improving the employability of graduates of the VET system, as the VET system is currently failing to ensure the wide-ranging and comprehensive employability of graduates.

10.2 Implications

Overall, there are three major lines of implication arising from the findings. The first implication is evident throughout the articles, namely that first and foremost the quality of the VET system and PTs must be improved. The low quality of training programmes leads to the problem of limited employability of graduates and also has a negative impact on attractiveness. There are various measures that can be taken to increase quality and promise sustainable success (Winch, 2013).

Improving the quality of teaching staff is crucial to increasing quality in the Indian system (Pilz & Gengaiyah, 2019; Pilz et al., 2022; Lasonen & Gordon, 2009). As has been shown, knowledge transfer is rigid, teacher-centred, not very practice-oriented and not focused on real-life situations but rather on examination contexts. This can be explained not only by cultural aspects, but also by the quality of teacher training. Teachers lack the pedagogical foundations, specialist skills and practical experience to be able to organise differentiated lessons with a view to the target groups and to be able to reflect on their teaching activities. In view of these considerations, further improvement of teacher training is required to ensure that teachers learn a broad spectrum of pedagogical methods. This will enable them to teach the necessary skills such as communication competence and problem-solving skills more effectively.

In order to achieve practical orientation, regular practical phases would also be useful for teachers to learn about the needs of companies and to keep their own knowledge up to date. Closer co-operation with companies would be desirable in this respect. In principle, greater involvement, inclusion and networking with companies is desirable, as this increases the benefits for companies as well as for schools and graduates, as is also shown in the next aspect (Lasonen & Gordon, 2009).

Achieving an appropriate practical orientation requires the curricula to be significantly improved and updated in order to increase their relevance and effectiveness. Current curricula are often outdated and impart knowledge that cannot be directly transferred into practical application. By adapting and updating curricula to the current demands of the labour market, the development of relevant skills can be promoted to increase employability and attractiveness to potential employers. Collaboration with companies is crucial here in order to identify the relevant educational aspects from an industry perspective and to anticipate future challenges and developments in the sectors. The integration of mandatory internships in companies into the curriculum offers a promising opportunity to improve practical relevance and the link between theoretical knowledge and practical application. In addition, the integration of

new technologies into curricula, especially in technology-oriented programmes such as those at PTs, plays a key role.

Another central measure for increasing quality in the education system is improving the infrastructure and learning environment in educational organisations. Research into knowledge transfer has shown that the design of the learning environment has a significant influence on the learning process. It is therefore crucial to design the learning environment in such a way that it optimally supports the learning process. In the context of VET, improvements to PTs could include, for example, reducing class sizes or creating flexible seating arrangements to facilitate the delivery of group activities. A high-quality technical infrastructure is particularly important in technology-oriented training programmes at vocational schools. This includes not only the provision of machines, but also computers and laptops with access to the internet and up-to-date software applications. Implementing these measures to improve quality would increase the benefits for all stakeholders in the education system and thus increase the attractiveness of the VET system and PTs.

The second implication that becomes clear from the results is that the general view of VET in society as a whole is negative and therefore the entire system and its organisations such as PTs are negatively influenced by this. Raising the overall social status of VET can only succeed in the long term, but there are also promising measures for this (Billett et al., 2022). If the perceptions of attractiveness of the individual players are improved, this will also have a positive influence on the assessment of society as a whole in the long term, e.g. the quality of the system must be improved (see above) in order to make it clear that positive life paths and success stories can be associated with VET in order to improve society's view of the system. Another measure is to increase awareness of vocational education and training (Winch, 2013). The study has shown that the poor assessment of vocational education and training organisations is often based on the fact that their individual functions are not known, which means that possible career paths or advantages such as the skill mix or opportunities for career advancement cannot be properly assessed. In addition to information events, cooperation with companies could also help to promote and positively present the advantages of career paths, e.g. via PTs in the labour market. Another option for raising the status of PTs in society would be to place Higher VET more strongly in the foreground. The pursuit of higher education has a high motivational potential, as can be seen from the interviews with the students who wanted to achieve a higher social status. The advantages of Higher VET, to which PTs belong,

should be further emphasised and expanded, such as the possibilities of entering academic education via PTs or the comparatively practice-oriented training in certain subject areas.

A third implication of the dissertation that goes beyond the substantive aspects is of a methodological nature. The dissertation has shown that dealing with the central topic of attractiveness can provide important indications of where the challenges of the system or institutions lie and what role they can play in overarching economic problems such as mismatch, which have an impact on broad sections of society. In terms of methodology, analysing attractiveness shows that a broad-based actor model is the essential basis for a holistic approach. Individual assessments of attractiveness are always linked to interactions with other actors, whereby different assessments can influence the overall picture in different ways. It has also been shown that the concept of institutionalism and ILs is useful for analysing the inherent behavioural patterns of actors and revealing the motivations behind their actions or assessments. The methodological approach in the dissertation regarding the in-depth analysis of PTs can be used as a conceptual framework to apply to other types of schools about which little is known concerning their functions or role. This can be employed for other countries and education systems with similar challenges and growing populations (such as Mexico or the Republic of South Africa, among others) as long as the measures are culturally reflected, processed and complemented. The same applies to the consideration of the topic of attractiveness and its application to school forms other than PT.

10.3 Limitations and future research directions

The research area of the dissertation is still under-researched and exploratory, so that limitations must be accepted. The limitations of the research have already been named in the respective articles and furthermore some methodological limitations have already been outlined in chapter 3.3. For the dissertation as a whole, these central limitations will be briefly summarised below.

The limited generalisability must be mentioned as a restriction. This is due both to the comparatively small sample size and to the limited regional focus. The small sample can be explained by the exploratory and innovative nature of the studies, as well as the complex research environment in a partly sensitive research area, which makes it difficult to generate an even larger number of respondents. Although the results offer valuable insights into the research area, they can only be transferred to other contexts or regions if they are analysed in detail and adapted to the specific conditions.

The regional focus of the dissertation is on urban centres of supra-regional importance such as Delhi and Mumbai in particular as well as Coimbatore. These urban centres have a comparatively good infrastructure with a sufficiently large number of educational organisations such as PTs and ITIs that can be chosen. However, due to this limited regional focus, which enabled the feasibility of the study, it cannot be assumed that it is generally valid for the entire Indian subcontinent with its different regions.

Nevertheless, the division into Delhi (North), Mumbai (West) and Coimbatore (South) meant that different regions were considered, at least to some extent. However, it must be noted that the urban focus meant that the important rural areas were not included. Educational organisations and the requirements of stakeholders as well as infrastructure and social norms, can differ greatly from urban areas (Bandyopadhyay et al., 2021). Educational organisations face other specific challenges in rural areas, so it can be assumed that PTs in rural areas play a different role to those in urban centres, for example. Accordingly, for future research efforts, the sample size and regional focus should be expanded to include other regions in India and rural areas in particular should be included in the analysis so that the results can be extended to these areas and possibly mirrored. In addition to the expansion of the sample, the inclusion of further aspects, e.g. by conducting a longitudinal study, could also be interesting for the research area, e.g. by looking at the transition of PT graduates into the labour market.

In addition to generalisability, social desirability is also a challenge that affects the different surveys of the individual articles. Interviewees may distort or withhold answers for social reasons in order to avoid negative consequences for themselves. This applies in particular to interviews with students and parents regarding their personal life decisions. An attempt was made to minimise this limitation by interviewing different stakeholder groups in order to compare and validate the respective answers of the groups and to create cultural sensitivity by involving local researchers. For further research projects, the survey could be expanded to include, for example, students who have not entered the PT system and have decided against choosing PT schools. In addition, companies that do not employ PT graduates could be surveyed to understand the arguments against these graduates in order to broaden the assessment of attractiveness to include these perspectives.

It should be noted that the research setting is located in the formal Indian education sector. The large informal sector, which plays a very important role for all areas of society in India, is only touched upon to a limited extent in this study. The transfer of knowledge and skills in the informal sector and the impact on employability is neglected due to the focus on the formal

system. It is a fundamental problem in India that the formal education system does not reach certain sections of the population and there is a lack of connectivity to the formal system (Pilz & Wilmshöfer, 2015; Srivastava, 2019; Brown, 2023; Regel & Pilz, 2019; Sodhi & Wessels, 2016). The connectivity of the formal system and the integration of informal systems can therefore be of interest for further research efforts with regard to the labour market and employability.

For further research efforts in the area of employability and the attractiveness of PTs, the challenges revealed through this dissertation should be addressed. These relate in particular to quality. A broad and detailed consideration of the quality of knowledge transfer, infrastructure, curricula, teacher training and the type of school in general is central to building on the findings of this dissertation and addressing the problems identified.

11 Final remarks

The Indian education system is considered to be the largest in the world as it encompasses an immense number of students, teachers and educational organisations (British Council, 2019). With a population of over 1.4 billion people, including many young people, a comprehensive infrastructure of schools, colleges and vocational training institutions is required to cater to the educational needs of the population. To cope with this challenge, an effective education system requires careful organisation to ensure that individual educational organisations can meet the expectations and requirements of the various stakeholders.

The example of PTs clearly shows that an organisation exists in the vocational education system that provides a wide range of functions that are relevant to the various stakeholders. Nevertheless, the attractiveness of this type of school is impaired as the stakeholders in the education system do not consistently manage to guarantee key elements such as the quality of training at PTs.

In order to meet the challenges in the Indian education system, there is a need for improved co-operation and co-ordination between various stakeholders, especially companies and the government. The limited involvement of companies and the government in India leads to numerous problems. Closer co-operation, for example in a corporatist model, could help to improve employability (Bosch & Charest, 2010). In particular, co-operation between companies and state actors could lead to the creation of structures that ensure a practice-oriented approach to education, the relevance of the knowledge imparted and adaptation to the requirements of the labour market.

Companies should increase their efforts to engage with the education system to improve links with vocational training institutions. This could be achieved through the provision of internships, active involvement in curriculum development and support for teacher training. Policy makers should set a clear objective for the education system, allocate resources accordingly and focus on untangling the complex patchwork of vocational education. There is a need to focus on educational organisations such as PTs, which have been neglected in India so far, both in policy and research, despite having a variety of functions that are suitable for addressing the existing challenges. In addition, policymakers need to be clear about the obstacles that have prevented political initiatives from having an impact on existing problems such as the lack of quality in the education system.

The topic of skilled labour qualification will continue to play an important role in an economically dynamic country like India in the future. If the aforementioned challenges of the system

are addressed by the stakeholders, effective educational organisations can be established that enable a matching of the interests of the stakeholders. This dissertation provides some significant insights in this regard.

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Summary of the dissertation

India has a large population and a growing economy with an increasing demand for skilled labour. Despite the large potential labour force, there is a shortage of skilled labour. A functioning vocational education system is crucial for the training and employability of this labour force. One part of the Indian VET system are the polytechnics. However, little is known about the school form and in particular its attractiveness, which is why the construct of the attractiveness of PTs is at the centre of this dissertation. As various aspects have an influence on the construct of attractiveness, further influential elements are analysed. Therefore, the dissertation first deals with the employability of the Indian workforce in order to create a basic understanding of the Indian labour market. Subsequently, an attempt is made to categorise and determine the importance of PTs in the complex environment of the Indian education system. It becomes clear that PTs fulfil an intermediary function and act as a kind of bridge. The dissertation then focuses on the central topic, showing from the perspective of various stakeholders whether PTs are an attractive option in the Indian education system. By using standardised interview formats principals, teachers, parents, students, companies and colleges were asked to what extent PTs could be an attractive form of school, what opportunities they offer, but also what challenges need to be overcome. It has become clear that the different perspectives of those involved have an influence on the attractiveness of the educational institution and that there are differences in this assessment that are related to the respective individual logics of those involved. While students and their parents see PTs as a good opportunity for the learners' individual future as they are also seen as a stepping stone to an academic education, potential employers tend to emphasise more critical aspects such as the graduates' lack of work readiness. Finally, the dissertation takes a look at the micro level of vocational education and training in India and analyses the way in which knowledge is imparted in vocational education and training. It can be claimed that a teacher-centred type of knowledge transfer is very common, which can be a reason for the wide-spread lack of employability of graduates. Therefore, a change to a more student-centred learning would be a solution to improve their employability. Also increasing the quality of vocational education in general would have a positive impact on the attractiveness of the PT school type and the entire VET system.

Appendix

List of all publications of the author related to the topic of vocational training in India, sorted chronologically

- Schneider, S., & Pilz, M. (2018). Demand-driven-Ansätze als Schlüssel zum nachhaltigen Kompetenzerwerb: Erfahrungen aus Meghalaya/Indien. *Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik*, 41(4), 35-39.
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Curriculum Vitae

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