Empirical Study of Vocational Education, Poverty and Inequality, Adult Skills, and Employment: Evidence from Developing Countries

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2023

Vocational education - Developing countries

Adult education - "

Income distribution - "

Poverty - "

Labor market - "

skill development - "

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A Dissertation Submitted to the School of Economics, International Institute of Islamic Economics in Partial Fulfillment for the Award of Doctor of Philosophy Degree in Economics of the International Islamic University, Islamabad.

2023

بسم الله الرحمن الرحيم

DEDICATION

To the ones who are no more yet never gone,

For they live in my heart,

My memories:

My parents

Who

Happily, sacrificed what they had

To realize what we dreamt of.

APPROVAL SHEET

EMPIRICAL STUDY OF VOCATIONAL EDUCATION, POVERTY AND INEQUALITY, ADULT SKILLS, AND EMPLOYMENT: EVIDENCE FROM DEVELOPING COUNTRIES

By

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Signature: _____

Dated: June 19, 2023

Muhammad Yousaf

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ABSTRACT

In this study, an effort has been made to examine the effect of technical vocational education and training on the challenging issues of alleviating poverty, reducing inequality, and employment in developing countries. The study uses the unbalanced panel data of selected developing countries for the period 1970-2019. The use of panel data helps to alleviate the problem of omitted variables by considering the country-specific and time-specific effects. Thus, the study employs various panel data methods such as fixed effect, random effect, and seemingly unrelated regression for unbalanced panel data as developed by Biorn (2004).

The study presents the findings of its three models. First, the study affirms that a significant negative nonlinear relationship between technical and vocational education and training and poverty is observed in the analysis. Moreover, in the mediation equation, the result of technical vocational education and training elasticity of adult skill is positive and significant which confirms that technical and vocational education and training improves an adult skill. Similarly, the non-linear effect of technical and vocational education and training and adult skill is negative and significant. Contrarily, the impact of technical and vocational education and training on poverty is positive. Furthermore, the non-linear impact of technical and vocational education and training on poverty is negative whereas the skill elasticity of poverty is negative. Second, the findings of the inequality model show that technical vocational education and training has an inverse and nonlinear relationship with inequality. Furthermore, the economic growth elasticity of inequality is significantly positive, and the financial development elasticity of inequality is positive and significant. Another interesting finding of the study reveals that due to excess in finance, weak credit laws execution, and thin financial markets in developing countries, financial development decreases economic growth and gives rise to inequality in the country. Third, the findings confirm that as the level of adult skill acquisition increases, employment growth starts increasing gradually which shows the positive relationship between adult skill acquisition and employment growth. The estimation results of technical and vocational education and training on employment growth through adult skill (technical and vocational education and training elasticity of adult skill) are positive and significant. Moreover, the impact of technical, and vocational education and training on employment growth is positive and significant and, the relationship between the interaction of technical, and vocational education and training and adult skill and employment growth is negative and significant.

Based on empirical findings, the study signifies its practical implications for economists, corporate investors, lenders and creditors, corporate managers, policymakers, and last but not least society. The technical and vocational education and training programs are found to be successful in fulfilling their objectives of upgrading the individual by making the best use of the human resources through improved skilled human resources, providing employment, increasing productivity and contributing to sustainable development activities. It is projected that the study will be beneficial in designing economic policy related to technical vocational education and training, and its impact on alleviating poverty, reducing inequality, and enhancing employment in developing economies.

ACKNOWLEDGEMENT

I offer my first and foremost gratitude to Allah Almighty, "who taught man that what he knew not", for granting me courage and perseverance to accomplish the daunting tasks of Ph.D. course and research works.

Secondly, I am highly grateful to my supervisor, Dr. Arshad Ali Bhatti, Assistant Professor, IIIE, without whose support, motivation and guidance, this work would not have seen the light of day. His erudite manner of guidance and stress relieving style impressed me a lot and always appeared as light whenever I felt myself in dark. I always found him helping and encouraging whenever I sought his help throughout this long journey.

Besides, I also stand in gratitude to my teachers who taught me during my course work of M.Sc., MPhil, and Ph.D. program, especially to Dr. Abdul Jabbar, Dr. Faiz Raheem, Dr. Muhammad Hussain Chaudary (Late) and Mr. Arshad Mirza (Late) for their insightful mentoring. I am also thankful to the academic and administrative personnel of IIIE, especially to Dr. Abdul Rashid, Dr. Hamid Hassan, Dr. Babar Hussain, Dr. Babar Amin along with Syed Niaz Ali Shah, Zaheer Ahmed and Arif Khan for their support and assistance during this voyage of academic exploration. In addition to this, I also acknowledge the support and motivation extended by all my Ph.D. fellows, especially by Dr. Ghulam Moeen-Ud-Din, Dr. Tauqir Ahmed, Dr. Anwar Mughees, Mr. Mustansar, Mr. Suleman, Mr. Arshad Sikhani, Mr. Osama, and Dr. Israr who kept their offices and hearts opened for me for group-study during the course work.

Moreover, I am highly indebted to my family and friends for their encouragement and social and moral supports during this long journey, extended over some years. I am deeply grateful to Gp Capt. Moin ud Din, Sqn Ldr Usman Khawar, AIR CDRE Prof. Aslam Bazmi, Wg Cdr. Maqsood ul Hassan, Mr. Ajmal Farooq, Mr. Adnan Rasheed, Mr. Khalid Jamal, Mr. Afzal ur Rehman, and Dr Arshad Ali (SEECS) who encouraged and pushed me to get enrolled in Ph.D. program. Further, I am also indebted to the person who lives in my memories now, Brother Ghulam Hassan Shami (late). I offer my special thanks to my elder brothers, Abdul Qayyum and Muhammad Younas, for their love, support and motivation during all this way of study. I am also thankful to Col Usman Ghani, Mr. Fahad Liaqat, Ms. Zainab Zeeshan, Dr Aiysha Khursheed, Dr Sobia Jamil and Dr. Ehsan Ul Hassan Shami for their full support and assistance.

Finally, I am grateful to my wife Shamsa and kids Rameesha & Raihan for their support and sacrifice. Sacrifice in a sense that I could not give them their due time and could not meet their demands and wishes for being unable to spare enough time for them from this hefty work.

Muhammad Yousaf

June 2023

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LIST OF ABBREVIATIONS/ ACRONYMS

AT	Apprenticeship Training
CTE	Career and Technical Education
EG	Economic Growth
FD	Financial Development
INF	Inflation
INQ	Inequality
LIC	Low-Income Countries
MDG	Millennium Development Goals
MIC	Middle-Income Countries
OE	Occupational Education
OJT	On Job Training
POV	Poverty
PRSP	Poverty Reduction Strategy Papers
SDG	Sustainable Development Goals
SKL	Adult Skill Acquisition and Development
SD	Skills Development
TE	Technical Education
TT	Technical Training
TVET	Technical and Vocational Education and Training
VT	Vocational Training
VET	Vocational Education and Training
OECD	Organization for Economic Cooperation and Development

CHAPTER 1

INTRODUCTION

1.1. Background and Motivation

Since the early 2000s, governments and development institutions all over the world have come together for fighting against the global poverty. The Millennium Development Goals (hereafter MDGs) have formed the first global agenda established to eradicate poverty and hunger by 2015 (Maxwell, 2003). Since then, several documents have been produced. Among others, a key policy document is the Poverty Reduction Strategy Papers (hereafter PRSPs). The main purpose of this document is to describe national strategies for promoting economic growth in a broader way and poverty alleviation (Tarabini & Jacovkis, 2012). Despite several attempts of national and international institutions, poverty reduction remains the greatest global challenge (United Nations, 2012). Worldwide, approximately 370 million people are the poorest of the poor (ILO, 2016a, p. 1).

Sustainable Development Goals (hereafter SDGs) have been approved by the *United Nations Sustainable Development Summit* on 25th September 2015 in New York. The post-2015 development agenda has been discussed by the UN member states. The SDGs have been built on the MDGs adopted in 2000. While the MDGs consist of eight goals, the SDGs have 17 goals, and 169 targets have been described for equitable economic, social, and sustainable development. Primary intension of the SDGs is to follow the principle not to leave anyone behind in term of provision of all basic needs. Here the message is to move towards equality among the developing and developed countries. So, the SDGs again have formed the global agenda established to eradicate poverty as number one.

Poverty eradication is not an easy task as both poverty and its eradication involve multiple human factors (Alkire, 2002). As it is defined, "poverty is, in many ways, the worst of human deprivation. It can involve not only lack of necessities of material well-being, but

also the denial of opportunities of living a tolerable life" (Anand & Sen, 1997). Thus, it can be measured by several phases of a person's life (Anand & Sen, 1997). As per one of the arguments, education is viewed as a critical means to ensure poverty reduction (Cremin & Nakabugo, 2012; Rolleston 2011; Tilak, 2002). Education has been encapsulated as a crucial element for completing the goals as far as MDGs and PRSPs are concerned (Maxwell, 2003). Education "not only generates economic benefits such as increasing salaries, productivity and growth, but also produces social benefits related to social cohesion, political participation, and even to fertility and health" (Tarabini & Jacovkis, 2012). Policymakers, experts, and researchers are still looking for the strategies to alleviate poverty.

Similarly, the SDG 10 is inequality reduction among the countries. According to this target, it is ensured that there are no unequal opportunities, and it is reducing inequalities regarding outcome. The world has recognized the importance of reducing inequality that has been focused specifically with respect to poor's real income reduction (Piketty, 2014). There is a great need to ensure the achievement of reducing inequality in all aspects of life like health, education, social protection, and decent jobs specifically for the young poor community. The continuous efforts have been made to achieve this target around the world irrespective of being developed or developing country.

Adult skill acquisition and development (hereafter SKL) is also an important phenomenon. Terms competency and skill are used alternatively in the educational and training literature. Competency is a capacity which can be applicable widely, while SKL is measured a basic component of competency. It is the capacity that is related to a meticulous context. Competency is defined a mixture of skills, knowledge, and mental attitude which is suitable to the perspective (European Commission, 2007). Both terms are the capacity and ability of a person for acting appropriately in every situation. It involves the applied knowledge and cognitive strategies along with uses of tools. These terms also imply attitudes and beliefs. Among many, some of the categories of SKL are vehicle painting, business services, automotive, entertainment, information technology, primary industry, hospitality, and tourism.

Adult skill acquisition and development (SKL) is the central policy in all over the world especially in the developing countries in this era of competition. If these economies want to attract investment for the growth point of view, their individuals must have certain skills level. (OECD, 2012). Moreover, the fate of unskilled youth is particularly poverty, which is generally observed. Now the question arises that how to acquire these skills levels without which our survival in competition is difficult. The level of SKL is a strong source of acquiring human capital in the long run.

In parallel with the challenges of poverty alleviation, reducing inequality and SKL, the world has faced serious concerns on employment and widespread work deficits (ILO, 2012, 2015, 2016, 2017). In 2012 alone, more than one billion people are either unemployed or living in poverty, and half of the job deficits are in more developed countries. According to ILO (2012), there are three million poor people in Latin America, five million in East Asia and one million in the South Asia who are in these circumstances. Employment hardship is particularly severe among young people. Youth residing in rural areas of developing countries are the most vulnerable, mainly due to their low level of education (ILO, 2015). An ILO report shows that slightly over 30 per cent of youth in developing countries have no educational qualifications at all (ILO, 2015, p. 26). Although educational attainment has been improved, even then, too many young people are still either unemployed, or not in education and training (ILO, 2016b). Hence, there has been a call to urgently address the global job crisis hy recovering the market economy and generating job creation, especially for workers living below the poverty line (ILO, 2012, 2015).

Here comes the concept of Technical and Vocational Education and Training (hereafter TVET) that has been considered as the best source of solutions among others for the above-mentioned issues. The term TVET has been officially used in Seoul, the capital of South Korea in 1999. It is the occasion when a historical World Congress for TVET has been organized. As per definition of UNESCO, TVET is "those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economic life". It incorporates all terms like

vocational education, technical education, on-job training, apprenticeship, and vocational training. TVET programs are providing all types of skills which are demanded in the economy like business services, IT, primary industry, and tourism along with some others (Arthur-Mensah & Alagaraja, 2013; Eichhorst et al., 2012; McGrath, 2002; McGrath and Powell, 2016). TVET programs prepare people for work, alleviate poverty, and enhance the economic growth of a country through knowledge, attitudes, and skills (UNESCO-UNEVOC, 2012). TVET is also seen as a labor force training and development system for tackling different concerns including unemployment, migration of rural-urban, deteriorating possibilities for jobs of formal sector, and satisfying industrial demands. (Arthur-Mensah & Alagaraja, 2013).

Technical and Vocational Education and Training (TVET), in fact, shapes nation's identity and people's lives. It empowers individuals to participate as active members of society (UNESCO-UNEVOC, 2012, p. 6). It is further asserted that TVET does not only promote peoples' skills and knowledge needed for a country's economic development, but also their capabilities Tikly (2013). Therefore, TVET has been becoming the government's main concern (Marope et al., 2015) for the agenda regarding educational as well as national development.

The major thrust of TVET is to report issues of poverty, inequality, unemployment and adult skills development for current and projected challenges and opportunities. It has been observed now a days that global wealth is focused to a lesser extent in lands, tools, machinery, and factories. Physical capital is estimated as three times less important than the human capital in the United States. All the developed nations are responding instantly, along with education considering a major priority in political sector. So, the human capital of high quality is concentrated to be developed in the systems of quality education in addition to the tertiary education that provides the skills of advanced levels which is appreciated as superior at all workplaces of the today's world (World Bank, 2004).

In this study, an effort has been made to examine the effect of TVET on the challenging issues of alleviating poverty, reducing inequality, and enhancing employment in developing countries. This relationship has been analyzed directly and indirectly through SKL. The study offers a fruitful way to enhance the adult skills through TVET that is

beneficial for the policy makers to examine the above-mentioned issues prevailing in the developing countries.

1.2. Objectives of the Research

The study has its objectives which are linked with the SDGs 1, 4, 8 and 10. SDG 4 suggests a transformative education vision to ensure quality education for everybody and encourage lifelong learning. Its vision focusses on the right of education on the principle of equity. There should be participation of everyone in the TVET as per SDG 4 to increase the youth employment through SKL. Furthermore, SDG 8 goals to "promote inclusive and sustainable economic growth, employment and decent work for all". This is the most important goal that will assist SDG 1 and SDG 10 which are "no poverty" and "reduced inequalities" respectively.

The study has the following three main objectives.

a. To explore the impact of TVET on poverty alleviation through adult skills acquisition and development in developing countries.
b. To investigate the impact of TVET on reducing inequality through adult skills acquisition and development in developing countries.
c. To analyze the impact of TVET on employment through adult skills acquisition and development in the developing countries.

1.3. Research Questions

This study comprises following three research questions:

a. Can TVET significantly impact poverty alleviation through adult skills acquisition and development in developing countries?
b. Does TVET significantly reduce inequality through adult skills acquisition and development in developing countries?
c. Can TVET significantly impact employment through adult skills acquisition and development in developing countries?

1.4. Significance of the Study

Strengthening the economy with qualified, capable, and competitive personnel is possible with the main objective of TVET policy. In this regard the aim is to train people to be able to participate for poverty reduction, reducing inequality, increasing employment and sustainable growth. To strengthen national development, it is very important to assess the TVET policy from time to time. Many economies are now much interested to expand TVET programs and arrangements for young people, at all levels in tertiary as well as upper-secondary, to handle the youth unemployment. SKL is the central policy in all developing countries in this era of competition. There is a need for individuals in these economies to have certain skills level if they want to attract investment for the growth point of view Organisation for Economic Cooperation and Development (hereafter OECD) OECD, (2012). Furthermore, the fate of unskilled young people is mostly poverty and unemployment generally observed. The level of skill is a strong source of acquiring human capital in the long run.

Although many of prior studies have shown positive effects of TVET on employment, poverty reduction and reducing inequality in different specific countries, still a lot of room is available to make research. There are several limitations/gaps in previous research. Some studies have experienced with only high-income countries but do not specifically focus on the developing countries. Very few studies are showing evidence of a systematic and comprehensive research for these challenging issues. Some studies have taken a traditional approach for synthesizing and some studies have used vote-counting methods based on certain assumptions. These studies have found significant results. No previous study focuses, specifically, on TVET's impact on unemployment through SKL along with analysing inequality and poverty reduction in the countries of low-income as well as middle-income; thus, there is a dire need to work in the developing countries.

More specifically, most of the literature focuses only on the direct effects of TVET on poverty, inequality, and employment for developed countries, while rare studies are available for the developing countries. Hence, there is a need to explore the precise

channels and conditions through which TVET may affect poverty, inequality, and employment.

1.5. Limitations of the Study

As discussed earlier we want to explore the mediating as well as moderating role of adult skill for the impact of TVET on poverty, inequality, and employment in developing countries. This study has various limitations, for instance, we could not explore the moderated-mediating role of income for the impact of TVET on poverty alleviation, inequality and employment. The moderate-mediating approach is a bit complex approach which estimates mediation and moderation in a single step. Further, due to unavailability of data on several variables and lack of theoretical and conceptual framework, this study could not investigate the other determinants or channels for the impact of TVET on poverty, inequality and employment.

1.6. Structure of the Study

Five chapters have been included in this study including the chapter of introduction. Chapter 2 provides a detailed literature review with respect to four themes: Vocational education and poverty, Vocational education and inequality, Vocational education and adult skill acquisition and development, and Vocational education and employment. Chapter 3 discusses the methodology and data. While, chapters 4 has been detailed for the results and discussion. Finally, Chapter 5 provides the conclusion, policy recommendations, and future directions of research. The references are provided at the end.

CHAPTER 2

LITERATURE REVIEW

Many developing countries are confronting the problems specifically poverty, lack of skilled manpower, income inequality, and unemployment along with many more. Policymakers, experts, researchers, and economists of the world are worried about these problems and are struggling to find feasible solutions to get rid of these exhausting issues. Technical and Vocational Education and Training (hereafter TVET) has been recognized the most essential source among other sources for alleviating poverty and reducing inequality. Similarly, this concept of TVET is also a significant factor to increase the employment level in developing countries. Primary objective of TVET is to train unskilled talent of the poor families and to help them for hunting employment through this skill. The study in hand is an effort to examine the impact of TVET on poverty alleviation and reducing inequality through adult skills acquisition and development (hereafter SKL) in the developing countries. The study also analyzes the impact of TVET on employment advantages and outcomes through SKL in the developing countries.

The study identifies four major themes of empirical literature on TVET viz vocational education and poverty, vocational education and inequality, vocational education and employment, and vocational education and adult skills acquisition and development. A brief overview of these studies has been offered in the subsequent sub-sections along with the gap analysis of the study.

2.1. Vocational Education and Poverty

A strong relationship between vocational education and poverty alleviation has been observed in many studies. Before progressing to present the link between vocational education and poverty, it is pertinent to clarify both concepts. As far as vocational education is concerned, only in English, a range of terminologies for vocational education have been found including technical education, vocational training, technical training, on-job training, occupational education, internship, apprenticeship training, skills

development, technical and vocational education and training, vocational education and training, workforce development, human resources development, and career and technical education (Maclean & Lai, 2011). Using these terms depends upon the specific geographical areas. For example, vocational education and training (VET) is generally applied in Europe, while career and technical education (CTE) is commonly used in the US. These terms are often used interchangeably as presented by different authors in their studies. Meanings of the different terms can vary even among the region or neighboring countries. There is a long debate about selecting and then using any term in different kind of studies. Researchers generally, see their concerned objectives towards their studies in this regard. They are using different terms for profitable organizations and for non-profitable firms. Similar is the case for public sector and private sector institutions, informal and formal sector workplaces. It means that they analyze about multiple factors before choosing any term including types of skill whether it is for basic or intermediate skill level as well as advanced skill level. Additionally, this phenomenon of using terms also depend upon the learning educational setups, enterprises, formal, and informal institutions, along with the organizations for professional and employment programs.

Views remain changing over time, regarding inclusion of any term for different forms of institutions for specific delivery of their several activities. Thus, it is always a highly difficult and problematic task as far as description of vocational and training education is concerned. TVET is conventionally known and understood as myriad forms for learning which has mainly aim for supporting towards participation with respect to worlds-of-work. This may be for increasing effectiveness being an on-going employee or a going to be a newly worker. Although, this definition being tentative is problematic. The idea focusses on ''worlds-of-work'' which is generally acceptable. This study uses TVET with the assumption that it is a collection of technology and practices.

As discussed in chapter one about the term TVET, officially used in 1999, may be defined by different agencies and authors in their own way. However, all definitions try to explain about the study of different technologies in which one can acquire practical skill. TVET builds the attitudes and understanding which is helpful to make capability in someone so that he can be a part of useful asset for the industry and society. This skill may be in the

form of contributing to any aspect of life like educational skill, IT industry, business services, medical services, tourism, or entertainment.

TVET is a solution to the worldwide challenges (Arthur-Mensah & Alagaraja, 2013; Eichhorst et al., 2012; McGrath, 2002; McGrath & Powell, 2016). TVET can provide skills, knowledge, and attitudes that is for preparing people for work, reducing poverty, and increasing the economic growth of a country (UNESCO-UNEVOC, 2012). The major thrust of TVET is to report issues of poverty, inequality, unemployment and SKL for current and projected challenges and opportunities. Aluko (1975) states poverty as "absence or lack of necessities of life" or "lack of command over basic consumption needs such as food, clothing and or shelter", "glaring defects in the economy, etc." According to Aboyade (1987), there seems to be widespread contract that poverty is an idea of tricky situation to grasp, and it is easier to perceive than describe. Even efforts for classifying certain specific aspects of poverty are plagued with disagreement. Taking the example of Organization for Economic Cooperation and Development (OECD) about the guidelines of poverty reduction that "an adequate concept of poverty should include all the most important areas in which people of either gender is deprived and perceived as incapacitated in different societies and local context. It should encompass the causal links between the core dimensions of poverty and the central importance of gender and environmentally sustainable development". Poverty, on one hand, can be classified as relative term or absolute term, while it can also be categorized, on another end, as stable or transitory. Aliyu (2003) explains that the poverty in term of absolute is "the condition where an individual or group of people are unable to satisfy their basic requirements for human survival in terms of education, health, housing, feeding employment, transportation, etc." Supporting this definition of poverty given above Aboyade (1987) defines it accordingly as "the insufficient or total lack of necessities and facilities like food, housing, medical care, education, social and environmental service, consumer goods, recreational opportunities, neighborhood amenities and transport facilities."

Various studies have concluded that the poverty reduction programs are beneficial for the communities. It has been recognized by many economies that the only way to reduce poverty is TVET through skill acquisition. The poor cannot change their fate until they

achieve some skill to get some earnings. Adedapo and Demokun (2021) explore the relationship between skill acquisition and poverty reduction. They use primary data of Nigeria and find that skill acquisition for Gele making (special cloth women use to cover their heads) is a tool for poverty reduction. They urge that the government develop skill acquisition centers at all levels. Special schools should be established for the purpose of vocational training that is helpful to teach skills. Furthermore, soft loans should be offered to help the unemployed begin self-help initiatives. Study proposes that the universities should make it mandatory for all students to acquire skill during their study tenure. The study also suggests that further research may focus on other skills such as communication skills, management skills and educational skills.

Similarly, a latest study has also been conducted to show the importance of TVET. Xu and Sun (2021) have explored the mechanism which is much effective for the vocational education reforms in China to see the impact of poverty reduction in the precision industries. This research investigates the financial and assistance to the poor students and examines the other assistance of vocational college at secondary level for consecutive five years. Just for putting an example of poverty-stricken region, an investigation and analysis has been done regarding knowledge level, educational background, and the behavior of students and their parents towards school. For this purpose, therefore, the study has taken a data of one hundred families who are observing poverty. The study investigates the registration of poor agricultural households, total amount of labors who are living in that rural region and now move into employment. The study is also investigating the growth level for income per capita in favor of farmers of these families observing poverty. As far as the results of this study is concerned, poverty subsidy for the vocational schools, yearly basis, has been increased and at the same time, subsidies for poor families have also been increased. Consequently, the intensity of reducing poverty has been realized to be continuously strengthened. Dynamic management has been realized and this situation has improved the poverty alleviation with respect to the concept of precision. The steady growth has been achieved by the income in terms of per capita. In view of the attitude to school, many parents consider it as a necessary element, but the thoughts of students are not in favor of it. Most of the people are in favor of going to the technical trainings in different localities and many training projects has been taken place whose proportion has

been increasing gradually. To achieve the objective for the development, such types of jobs are much needed by societies nowadays.

In addition to this, other studies show that TVET is an efficient way not only to achieve the target of poverty alleviation but also to throw out intergenerational poverty. It is an important requirement for implementation of poverty alleviation with respect to vocational education. Parallel to this, assessment system for performance of TVET to reduce the poverty is also very essential. With respect to the phenomenon of the performance assessment arrangement, Wu (2020) mainly explores the difficulty of alleviating poverty in TVET. He also examines the problems of constructing an assessment system for the performance of TVET to reduce poverty and places certain actions for its improvement to strengthen the vocational education. The study finds that it is very important to construct a complete accident poverty alleviation assessment system. The development of poverty alleviation assessment system can effectively improve the performance assessment mechanism.

TVET is a central feature of Goal 4 in Sustainable Development Goals (hereafter SDGs) that is to safeguard quality education for all and encourage opportunities for lifelong learning (UN, 2015). There is a need to put thoughts seriously for skills because of having importance of human development. The study of McGrath (2012) is to talk recent thoughts of human development with respect to TVET. It is the TVET that is acting as the main role in transforming work and society. It looks at the great concentration of human development through TVET for sustainable development. That means there is only skill within life-enhancing and environmentally sensitive to have a decent quality of life. This is useful for poverty alleviation and reducing ineqnality through income. It has been observed that the TVET policy provides quick returns since 2010. Even yet, there is a need for reimagining the role of TVET to address the sustainable development (Powell, 2014). McGrath and Powell (2016) offer a new way of thinking which unlocks a new discussion.

An approach of TVET named as pro-poor tourism introduced in UK in 1999 for poverty alleviation in the field of tourism (Ashley & Goodwin, 2007). People are agreed for such training in which they expect to get more returns for their families and country as well

(Hadi et al., 2013; Qin et al., 2019). In the developing countries, government agencies through their concerned ministries of tourism are inspired to design a vocational training system to guide tourism providers. According to the findings, such vocational trainings for tourism activities are helpful to reduce the poverty through earnings. This is because of the skills, they have learnt, how to deal with the tourists (Jakoa, 2011; Kamarudin & Ngah, 2007).

As mentioned above, the successor to the Millennium Development Goals (hereafter MDGs), SDGs are subsequently established to focus on the core causes of poverty and the universal nature of its progress (UNESCO, 2016). SDG 4 recognizes the significance of the TVET as an essential part of sustainable and successful development for the attainment of vocational and technical skills for achieving employment, decent job and even entrepreneurship; the removal of gender inequality and ensuring contact for the helpless (UNESCO, 2016). Now the TVET is recognized as a "necessary element in the development strategies of developing countries" providing employment opportunities and the required skills for concerned industry (Wilkins, 2002). One of the reviews in the literature demonstrates the involvement of TVET for economic and human development in the territory and even outside. The Asian Tigers and Japan are such countries those can be represented for examples with respect to their successful and well-established TVET programs. These TVET arrangement have contributed a lot for their citizens as well as the economic development of their country since 1960s (Agrawal, 2013). Another example can be offered here which is of Singapore who has been also recognized internationally for its TVET's 'significance, values in the planet, and quality. It also remains in quick respond to changing its requirements of labor force (Agrawal, 2013).

During the year 2011, the government of Brazil prioritizes resource allocation towards TVET and targets productive and social inclusion of vulnerable and the poor. Brazilian government emphasizes "entrepreneurship, digital inclusion, self-esteem, health, rights, duties and cooperative thinking" (Glewwe et al., 2015). Analyzing the result, enrollments increase on average by forty seven percent from the year 2011 to the year of 2014. It has also been observed that it has accelerated economic growth because of innovation priorities and new investment (Glewwe et al., 2015). Similarly, TVET program of

Palestine provides an "eight-fold benefit for young women compares to their non-VAT peers" and both male and female graduates who have experienced the unemployment rate as compared to the non-VET male and female graduates (Hilal & McGrath, 2016). Qualification of vocational education demand higher wages relative to the general education at secondary level, for example, twenty percent in the regions of India (Agrawal, 2017) and up to twelve and half percent in the state of Brazil (Glewwe et al., 2015). So, we can conclude from here that TVET has complete capacity for boosting the growth of wages and GDP. There is no doubt that skill shortages have been a significant limitation for the aspirations of many countries like even Cambodia for sustained, strong, and comprehensive economic growth. Solid partnerships between non-government organization (hereafter NGO), Government, and the industry of hospitality are required for financing the Government's novel TVET Policy to improve governance, provide unbiassed access, and to support sustainable development whereas producing the trained labor requires meeting national as well as international demand (ADB, 2018). Different studies present herewith that TVET can support the local and even international markets for the delivery of economic benefits. It also further contributes for better TVET initiatives for learning the future skills and for designing of more appropriate training programs as per culturally requirements.

It has also been observed that the results of TVET have been drawn positive in the (SR) short term as well as in the (LR) long term. Among the latest literature, Miller (2020) explores, using a capabilities approach, the impact of vocational training through finding opportunities for employment. Miller analyzes the relationship between TVET and poverty reduction considering TVET as a productive development initiative in Cambodia. The study is conducted on site over two month's data of NGO vocational hospitality school at Siem Reap, Combodia. The author uses the qualitative right-based approach through narratives of the students studied at school. The study has also used capabilities approach in which students have been supported for human development by the NGO. The study concludes that the students have been facilitated through the training for finding employment which resulted in poverty reduction. So, the study is beneficial for the other countries having the same structure to use different vocational programs for alleviation of poverty in their regions.

The importance of TVET has also been recognized by all media around the world as a vital tool regarding social development and sustainability. The main reason is the stress which is found nowadays for the aspect of employment and provision of human capital to acquire the high growth and development in the economies. Now not only UNESCO (2004) weights on TVET for considering the most significant tool for social development and sustainability but GMR (Global Monitoring Report) has also suggested that the role of TVET for the transition to work from school especially for the marginalized groups. These are the groups who do not have equal opportunities due to poverty and other social and economic problems.

Some of the studies have shown that efforts of NGOs for marginalized groups are appreciated (King & Palmer, 2006). In this regard, studies have been done in Cambodia and Tajikistan to see the role of NGO approaches towards TVET. For instance, Wallenborn (2009) examines the practices for the project of SDPR project that is conducted in Tajikistan at province of Khatlon between the year of 2006 and the year of 2008 for the international debate of TVET on the alleviation of poverty. This TVET project is perhaps one of the most challenging ever conducted in Tajikistan because Khatlon is one of the poorest provinces in this country, and it has also been the region that has been mostly affected due to civil war during the year of 1992 up to the year 1997. The main objective is to empower vocational schools at the rural level in the training and formal education system for designing, implementing, and conducting tailor-made training development programs to target adult groups. The findings and approach of the project has been discussed in relation to an international debate for TVET in the framework of poverty reduction. It is expected that the contribution to optimize the design along with its implementation, monitoring, as well as the evaluation of the similar TVET projects can be achieved by its conclusions.

Many UN organizations have also used rights-based approach for human development. Results of TVET have been observed beyond productivity as well as employability (McGrath, 2012; Powell, 2012). In the framework of capability, the contribution of women has been highlighted by many gender researchers among these marginalized people. It has been shown in some studies that the role of TVET is the key factor for the

concentration on human well-being (McGrath, 2012). Another study has emphasized enhancing well-being and poverty alleviation in the marginalized groups of Occupied Palestinian Territories (OPT) (Hilal, 2012).

The focus of Hilal's study is the efforts made by NGOs for making a mechanism for the crucial challenge of poverty reduction along with human well-being. Different sources to acquired data has been used by this study including secondary data as well as a survey through interviews. In this regard, 2 case studies for vocational educational and training (VET) have been used delivered by international organization that is church-related: the Young Men's Christian Association (hereafter YMCA), and other is Lutheran World Federation (hereafter LWF). Information has been collected from their vocational training centers (hereafter VTCs). The survey targets the data of the graduates from YMCA-VTC at Jericho, whereas other sources of the data for graduates has been taken from LWF-VTC at Jerusalem in addition to Ramallah for the year 2007 along with the year of 2008. The sample size is only 29% of population which is equal to 151 out of 528 graduates. It is observed that data of male is 85% in this survey whereas female are only 15% which showing an imbalance gender reflection in their institutions despite their commitment for including the young women. The analysis of data has been performed using SPSS and then further focus group and interviews have also been conducted. Later, income analysis and contribution of the graduates in the income of their families has been linked to poverty lines at national level. The criteria are to measure the effect of income and employment on the poverty alleviation. Although sample size for the data analysis is comparatively small, even then, it is providing a useful intuition into the TVET. The findings of the study are that a crucial role, evidently, has been played by these programs in increasing the opportunities in favor of the youth at marginalized stage. This role is also assisting women for participating within the workforce by gaining access to the labor market. Furthermore, most of the graduates are now in the capacity of contributing to the income of their family with their own level of income, they are generating through their employment. Untimely, it becomes a kind of protection from the poverty from which they have helped their families to come out in a decent way.

Moreover, it is also found that graduates state that they have gained the maturity through this training. It has also provided them knowledge regarding working of market and awareness of different skills of life. Training has also provided an opportunity to enhance their network and to get a transition to real life and work from the school level. The involvement in these TVET programs helps not only to develop their expectations towards a good quality life, but also create possibilities to meet largely their expectations. These expectations go far ahead of narrow economic concerns and include a clear-cut sense of personal wellbeing as well as social responsibility. The study shows a precedent that young women graduate, who participate in certain TVET programs, have a better position at labor market and have more outcomes in shape of earning comparatively than female individuals who have not access them. This indicates the requirement to add some innovative interventions in favor of employment for women and to increase the connections with the labor market.

It is also suggested through the experience of above studies that TVET programs of a good quality can perform a facilitating role of supporting groups of marginalized people for enjoying economic advantages and broader well-being. Associating TVET to the well-being of humanity suggests offering a good quality training that is relevant to the market for the marginalized and the poor and authorizing them for transformation of the realities about the life for whom they value. This kind of study is essentially only a beginning of thinking about foremost challenges faced by the people who are struggling for developing the wellbeing in favor of young communities of developing countries. Such studies motivate the researchers to make attention for TVET to achieve benefits regarding poverty reduction in other nations.

Going further in the debate of TVET and poverty reduction, many studies try to show poverty reduction from the findings with respect to relative returns of TVET. Some studies have explored that in some cases women have significant increase in their returns and in some cases, men have significantly higher returns of upper and post-secondary TVET (Hollenbeck, 1993; Trost & Lee, 1984). Keeping in mind this phenomenon of relative returns of TVET, Moenjak and Worswick (2003) use the data of Thailand and find with the help of the probit model that TVET is undertaken by well-to-do families.

Their study finds evidence that TVET gives higher benefits than the earnings from general education. So, it shows more value of TVET than the general education as far as earning returns are concerned which is beneficial for poverty alleviation. It means investment for on job training is the key to more benefits as suggested by Moenjak and Worswick (2003).

Taking an example of Africa which is one of the blessed continents yet remains the poorest and the least developed region of the world. Over the last three decades, several African countries have indeed been consumed by a succession of domestic crises. Poverty has expanded around the world has resulted of all these crises, and it has hampered education and contribute to the national in the impacted nations. For the great majority of inhabitants in poor nations, education continues to be a challenge to growth. Many developing countries lack basic raw resources, information, and skills acquired via education and professional (Oriahi & Aitufe, 2010). TVET is generally defined as a type of education that prepares people for work in a certain occupation or range of occupations. According to Hamza (2011), it is a type of education, training, or upgrading that is aimed at improving the learner into becoming productive in either a paid or self-employment setting.

Discussing the example of Africa, many studies define poverty and explore the reasons of poverty crises (Corbett, 2012). Some studies explain the reasons of poverty in Nigeria, one of the poorest countries in developing countries, such as the lack of essential materials, infrastructure, funds, and education (Oghuvbu, 2012; Oriahi & Aitufe, 2010). Some studies show that poverty is increasing due to rapid decline in public funding for higher education (Abdullahi, 2010). There has been recognized that the continent is in dire need of TVET to have qualified and skilled personnel to be equipped well for the new technology. This skill acquisition has been neglected along with the many other facilities to be met to all in African regions (Ajie, 2011; Oshewolo, 2010). Although it has been found that the main cause of state of poverty in this region is lack of skills training along with others, even attention has not been given. Studies of Fluitman (2005) and Ogudu (2013) have shown that narrow focus to TVET has been given and funds have been utilized on other development goals.

Poverty reduction initiatives have been designed in Nigeria for many times but have produced very less fruit. For this purpose, Philip (2014) explores that TVET significantly reduces the poverty in Nigeria. His study also identifies the factors that are main causes in applying the programs of TVET. The question, how it can be used being an instrument for enhancement of development and alleviation of poverty in Nigeria. He further recommends reviewing TVET policy and availability of funds for TVET school level integration of TVET with general education. Furthermore, he advises that the government reconsider vocational education policies in order to improve the Nation's growth.

The study of Usman and Tasmin (2015) identifies different strategies which are used to enhance skills-acquisition for the undergraduate (UG) TVET students because of the improved industry collaboration in Nigeria. Their study reviews the provision of scheme with respect to work experience and positions for the undergraduate candidates in the industry. Above scheme is constantly accepting positive results under the command of Industrial Training Fund (hereafter ITF). As entrepreneurship education is very important for the promotion of strategies in creativity and reducing poverty, it has been used as an instrument through industry collaboration. It is recommended that stake holders from the economy should join hands to assist the youth's poverty. They should provide youth skills, entrepreneurial behavior, and awareness to increase their output for generating income. So, it is concluded to provide them a plate form where they can achieve such commercial and entrepreneur activities for getting more opportunities which help them to get more income for alleviation poverty in their region.

Looking at the case of India, who has made remarkable progress and achieved near universal enrollment in primary school education. However, the quality of learning and progress beyond primary education are of concern; nearly 50 percent of fifth graders are unable to read second grade material and retention rates at the secondary level are quite low. The higher education sector has also shown impressive growth but faces several challenges around inequitable access and low quality. Low outcomes at the secondary and higher education levels have resulted in a significant deficit in employable and vocationally trained individuals in the workforce. Evidence shows that just 14 percent of new entrants to the workforce are likely to have a college or graduate degree. Research

also shows that over the long term, low outcomes at the secondary and postsecondary levels are likely to translate into low lifetime earnings and well-being. Considering low educational and employment outcomes, policy in India has focused on skill development through TVET sector. The most important purpose of these strategies is to significantly enhance the participation rate of young adults and youth for these programs. Though, we find evidence of limited research on TVET not only in India but also in many developing countries.

Most colonial territories and several Western nations have historically restricted technical and vocational education to a lesser extent of academically inclined, generating a bad view for technical and vocational education which results in low enrolment, but completion rates are high (Alagaraja, 2012; Fuller & Unwin, 2011; King, 1993; Oketch, 2007; Symonds et al., 2011). Such unfavorable view has altered during recent years as technical and vocational education has been expanded to encompass lifelong learning for the students and policymakers battle with addressing labor market skill needs. (Machin & Sparreboom, 2005; Symonds et al., 2011). Emerging economies, for example, see technical and vocational education to develop a skill and training system for expanding their labor force and tackling concerns like rural-urban mobility, unemployment, dwindling formal-sector job prospects, and satisfying the demand of manufacturing for more industrialized countries (King, 1993; Oketch, 2007; Stuart, 2012). Technical and vocational education can take place in several locations, including institutions for academics and businesses, and it can benefit a broad range of individuals. As a result, this technical training's ability, and flexibility to satisfy different skill requirements turns into an appealing style of education for both businesses and students in the labor market (Hughes, 2005; King, 1993). Now the school-based training takes place at various educational stages at secondary as well as and postsecondary institutions or organizations (Lynch, 2000; OECD, 2010). Though, in few emerging economies, technical and vocational education may be introduced into the curriculum of primary level to expose kids to manual and practical tasks when the formal schooling comes to an end for certain graduates. (Akyeampong, 2002; King, 1993; Oketch, 2007).

Technical and vocational education and training (TVET)'s complex character necessitates a large range of different activities to ensure its success. TVET has moved from concentrating exclusively on pupils to including employer demands (OECD, 2010), necessitating collaboration with business partners. Partnerships provide TVET students with chances to obtain practical experience in a real-world work setting through activities like internships, job shadowing, and apprenticeships. TVET strives for inadequate resources, making it difficult for programs of TVET to play an increased involvement in the preparation of workforce (King, 1993). Better partnerships among companies can assist in the shape of mentorship, equipment use, and training, along with resources with respect to finance. (Grubb, 2006; King, 1993; OECD, 2010).

Grubb (2006) concedes that remaining current is a big issue for TVET schools, particularly those with little linkages to companies in the labor market. It is vital to review and revise the TVET content on a frequent basis to produce TVET more sensitive to labor market demands and to contribute meaningfully to economic growth (Kararach, et al., 2011; Ohinwerei & Nwosu, 2013). education TVET curriculum improvements have included the inclusion of academic topics such as mathematics, sciences, and literacy, which can increase the commercial viability of TVET graduates and their chances of finishing their studies (King, 1993; OECD, 2010; Stone, et al., 2008; Symonds et al., 2011). Due to the nature of their training, TVET students have traditionally been barred from pursuing further education. However, including academic courses within TVET has increased chances for further educational levels. (Bandias, et al., 2011; OECD, 2010; Powell & Solga, 2010).

Techniques for the issue of quality assurance are also required to improve the credentials of great quality and facilitate the system, because it guarantees that student's abilities encounter the needs of proprietors while also giving them with the knowledge, they need to build the best choices for their career (Wagner, 2008). It is especially important in TVET since numerous authorities might oversee distinct strands of technical and vocational education, especially in emerging/less developed nations (Akoojee & McGrath, 2006). Furthermore, to correctly estimate TVET's effectiveness, it needs to be assessed not only against prevailing rules and procedures, but also against altering human

capital demands, demographics, and worldwide developments. (Fretwell, 2003). The outcomes of such assessments must be conveyed to partners for them to make smart judgments concerning TVET development, sustainability, and delivery.

Technical and vocational education and training (TVET) has the ability to help people build skills for themselves and their communities, lifting them out of poverty. To that aim, governments must pay heed to informal TVET (Hughes, 2005; King, 1993; McGrath, 2002; Palmer, 2009). (Hughes, 2005; King, 1993; McGrath, 2002; Palmer, 2009). Entrepreneurial education has gained in popularity in many TVET courses, especially in developing nations, as the integration of management studies to practical courses allows TVET students to seek self-employment after graduation. This technique aids in managing the high unemployment rates amongst TVET graduates as well as the broader population (King, 1993; Nafukho & Muyia, 2010). TVET's ability to satisfy a variety of skill demands makes it appealing as a way of instruction for both organizations and employees, as it provides the versatility to meet a variety of skill needs that are important to each (Hughes, 2005).

After analyzing the available literature, the study highlights the insights of current literature in such a way that TVET is a very important learning activity of education and training. It enables and strengthens people through attitude, skills, and knowledge. This helps them to get jobs quickly after schooling thus resulting in getting earnings. Evidence from the above studies shows how much importance is there for TVET implementation for the reduction of poverty. Specifically, it examines the role of TVET on poverty reduction through skills in developing countries so that investment decisions regarding human capital may be taken efficiently and effectively.

In addition, lack of consistent policies regarding TVET becomes the major reason for the high-level of poverty in the developing countries. Governments of all economies are now realizing that if they want to reduce poverty on a serious note, they will have to think about TVET for human capital in a serious note. Therefore, to alleviate poverty, funding for TVET should be increased as recommended by different studies with the experiences of different countries. This study focuses rigorously to explore the impacts of TVET on poverty reduction through SKL in the developing countries.

2.2. Vocational Education and Inequality

Inequality is closely associated with poverty. Just like efforts of poverty alleviation, many studies have tried to find out the solutions of reducing inequality. Attention on reducing inequality is nowadays focused globally, specifically with respect to real incomes reduction of the poor (Piketty, 2014). Inequality is a universal feature in the world's economies. Not only developed but also developing countries over the past generation are experiencing greater inequality. However, empirically, it has been proved that a rise in the quantity of skilled labor is reducing the inequality because the return is increasing with the help of TVET programs. So, there's a powerful correlation between TVET and income inequality.

One explanation of increasing inequality that has been observed is the technological progress which is unmatched with the available skilled human capital (Berman et al., 1998). In the field of information technology and communications technology, efforts have been enhanced to make revolutionary changes for skill development (Katz & Autor, 1999). Behar (2016) explores technical change as a contributing factor in the developing countries and finds it is endogenously skill biased. According to his findings technological change may not be necessarily skill biased. It can favor either unskilled or skilled workers. Few studies have introduced this concept of technological change for the countries of low-income as well as the countries of middle-income (Acemoglu, 1998; Kiley, 1999). Behar's study is the only from one the handful of published studies that models the technical change. There is some difference in opinions in the literature showing skill bias of technological change which are related to endowments and some other conditions seem to be consistent supported by a formal analysis (Atkinson & Stiglitz, 1969; Caselli & Coleman, 2006).

The nature of the technology used by the developed countries shifted to developing countries and they need such skilled persons (Berman and Machin, 2000). Concluding the above discussion, one can understand that SBTC is a very important contributor to increase inequality in developing countries. However, a study showing education and technology recipients may be able to adjust the SBTC (Tinbergen, 1975). It may or may

not alleviate inequality and there is a possibility of no assistance for the people who are unskilled.

Acquisition of skills along with education is considered as a symbol of growth generation (ILO, 2014). It has been observed in some studies that job-related training has significant effects on growth in earnings and inequality reduction (Attanasio et al., 2017). But what about the incomes of the poor people who are already having low incomes and not able to go for training because of the shortage of funding? So, the concept has been highlighted by Aizenman et al. (2018) that with a limited number of resources, subsided education should be focused. In order to answer the question whether a free college education is the key solution for the working poor, Aizenman et al (2018) examine the OECD countries. He finds the pattern which tells that improved access of better TVET can probably benefit more than increases in college education. The study demonstrates its results in a way that there is an association between TVET and the income of the poor people who are working. An example of Germany and United States in the study suggests the support to this phenomenon.

Some other observations of the literature have confirmed the effectiveness of TVET programs (like randomized control methodology) in countries of specific nature (LaLonde, 1986). Recent examples can be taken for Colombia, Uganda, China, Thailand, and Dominican Republic (Attanasio et al., (2017); Blattman et al., (2014); Yang (1998); Moenjak & Worswick (2003); Card et al., (2011). Association of different programs has the effectiveness accordingly from the findings of the above-mentioned literature. But without any doubt, TVET programs have financial benefits higher than the general education. So, as suggested by some studies that public policy should desire more investment in TVET than academic education. However, El-Hamidi (2006) examines Egypt, and finds the opposite preference. He argues that general education along with on-the-job training offers the highest benefit. Chen (2010) also finds heterogeneities in the outcomes using data of a panel survey of Indonesia households.

Some other important factors also need to be taken into considerations that are affecting such decisions of adapting TVET for the discussion of inequality reduction. Students may select TVET rather than the university degree because of their financial reasons. Here

again, the effect on inequality may be observed. They may focus on well-being as of increasing incomes with doing jobs and skilled work. Whenever the people are well off, they become in a position to get rid of poverty. So, income inequality reduces that helps the poor to live in high morale.

Some studies discuss the concept of artificial intelligence and information technology, and their impacts on earnings again creating inequality among the different sectors of the economies. We are not sure if sufficient jobs will be offered in the new industries to compensate for old industries that have disappeared due to outdated technology (Acemoglu & Restrepo, 2020). The outcome of Aizenman et al. (2018) is this TVET that is playing a key role in deciding the income or wages distribution. That is why TVET has a huge impact on inequality. Hopefully, targeted TVET and re-training will stop the unemployed future for whose consequences are not yet be understood. An example from Singapore, known as the manufacturing economy, can be helpful to understand the subject because he achieved the benefits from the TVET provided to different age groups.

Income inequality is also closely related to the wages of individuals. Understanding wage inequalities is very important in this regard because of welfare variances among the people. Relationship between education and wage inequality using regression model is explored in developed economies like USA, Spain, Australia, UK, Germany and Ireland by researchers such as Buchinsky (1994), Abadie (1997), Budria and Moro-Egido (2008), Hartog et al. (2001), Machado and Mata (2001) Machado and Mata (2005), Martins (2004), Andini (2010), Ferstere and Winter-Ebmer (2003), Prasad (2000) and Gernandt and Pfeiffer (2007) and McGuinness et al. (2009). Similar studies have been investigated for several other European countries by Pereira and Martins (2002), Martins and Pereira (2004), Budria and Pereira (2005), and Prieto-Rodriguez et al. (2008).

From the viewpoint of results regarding wage inequality, during the 1980s, wage inequality has been increased as there is an increase in wages of skilled workers as compared to the less-skilled Juhn et al. (1993). Ultimately there will be an increase in the demand for skilled labor. So, different studies have given evidence of wage issues with respect to inequality (Borjas & Ramey, 1995;Feenstra & Hanson, 1996; Blom et al., 2001; Gonzales & Miles, 2001). It basically motivates the workers to acquire skills by

any method they can have to enhance their earnings. As a nation builder, every economy especially developing economies, has a responsibility to provide such opportunities and environment where the poor can have some skill. TVET is one of the best strategies for making poor skillful to reduce the income inequality.

All above cases of wage inequality are from developed countries and it is considered that it is due to SBTC. If this is the case, then wage inequality will be more in developing countries as compared to the developed countries. It means, there is a huge room to investigate this inequality regarding wage and income perspective discusses by Berman et al., (1998) and Tansel and Bodur (2012) exploring the results of male wage inequality. Their study has been done in Turkey, investigated for the period of 1994-2002. Equations of Mincerian wage are estimated by using OLS and quintile regression techniques. The main findings are that male wage inequality is high, and it also indicates that wage inequality deteriorates at the bottom end and enlarged at the top end of wage distribution. One of the reasons is the considerable improvement in the education. Inequality has been experienced even in past just like the current time. In particular, the effect of an alternative of TVET, as in Germany, gives an expected possibility of more returns so that income inequality is going to be reduced in the developing countries.

The impacts of socioeconomic origin on educational achievement have frequently been divided into two main effects (Boudon, 1974). Dropout risks are dispersed across various social groups as a result of inequities in vocational education. Overall, educational achievement discrepancies are a well-documented issue. As Shavit and Blossfeld (1993) established in their seminal work, family background has continued to impact vocational educational achievements in the industrial nations throughout the twentieth century. The linkage, but from the other side, has been demonstrated to fluctuate over time and among nations (Breen & Jonsson, 2005). To some extent, the correct mix of academic and occupational policies appears to alleviate vocational educational gaps (Ross, 2009).

The fact that students from diverse socioeconomic backgrounds perform differently at vocational schools is referred to as a primary impact (Van de Werfhorst & Mijs, 2010). This finding has been explained in a variety of ways, including ethnic disadvantages, such as lower-educated parents being less able to assist their children, and economic

constraints, such as disadvantaged families having fewer resources available necessary to finish well, such as lecture halls or ICT equipment. A secondary impact of social origination refers to the finding that even students with the same measure of academic proficiency appear to make different academic preferences based on their social origin (Breen et al., 2009). Although, it is common that all the graduates consider vocational training as a form of education that allows them to attain skills and knowledge at a basic level. The gender and social disparities in TVET differ across 12 different European nations (Iannelli & Smyth, 2008). Women tend to be least disadvantaged in the east European countries under study and most disadvantaged in southern European nations, France, and Belgium when it comes to accessing vocational education and securing job. Little of this massive disadvantage is alleviated by higher training in any region.

The study of disparities between TVET and the workforce begins to focus on comparisons at the end of the 20th century. TVET is a hot area of study up to the year 2000 in several nations, although almost all of it is done at the national or municipal level. It is peculiar to each country and reflects the various governmental considerations and notions of TVET in those nations. When young unemployment rates start to grow in the 1970s, officials start to get interested in cross-national comparisons because they want to learn how other nations are resolving the issue. (Reubens, 1977; OECD, 1977). In the 1980s, various comparative studies, particularly of technical and vocational education and training, are motivated by the rising concerns about national economic competitiveness and the role that education and training may offer (IMS, 1984; OECD, 1985; Hamilton, 1987). By the decade's conclusion, research comparing inequality and vocational education across nations starts to emerge in several countries. (Allmendinger, 1989; Rosenbaum & Kariya, 1989). The 1990s have seen a continuation of this trend. To compare their findings internationally, social scientists of different countries who have examined the transitions between school and work within their respective nations collaborate in networks and research teams. (Ryan, Garonna & Edwards, 1991; Shavit & Muller, 1998; EGRIS, 2001; Raffe, 2001). High-level conferences on transitions of education-work are held by the OECD (OECD, 1999a; Stern & Wagner, 1999), undertakes a Thematic Review of fourteen nations in 1996 (OECD, 2000).

The European Union commissions comparative study projects on vocational education and inequalities (Hannan & Werquin, 2001) whereas Kogan and Muller (2003) has added a module on Ad Hoc basis to Labor Force Survey on this subject in 2000. The rigor of comparative research, both qualitative and quantitative, increases throughout time; descriptive "side-by-side" comparisons of transitions in other nations (Ashton & Lowe, 1991). It then leads to further in-depth comparisons where national studies are compared using a shared theoretical framework and research topics (Shavit & Muller, 1998). Muller and Gangl (2003) perform comparative analyses using cross national data whereas Teichler (2007) gathers first-hand cross-national data. It is observed that with the passage of time transition in comparative research contributes towards the expansion of methodological elegance, theoretical ambition and accommodates several numbers of countries in 2000s (Brzinsky-Fay, 2007; Blossfeld et al., 2005; Huitfeldt, 2008).

Interestingly, the research gives us the insights of two messages. One is global trends affecting TVET just because of inequalities. Young people are having more unfavorable impact due to inequalities. High risk of underemployment or unemployment are faced by the young people as compared to the older workers. So, the policies have been prepared for improving skills and for promoting knowledge. The objective of these policies is to alleviate inequality achieving direct impact in favor of young people. Second message is about the nature of global trends which are not prominent to convergence of cross-national. There are a lot of differences among the countries in their processes and outcomes of TVET and such differences are continued.

Comparative researchers Kerckhoff (2000) and Walther (2006) have explained these continued national differences for inequalities in TVET with respect to institutional differences among countries. They have argued that TVET and the system of training have shaped the outcomes and processes of transition. The same has heen done by the family structures, welfare system, other institutions, and lahor market. All above aspects whose interrelationship and character are varying in the different countries. The transition process as well as outcomes are shaped by the structural arrangements (Smyth et al., 2001) whereas societal institutions include a system of transition (Muller & Shavit, 1998). Some other terms like, dimensions of societal variations, institutional effects, and transition

regimes convey the similar sense. A specific logic that shapes TVET with inequalities in a country is generated by every transition system. These systems cannot be changed easily because of having deep cultural and historical roots. Having the characteristics of mutually reinforcing for different elements of these systems is another reason of staying unchanged.

The policy analysts are facing a lot of issues due to the concept of inequalities. Policy makers are interested to find out the best practices and different techniques to come out of inequalities using cross national comparisons. They compare these transitions for the years of 1980 and 1990. Reasons for dealing it is to learn awareness about the models and policies of TVET which are beneficial for promoting skills to get employment for youth. Some of the researchers assume that the best practices in one country can also work effectively in other country (Raffe, 2007; ETF, 2008). This assumption has created doubts when it is discussed with respect to TVET policies. It is suggested that the policies, logics, and provisions shaping inequalities may be ineffective in a country those are effective in some other country. So, there is a need to have a distinct best practice for different countries depending on the concept of inequalities, gender, and discrimination in the TVET system.

Adult rate of unemployment is lower than the youth rate in OECD countries. Young people change their jobs more frequently and even between unemployment and employment periods (Couppie & Mansuy, 2003). If we compare youth jobs with adult jobs, youth jobs are lower paid and less secure (Quintini & Martin, 2006). The reason for this phenomenon is not lowering the aspirations of young people but the inequalities in gender and faith. They have much inspiration as compared to adults because they want to do a lot in their life being at the early stage of their professional life. The orientations of employment are conventional and strong in many countries (Krahn & Lowe, 1999). Personnel at jobs with more access of business networks and more experience, being insider, face competition from the young people who are entering as outsiders of labor market.

Employers are always in a great risk when they hire young people instead of adults because of their future performance which is unknown in later period of their

employment. They have only the option to depend on the potential of young people via their known qualification or obtaining information through business networks or their personal networks. Another important aspect is the training program for which employers are required to arrange after employment for these young people. They need to spend less amount of money on the training for older workers as compared to young people. This heavy investment on the training for young people has increased relative disadvantages of employers. Although young people are having a huge aspiration but their importance of working for labor market has been deteriorated relative to adults (Freeman, 1999). A study has concluded this phenomenon for young people which describe as the losers in the process of globalization as compared to the young adults (Buchholz et al., 2009).

Selection and then preparation of young people towards labor market is very important and TVT programs are playing an important role for this purpose in all developing and developed countries (Van der Velden 2001). As far as education is concerned, there are three functions according to the suggestion of Velden. The first one is skill production, second is screening or selection, and the third is allocation. The screening or selection is about to sort students into various tracks whereas allocation means influencing to jobs. Some other commentators have added another fourth function called socialization. They explain skills production as inclusion of developing appropriate attitude, experience, identities, and disposition of work. Additionally, some other skills along with technical skills are important like soft skills includes interpersonal skills, self-confidence, and management skills in the career. Emphasis has been increased to make policies in favor of youth transition for making them responsible to manage the shifts by themselves and for over-all employability skills. (Brooks, 2009; Wyn, 2009).

Teehnical and vocational education and training (TVET) programs have been substantially enhanced during the past decades especially in young women. These are the young women who are overtaking men. If we see this it in absolute term, credentials have been downgraded. Some credentials do not offer much desirable jobs as compared to the past, but it is reserve in relative term which become wider the differentials or inequalities particularly between the graduates of university and all others. Opposite to this, young people who have no qualification or have less qualification and they leave TVET

programs are facing a lot of difficulties in the progress of transition making (Smyth et al., 2001). These differences often compound, and interact with, other inequalities in the process of transition which are also associated with disability, social class, and ethnicity or race (Furlong & Cartmel, 2007). The trend of increasing participation of young women towards traditional male occupations and subject continues to make differences between female and male. This is happening because of a smaller increasing trend of young male participation towards traditionally female jobs fields outcomes and processes of transition (Gayle, Lambert & Murray, 2009).

Rosenbaum et al., (1990) state that, in many countries, the employers face problems of poor information regarding inequalities of after receiving TVET to find the right job. Such information is usually not available by that how inequalities made huge differences through vocational education especially in the case of gender. There is some information available on inequalities through networks of institutions which are made up differently in various countries that results in different outcomes and patterns of TVET. Similarly, analysis of differences between inequality and TVET has been concluded in another study (Van der Velden, 2001). This is also about handling the above three functions of producing skills screening or selection and allocation.

Looking at the inequality rate in TVET for different countries of the world in 2007 especially for OECD countries, it ranges from 7-8 percent to 19 percent or more. This is among the young people who are less than 25 years old. Rate of 7-8 percent is in Denmark, Ireland, Iceland, and Switzerland whereas the inequality rate of 19 percent and more is in Belgium, Poland, Italy, Slovakia, and Turkey. If we see this rate among the non-European countries, 6.7 percentage is in Mexico. Some other non-European countries have different rates like 7.7 percent in Japan, 9.4 percent in Australia, 8.8 percent in Korea, 11.2 percent in Canada, and 10.5 percent in the US. Analyzing the data of 1997 and the year of 2007, we observe that the young people get affected due to inequalities in TVET. It also has been observed that the unemployment rate for youth halves in Spain and Ireland but falls substantially in Greece, Finland, and Italy. These highest rates remain continue to be observed in southern Europe as well as in eastern along with France, Belgium, and Sweden.

Merely obtaining employment after having TVET is not an adequate indicator of a winning transition. Quintini and Martin (2006) observe that TVET leaver who finds any job, looks like a rule of a temporary employment in Europe. Over half of the youth who are employed after one year of leaving vocational education institutions due to inequalities in 2004. All of them get temporary contracts in Poland, Sweden, France, Finland, Spain, Portugal, Germany, and Italy. This proposition is below twenty percent in Austria, Hungry, Iceland, Ireland, the UK, and Slovakia.

The young people (Gangl, 2001), who recently facing the inequalities due to gender ethnic discrimination after having the vocational education now, are placed less favorably in labor market as compared to the experience workers. However, the speed for integration of labor market in respect of young entrants is varied as compared to the pattern of adults in the labor market of the different countries. This speed has measured by (Couppie & Mansuy 2003) comparing young people who have different experience for full-time employment in the labor market. This is done for up to two years, three to five years, five to ten years, and so on regarding inequality, unemployment rate, gender, temporary employment, occupational distribution, and entry rate to and leaving from unemployment. Similarly, the speed for labor market integration is different in the European countries depending upon the selected indicators. As per many analyses, the speed is the fastest in Germany, Australia, the Netherlands, and Denmark whereas the slowest in European countries of south, except Portugal, in France, Ireland, Belgium, and Sweden.

Some students work in the labor market and study as a part-time student. Conversely, some students engage in apprenticeship during the period of their study time. It all depends upon their different status in different countries as per their own policies for their young people. So, such status of students is also source of inequalities. Austria, Denmark, and Germany offer high numbers of working opportunities in the organizations in the shape of apprenticeship whereas large numbers of working students are found in the Netherlands, Denmark, and the UK who are studying part time (Wolbers, 2003). In some other countries, such kind of dual statues, working students and studying workers, is not a more important attribute (Kerckhoff, 2000). Considering the expectations of average person to spend the period in the status of vocational education, the trend is also different.

Average person between fifteen and twenty-nine years old, in the Netherlands, Iceland, and Denmark, expects to stay more than two years in the capacity of vocational education. Austria, Finland, Norway, Switzerland, the UK, Sweden, and Germany experience even greater than this period of two years. However, this period is shorter in some of the European countries in addition to the eastern and southern countries of Europe as well as in France, and Belgium (OECD, 2008b).

Brzinsky-Fay (2007) compares young people in 10 different European countries due to inequalities during the initial five years when they have completed initial education. He compares the sequence of transition for five different statuses which are education, apprenticeship, and employment along with unemployment and then inactivity. He identifies eight types or clusters of sequence whose occurrence varies across countries. Large numbers of clusters where TVET program leavers usually involve in a relatively sustained and rapid transition towards employment has been observed in Belgium, France, and the UK. Brzinky-Fay has labeled these types of sequences according to the different descriptions. We have discussed above the express sequence being the first type he labels about the sequence. Denmark is also observing this sequence commonly however, many young people in Denmark are experiencing other sequence type labelled as return which means returning towards TVET programs after spending some period in the capacity of an employee. Another type is break in which young people wait for a brief period before getting any employment opportunity. This break sequence is common in Ireland, France, and even in Greece for their young people.

Therefore, the countries vary in the processes dynamically by which outcomes are being achieved. These countries also differ in the outcomes of transition such as the rate of unemployment and employment types. Further variations in the countries are found when we try to get correlations between educational attainment and transition outcomes. Although, there is a strong correlation between occupational entry and educational attainment in general but in the countries of Southern Europe, the high attainment does not help much to protect youth against unemployment (Gangl, 2003). However, in most countries, young people have achieved better opportunities of employment through educational attainment. Comparing TVET with academic qualifications, it is observed

that the value of TVET in the labor market relatively tends to be greater in Denmark, Germany, the Netherlands, and Austria as compared to other countries in Europe (Gangl, 2003). Another study has provided qualitative perspective for the linkages between TVET, inequalities and employment. It is with respect to the graduates in higher education for thirteen countries mainly European countries (Allen & Van der Velden, 2007). Only about fifty percent of graduates in Germany, the UK, and Italy feel that their TVET programs have provided sound entry tickets in the world of work and rest of them due to inequality issues, they are still not successful to reach their employment goals.

The research distinguishes two types of causes and consequences: a collection of vocational training methods and a set of socioeconomic policies aimed at reducing inequities and situations. (Kritikos & Ching, 2005). As dropout often occurs due to incqualities as the endpoint of a vocational educational career marked by failure, it is particularly relevant to consider how the design of the vocational educational system deals with disadvantaged or low achieving students (Lamb et al., 2010). A common response in many nations has been to separate low achievers from their academically more talented peers by placing them into less demanding tracks at an early stage in their career (10-14 years). It has been repeatedly shown that such early tracking increases the gap between strong and weak students (Hanushek & Woessmann, 2006) and between students from different social classes (Dupriez & Dumay, 2006; Duru-Bellat & Suchaut, 2005; Horn, 2009; Van de Werfhorst and Mijs, 2010) as it raises a number of structural barriers for disadvantaged students to proceed successfully (Husén, 1975). Hence, we expect that early tracking also reinforces the effect of social background on the probability of graduation (Brunello & Checchi, 2007; Pfeffer, 2008).

At the same time, the vocational tracks which cater to the less academically inclined students may act as a safety net against dropout. In particular, when vocational education delivers specific skills highly demanded by the labor market and disturb it due to inequalities in terms of income, gender, and same kind of issues it may not provide access to relatively safe and well-paid jobs.

Despite the relative strengths and weaknesses of the available measures, empirical studies show that they are mainly in agreement when comparing inequality differences across

countries. However, the evolution of inequality within a country or the effectiveness of a specific policy can be perceived differently depending on the specific metric under consideration, as well as what variable is being measured. For instance, if policymakers care more about what happens to the poor, they should use the Gini coefficient as their inequality measure and focus on consumption instead of income data. Before choosing a particular metric, a decision must be made about the dimension of economic inequality to be measured. This choice is important, not only from a conceptual point of view, but also because it determines what instruments are available to policymakers trying to correct a given distribution.

After critically reviewing the above the literature of income inequality the contribution of TVET is observed to economic growth concluding that education has always been considered a dominant tool for reducing inequality through productivity enhancement, which is also a key factor in sustainable development in the country. Therefore, to address the need, the present study interests to test the theoretical considerations regarding the challenges to alleviate the poverty in the developing countries. Income inequality is closely related to the wages of individuals. Not only developed but also developing countries over the past generation are experiencing greater inequality. However, empirically, it is intended to prove that an increase in the supply of skilled labor reduces the inequality because the return will increase with the help of TVET.

2.3. Vocational Education and Employment

The world economies are trying to walk with the pace of technological improvement and quick progress that has been realized during past years. This is not possible without the technological equipped manpower in all spheres of life. So, the importance of skilled personnel has been increased more than the previous time. To get such employees who can handle the new technology, developed and developing economies have started their efforts in a serious manner. They have tried to find out different ways for equipping their human resources. Technical and vocational education and training (hereafter TVET) is one of the best strategies that is found responsible for creating skilled human resources resulted in enhancing the employment level.

Technical and vocational education and training (TVET) is not only a hot and crucial issue in this modern era but the importance of TVET has been recognized many years ago. Applying the source of literature of history of education and sociology, Benavot (1983) has described few perspectives with respect to rise of programs related to TVET in all over the world in the beginning of twentieth century. This is the industrial revolution that has produced such point of view relating to the rise in TVET along with technological improvement. Just because of the mechanization processes, we see more specialization and the complexity in the jobs which have increased the demand of skilled manpower. It is beneficial for promoting educational growth from which talented and technical labor force can acquire skills and training. So, the requirements of skills acquisition for old jobs are elevated at this phase of time due to the general methodologies of different training are not sufficient. Therefore, the major goal for expanding the TVET programs and training sessions is not only the fulfillment of the demand for technically sound personnel but also to fit in the students related to lower economic and social background for certain trainings and to make them well-organized and trustworthy workforce.

After the mid-twentieth century, independent nations start expanding post-primary education and many TVET programs are introduced at the secondary level (Benavot, 1983). During the post-World War II period, many international agencies, such as the International Labor Organization (hereafter ILO) and UNESCO, played major roles in the development of TVET. It has been opined that after the Second Industrial Revolution at least three ideal models of the vocational system emerge. First, a market-led system in which a labor market characterized by substantial mobility provides much of the vocational training. Second, a school model where most of the TVET takes place. Third, a dual model with the presence of an apprenticeship system (Nilsson, 2010). These models continue to distinguish today's national systems.

So, that is the reason that the creation for technically talented manpower has become a challenge, during the recent years, in most of the countries due to the enhancement of their skillful workforce that has been continued to be unsatisfied. Thus, the energies have been placed in a serious manner on TVET arrangements for completing the demand of skilled manpower. Different steps have been initiated for a comprehensive TVET

programs by the government of several nations specially in the South Asian economies. It means that the TVET programs have become the main policy agenda among the developing as well as developed countries for remaining in the labor markets in an efficient way.

Technical and vocational education and training (TVET) have played a central role in promoting the school-to-work transition of young people. Despite this role, the return to TVET has been neglected in previous studies. However, strong evidence has been found regarding the use of TVET programs in developed economies, hut very rare evidence has been observed from the developing countries. In fact, mixed results of government TVET programs from the UK, the US, and other industrialized economies have been justified.

Many studies explore the importance of generating employment through human capital policy (LaLonde,1995; Heckman & Carneiro, 2003; Heckman & Krueger, 2003). Some studies from the US about the programs of randomized training show interesting results, such as (LaLonde, 1986; Burghardt & Schochet, 2001; Card & Sullivan, 1988). However, the picture may be different in developing nations, as levels of skills will be correlated with the returns in different countries. Many training sessions have been offered for disadvantaged personnel in recent time periods in different countries, including Brazil, Argentina, Colombia, Chile, the Dominican Republic, Peru, Panama and Uruguay. It has suggested positive income returns in Latin America (Betcherman et al., 2004; Elias et al., 2004; Card et al., 2007).

A randomized training program is introduced for disadvantaged youth in Colombia in 2005 (Attanasio et al., 2009). It offers an exclusive opportunity to explore the impact of TVET in developing countries. The finding of the program is that it raises employment and earnings, particularly for women. Women have a 0.05 more probability of finding employment than those who are not offered training and earn 18% higher in the formal sector jobs. Attanasio et al. (2011) again assess the effect of a randomized trial and find similar results. It suggests that the TVET program produces much larger gains than the others in developed economies.

In the above two studies, the TVET program is focusing on work involvement for young people. Its original assessment, by Attanasio et al. (2011) has shown positive effects on women and men. However, formal employment has been increased for men, but no earnings have been enhanced but earnings and formal employment both have been increased in the case of women. Similarly, Attanasio et al. (2017) also investigate the long-term effects of randomized training in Colombia with consistent results.

Regarding above discussion, different studies have been considered. Some studies show innovative involvements in developing countries (Bettinger et al., 2007; Angrist et al., 2002, 2006; Barrera-Osorio et al., 2008). Some of the studies offer in shape of transfers to the families who are sending their children to school (Attanasio et al., 2005; Behrman et al., 2005; Glewwee & Olinto 2004; Kremer & Vermeersh, 2005). Few studies have shown the results regarding teacher's incentives aimed at enhancing quality Banerjee et al. (2007) and Muralidharan and Sundararaman (2006). Similarly, some studies discuss employment policies for the poor and randomized trial in the US Holzer (2007), Card and Sullivan (1988), LaLonde (1986), Burghardt and Schochet (2001), Betcherman, Olivas and Dar (2004), Elias et al. (2004) and Card et al. (2007). In Peru, the effects regarding higher as well as lower quality of TVET on market of labor are studied Galdo and Chong (2006). Ridge matching approaches have been utilized to get fair results. A related study by Malamud and Pop-Eleches (2009) compares the impacts of TVET and general education by using a regression discontinuity design.

Similarly, Sianesi (2003), Blundell et al. (1996) and Alagaraja and Mensah (2013) explore changes and trends in TVET for emerging economies using a national human resource development (hereafter NHRD) approach for Swidich and Ghana. Blundell et al. (1996) show the positive returns from the private employer who provided training. Alagaraja and Mesah (2013) explore the changes and trends in the TVET in emerging economies as a national human resource development (NHRD) approach in Ghana. They apply a case study approach. They argue that TVET is a significant contribution to skill development in Ghana. Furthermore, informal TVET is crucial in professional growth.

Unemployment is very high all over the world, especially in developing countries. It is also high, exceptionally, in Latin America. Most of the problem is for the poor with

respect to unemployment. In the late 1990s, the unemployment rate was 13 times more than the previous time. Similar is the case of high unemployment in Argentina, Bolivia, Chile, Colombia, and Panama. This is a very sad start to anyone's experience of the labor market, and it affects employment prospects. Due to this high youth unemployment, particularly among the poor, criminal activities have been observed in Colombia, Mexico, Brazil, Venezuela, and in many other nations of the world. Major reason of the problems like unemployment is lack of skills and poverty. So, it is being tried to reduce the cost of schooling in the developing countries. Target is in the early interventions to reduce the cost for education and to provide quality education at both secondary as well as primary levels which will ensure long-term reduction of poverty (Heckman & Carneiro, 2003).

In several studies, the reasons and main factors of unemployment have been explored (Blanchard & Diamond, 1994); Machin & Manning, 1999). Some studies show that the skills and qualifications of the people who remain out of a job for a certain time do not meet the requirements of new jobs Layard et al. (1991), Bean (1994) and Boeri and Terrell (2002). An example of the Russian economy is helpful to conclude about TVET. Young people have less opportunity to get TVET because of low income and this produces a considerable effect on the youth employment level. Blinovaa et al. (2015) conduct research to find the factors which are affecting the employment for youth in the Russian region. The purpose of their research is also to investigate the effect of TVET on the reduction of unemployment for youth. Their methodology includes regression models and factor analysis. The study finds that the TVET plays a significant role in the reduction of youth unemployment. The study is practically important because it enables the exploration of factors which are contributing to reduce youth unemployment.

The above debate of different studies tells us that the TVET is considered as a solution by policy makers when many young school leavers have been observed in the economy Hoffman (2011) and Biavaschi et al. (2013). Many studies unambiguously explore that TVET graduates obtain jobs faster than general qualified graduates Arum and Shavit (1995), Shavit and Müller (1998), Müller and Gangl (2003) and Breen (2005). The occupation-specific skills generally attract the employers and benefits of TVET qualified are the highest in the form of a dual system Wolbers (2007) and Iannelli and Raffe (2007).

Among the latest studies of 2016, Hanushek et al. (2016) argue that TVET graduates have more benefits at the beginning of their career but go into disadvantage later in life. TVET students have more probability of employment than the general education but this pattern reverses in 50 years. It is due to the specific skills gained in TVET, which assist to move to a first job from education. Some studies investigate the impact of change in skill Krueger and Kumar (2004).

Forster et al. (2016) revisit the hypothesis as TVET qualified individuals are getting jobs easily in the earlier stage of the career than those of general education qualified, but the pattern is reversed in later life. Secondly, this pattern is specifically strong in the countries that have a strong occupation-specific TVET system. Using data from the PIAAC, they test the hypotheses in regression models. They analyze by the pooled model for overall life cycle which effects of TVET on employment. In the next step, country-level indicators are introduced for the TVET educational system. Finally, they take a closer look at the life cycle effects of vocational education in the single countries by conducting separate analyzes for each country. They find that the vocationally trained workers experience an initial advantage and later-life disadvantage in their employment probabilities.

After being ignored by the World Bank and other funding agencies for most of the 1980s and 1990s, funding in TVET has increased since 2000. Many previous studies detailed the known research in this field. These reviews also have numerous restrictions. Some exclusively include evidence from high-income nations; others, while larger in geographical area, do not include research from impoverished countries. Very few established reviews are based on an extensive, systematic search of the literature, and almost all use either a linear narrative strategy to synthesis or vote-counting methods to draw conclusions about effective interventions depending on the percentage of studies that show significant positive results. None of the prior assessments have focused explicitly on TVET for youth in LMICs. Tripney and Hombrados' (2013) review, on the other hand, tries to give a solution, therefore adding value to the current body of research on this issue, because the globe is experiencing a deteriorating youth employment crisis.

In response, TVET is back on the development agenda after years of neglect. Tripney and Hombrados (2013) evaluate the data from studies assessing the effectiveness of TVET

programs for youngsters in middle- and lower countries (LMICs). The 26 selected studies examined 20 different therapies, the majority of which originated in Latin America. The overall mean effects on overall paid employment, formal employment, and monthly earnings are small, positive, and significant; however, significant heterogeneity is observed. Moderator analysis is performed to explain between-study differences in effects. The overall paucity of research in this area, together with specific gaps and methodological limitations, affirms the need for strengthening the evidence base. Implications for policy, practice, and research are discussed. While a key strength of this study is its application of systematic review principles to improve upon prior work.

The discussion has been started in reverse as even intergenerational effects, in the recent years. Literature is available about the impact of parental unemployment on the decision of selecting TVET or general education for their children. So, again TVET is gaining more importance. Previous studies support that income loss due to unemployment is one reason Coelli (2011), Kalil and Wightman (2011). Regarding this above concept, Lindemanna and Ganglb (2019) explore the intergenerational impacts of parental unemployment on the decisions of students' post-secondary transitions. They use longitudinal data from the German Socio-Economic Panel and propensity score matching estimators. The study finds that paternal unemployment has an adverse impact on the likelihood of entering tertiary education, whereas maternal unemployment does not. Another finding of the study is that the magnitude of the impact depends on the duration of unemployment. Even though they are unable to fully account for the underlying mechanisms, their mediation analysis suggests that the effect of paternal unemployment is not due to the loss of income but relates to the negative consequences of unemployment for intra-familial well-being and students' declining optimism about their academic prospects.

Technical and vocational education and training (TVET) discusses the programs those are skill-based and emphasize on trades and carry the skills of practical nature. This permits the individuals to participate in an explicit occupational activity. The major aim of TVET programs is to create opportunities for employment and developing that specific skill which is suitable and vital regarding self-employment especially in rural areas and the

unorganized sectors in India. A considerable attention has been attracted by the skill development of the same country in the previous few years. The importance of this matter can be imagined in the way that the development of skill has become the central part of the national policy agenda in this country. However, according to one of the reports of World Bank related to skill development, it is argued that there is not an efficient system of vocational training in terms of its outcomes in India because a large number of graduates equipped with vocational training are unable to achieve employment and have been continued to be unemployed (World Bank 2008). Similarly, three states of this country have experienced the same where labor market outcomes of vocationally trained people are unsatisfactory as per the study of Industrial Training Institutes (hereafter it is) as well and Industrial Training Centers (hereafter ITCs). This study is for impact, evaluation and efficiency linked with an International Labor Organization (hereafter ILO) and the states are Andhra Pradesh, Orissa, and Maharashtra for whom this study has been conducted. The finding of the study is very interesting because spending time in vocation education and training has been resulted in gaining employment or joining family businesses or becoming self-employment in the lower percentages of 41.0, 16.2 and 35.7 in three states mentioned above respectively (ILO, 2003). Consequently, this is essential to investigate the current situation of employment for the graduates who are vocationally qualified. As there are not sufficient studies who have address this matter and even the studies those have discussed about the issue have been confined to few individual states or some kinds of institutions. It is required to have a systematic, comprehensive, and detailed study for investigating the outcomes in the several national as well as international levels.

Agrawal (2012) explores an overview of the system of TVET in India for discussing the and discusses the variety of challenges in addition to the obstacles in its TVET system. The study also investigates the outcomes in labor market for vocationally qualified graduates along with the comparison with the graduates of general education at secondary level. A household survey of large-scale, for the purpose, has been used which is representing nationally. It is performed by the National Sample Survey Organization (NSSO). The study finds quite a high rate of unemployment (11%) for TVET holders in the age group 15–29 years. Although the unemployment rate of TVET holders is higher

than the overall unemployment rate in the same age group. However, the rate is lower than that for general secondary graduates. It shows that average daily wages are higher, both for regular and casual workers, for TVET holders. There has been a substantial increase in the number of Industrial Training Institutes/Centers (ITIs/ITC) in the last decades but imbalances in the regions are still a concern. It has been recommended that more vocational institutes should be established in the regions where they have less in quantity. Although there are very poor outcomes, but policymakers are still interested to expand TVET which looks reasonable (World Bank, 2008). However, major reforms are required before the TVET system's expansion according to the suggestions of the World Bank. This is because the quality, which is very important, may not be compromised with the quantity of the institutes. It is also recommended to discover the potential industries which are in the need of specific skills in near future.

The studies also indicate that the TVET programs and arrangements have been playing the most important role for the economic growth in many developed countries in the Asian region. The most surprising picture regarding the programs of TVET is that these are not completely successful in the countries of South Asia including India, Pakistan, Bangladesh, and Afghanistan. Although, this system of TVET has heen recognized and implemented all over the world but these above-mentioned countries have not upgraded their TVET programs during the previous few decades. One of the reasons for this non-improvement in past is that the programs of technical and vocational education and training in the region of South Asia are irrelevant, qualitatively poor, and even found frequently inadequate. Ul-Haq and Haq (1998) has pointed it out rightly even before than few decades. There is the dire need of other arena of education for the policy makers to rethink about the sweeping reforms as well as extensive changes.

All the countries of South Asia are trying to expand their TVET programs, but this expansion needs for having assurance that the quality is not deteriorating because of enhancing the quantity in this regard. Governments in developing countries can follow such types of the strategies and policies those have been utilized by the different developed countries. Singapore may be an ideal subject to take for precedent who have made it powerful economically by developing the TVET programs which are the

demanded by their in-hand industry. Many developing countries are confronting difficulties in the provision of unskilled personnel for their industry. Therefore, it is the need of current time to have skilled labor force especially in the scenario of technical changes and globalization. TVET programs are the only way out which can fulfill this objective through the provision of skills required by the market, to the individuals. The above has been concluded by the study of Agrawal (2013) who investigates a review on outcomes and challenges in some Asian countries. The study presents the situation of TVET programs in these specific countries mentioned above. Despite there being a growing demand for a skilled labor force, the labor market outcomes of those who have followed the vocational path are not good. However, the governments are giving full attention to making the TVET system robust in these countries. Various new policy initiatives have been undertaken by the governments in recent years. In these countries, the system of TVET arrangements is combating many challenges as mentioned before. However, this region is facing two main and critical problems, and these are the quality in the institution and shortage of connections between the industry and TVET providers.

Just to avoid the risk of unemployment after the completion of school education, many countries have recognized the importance of vocational education programs. They are emphasizing their school education systems for implementing vocational education instead of having much focus on general education. Some of the countries are in favor of only general education systems whereas some are in favor of replacing it with vocational education in their schools. There are countries that are in favor of the mixed system of general education and vocational education in their schools. Secondary education in several European nations, such as Germany and Sweden, comprises in part of vocational programs that educate students for job in certain vocations. The major justification for offering such curricula is that giving students with appropriate job-related skills would accelerate the access into the employment market and so make them productive sooner (Fersterer, Pischke, & Winter-Ebmer 2008; Hanushek, Woessmann, & Zhang, 2017). High schools in other nations, such as the United States, are more focused on broad education, which should give a wide foundation for further learning. Equipping pupils with broad skills are frequently seen to be especially crucial in an incredibly quickly

economy, since it should allow individuals to change jobs and adjust to technology advancement more swiftly (Goldin, 2001).

Only a few studies have taken use of policy changes that result in (possibly) exogenous changes in curricular content. Malamud and Pop-Eleches (2010) investigate a 1973 educational reform in Romania that relocated a significant proportion of pupils from vocational to education in general. They will utilize this reform to compare the advantages of general vs vocational education as the country transitions to a market economy. They discover no significant change in unemployment or wages among before and after cohorts using an observational study methodology. Oosterbeek and Webbink (2007) study the impact of a 1975 Dutch reform that added a year of general education to three-year vocational programs. The effect is calculated using a difference-in-differences technique, with students in non-lengthened tracks serving as a control group. They discover no favorable effect of an extra year of study on the long-term salaries of vocational students.

Hall (2012) studies the similar type and concludes that entering a longer and more general vocational program increased the amount of upper secondary schooling obtained but did not raise enrollment in university studies. It also does not seem to have affected individuals' wage earnings. Moreover, the more demanding programs significantly increase the dropout rate among weaker students. However, neither Oosterbeek and Webbink (2007) nor Hall (2012) considers impacts on the risk of unemployment. According to Malamud (2012), to the degree that a simple education serves to protect employees against unfavorable labor-market shocks, these advantages may appear on the margin of joblessness rather than salaries.

Again Hall (2016) investigates the study of educational reform in Sweden and explores whether acquiring more general education reduces the risk of future unemployment. Sweden prolonged the vocational programs in upper secondary school by giving a considerably larger general content. Sweden and the Public employment Service provided (PES) data for this study. Statistics Sweden's registers include the whole workforce from 1985 to 2010 and include a variety of individual attributes (year of birth, international origin, location of residence, etc.) as well as thorough data on each people's training and job history. The PES register contains information on unemployment periods for all

unemployed persons who have been registered with the PES during 1991–2010. The sample consists of 186,871 individuals who finish compulsory school during 1986–1990 and who enroll in upper secondary school the same year. The focus of the main analysis in this study is on those individuals who begin vocational tracks. The study examines the students' labor market experiences during the 2008 –2010 recession, at which time they had reached their late 30s. The study finds no evidence that having attended a longer and more general program reduced the risk of experiencing unemployment.

Among students with low GPAs from compulsory school, attending a pilot program seems instead to have led to an increased risk of unemployment. This pattern is strongest among male students and the effect is likely to be explained by the increased dropout rate which resulted from the change of the programs. The increasing dropout rate from high school because of the program changes is one possible reason for the poor employability with students with poor prior grades. The findings suggest that prolonging upper secondary education with more general curriculum might have a detrimental impact in terms of increased dropout rates and, consequently, poorer labor market outcomes for weaker pupils.

Different studies have been made to provide employment levels to the youth through various practices and approaches in the world. It is being tried to achieve an equation between the requirements of the labor market and the skill of the existing manpower. National human resource development (NHRD) research and practices are concerned with national human resource development (HRD) practices, systems, and policies (Alagaraja & Wang, 2012; Lynham & Cunningham, 2006; McLean, 2004). Existing NHRD research has mostly focused on single instance country NHRD policies and practises. (Cho & McLean, 2004; Lynham & Cunningham, 2006). Such focus on specific instance country circumstances is beneficial because it emphasizes the need of increasing and maintaining national human capacity building. Despite significant contributions to the development of NHRD theory and research, TVET has received little attention in HRD literature.

Technical and vocational education and training (TVET) refers to a range of learning experiences that occurs in a wide variety of settings and is focused on developing the skills needed for certain occupations in the labor market King (1993); Rojewski (2002);

UNESCO-UNEVOC (2006). According to the OECD, TVET concentrates on specialized trades rather than general education along with it plays an important part in training youth for employment for the development of adult skills, and also reacting to an economy's labor market demands (OECD, 2010, p. 9). TVET has acquired national and worldwide importance in the recent decade as an option to the education for traditionally academic and a methodology of concluding the gap in skills (Symonds et al., 2011).

It has been observed that the rebirth of interest in vocational education and training because of the considerations of direct provider along with the substitute avenue of national skill development. It is also for the aim of capacity building not only in the developing country but also in the developed countries. The nature as well as the substance of employment, changes for global market, and the technological advancements have pushed businesses in the labor market for demanding complicated capabilities from their workers and entrants in future labor market (Hughes, 2005; Jacobs & Hawley, 2009; Marquardt & Berger, 2003). As a result, countries have started for the evaluation of their systems of education and how they may be improved to fulfil the demands of socia-economic progress. (Cho & McLean, 2004; Wagner 2008). Because TVET is directly responsible for educating people for the world of work, these advancements have increased it considerably more difficult for it to adapt to new and developing competencies at a quicker rate than general education (Wallenborn, 2010). The role of TVET in national skill and capacity development varies by country. The historical, cultural, economic, and social elements that influence how TVET systems work and the communities they serve impact TVET's position and purpose (Atchoarena & Delluc, 2001; Grubb ,2006; Hughes, 2005; King, 1993; OECD ,2010; Stuart, 2012). To that purpose, it is critical to comprehend the difficulties confronting TVET that impede its efficient implementation and delivery (Lambeth et al., 2009).

Alagaraja and Arthur-Mensah (2013) use Ghana as an example to investigate trends and developments in TVET as a national human resource development (NHRD) method. The case study method is used in the study to produce an in-depth examination of TVET procedures. They used a targeted assessment of literature, analysis of government records, and interviews with key informants to create the case study. According to the report,

TVET has been identified as a significant contributor to skill development in Ghana. There is a need to address the issues of expanding employer participation in TVET, and TVET curriculum should be revised to promote student employability and match labour market demands. The study suggests that similar techniques like HRD to explore the potential of TVET be used in other developing nations to obtain beneficial results. Future research should look at the influence of changes like the establishment of qualitative frameworks and core courses on TVET participation in developing countries as a whole or on a case-by-case basis. Furthermore, informal TVET is important for developing skills and should be studied aspects of TVET. Furthermore, future research might compare the state of TVET in one country to that of other developing/emerging countries.

The impact of TVET on the labor market can also be checked in another study that has been done for the Czech Republic. The apprenticeship training has been implemented to get positive results in the country. The reason behind is that the European Commission stresses the importance of vocational education and endorses apprenticeship training. Educational systems that have dual tracks of academic alongside vocational learning routes have been shown to generate better labor market outcomes for school leavers and smooth the school-to-work transition. On the other hand, dual-tracked educational systems can reinforce the effect of social origin on educational performance: the differences between the achievements of students from a background characterized by low socio-economic status and students from high socio-economic status backgrounds are greater in a tracked system than in a comprehensive one. In addition to these general tendencies, the content and organization of vocational education differ in individual countries, as do its strengths and weaknesses and impacts on the labor market prospects of young people.

Strakova (2015) explores one of the TVET program in the Czech Republic which is the apprenticeship track leading directly to the labor market. The study attempts to get the answer to the questions about whether the Czech apprenticeship education system provides its students appropriate knowledge and skills necessary for success in the modern labor market. Another question is whether it facilitates their transition from school to work. The study also explores the impact of the high vocational specificity of the Czech

education system on educational inequalities and the development of these inequalities over time. International surveys of SKL, the International Adult Literacy Survey (IALS) and the Organisation for Economic Co-operation and Development Programme for the International Assessment of Adult Competencies (PIAAC) have been used as the sources of data for the analyzes of Czech. Binary logistic regression is used for analysis of the IALS and PIAAC data. Statistical year books of education and national survey on transition from school to work is also used for providing the evidence taken from descriptive statistics of PIAAC. Results of the study show that the efficiency of the Czech education system in facilitating the transition to the labor market is relatively low, as are the achievement outcomes of its apprentices. Moreover, this high differentiation contributes significantly and increasingly to educational inequalities. The study recommends that there should be adopted Czech apprenticeship education system.

Such experiments regarding the TVET programs in the shape of apprenticeship, or any other shape, can be useful for the rest of the economies. The labor market outcomes are expected to be positively affected by similar policies in developing countries. A study for the TVET program for specifically women in Turkey has also been done to support the argument. Alnıaçık et al. (2019) investigates the women's vocational education in Turkey as a gendered and gendering process. Cultural norms about women's role in society, a vocational curriculum that echoes these norms and a labor market with gender inequalities constitute the background against which women formulate their vocational preferences and seek pathways into the labour market. They use the literature on gender and vocational education, school-to-work transitions, and gender bargains to analyze data from qualitative fieldwork with students and graduates of girls' vocational high schools. First, they scrutinize how students choose vocational tracks. The findings of the study point to the presence of a gendered bounded agency by students and graduates, according to which their choices echo traditional gender norms. Secondly, they diseuss the transition from school to work, during which they are faced with gender prejudice in the labor market. Finally, the study shows how that process turns into a 'school-to-home' transition whereby graduates become homemakers.

Just like this study of the Czech Republic in which the importance of apprenticeship has been highlighted for the employability in the labor market, another latest study has been done in China Hou et al. (2020). It is now globally recognized that TVET is one of the best solutions for increasing employment. It results in not only poverty alleviation but also a source of inequality reduction in the country. However, there are some other factors which again help to see the personality of the candidates. Such factors are essential at the workplace because a better controlled and balanced candidate can perform his duties at the job in an efficient way. That is the reason, training before and after employment is always beneficial to develop such attitude of work which provides high output. Similarly, an internship is a key part of the experiences of Chinese secondary vocational school students. The quasi-employment internship, which requires students to undertake formal, independent work positions in factories, has led to many psychosocial problems.

Hou et al. (2020) attempt the study how the quasi-employment internship affects the students who have experienced the rural vocational school during his internship. They use qualitative data. Data is collected through a semi-structured interview and interpretative phenomenological analysis (IPA) is used to analyze this qualitative data. Five super-ordinate themes emerged from the analysis: the loss of control, regaining a sense of control, seeking an explanation for the meaning of life, forming a new self-identity, and uncertainty about the future. The findings of the study convey how quasi-employment internship disrupt a sense of control and meaning making yet help cultivate a new self-identity. It means the findings can extract that even after this activity the participants may still have uncertainty about the future.

Because of globalization and technical changes, there is a need for a skilled workforce. Many countries are already facing the problems resulting from an unskilled workforce. To meet the requirement for a skilled labor force, more emphasis should be given to the TVET programs. The studies have given the gap for future work for the different nations in the shape of recommendations to adopt the TVET programs. These programs may be in terms of the extended program like in Ghana Alagaraja and Arthur-Mensah (2013), apprenticeship strategies in the Czech Republic Strakova (2015) and specific programs for the women in Turkey Alnıaçık et al. (2019). In this regard, to achieve positive impacts

of TVET programs on employment, different approaches have also been recommended to apply for the developing countries like capabilities approach, HRD approach, and others in a formal way. Moreover, informal TVET programs are also recommended by past studies in skills development that pushbike with the formal TVET programs. Future research can also compare the state of TVET in one country to that of other developing/emerging countries.

Very few studies have shown a little, effect even no effect, of TVET on employment level in some of the countries. But at the same time, although many prior studies show the positive impacts of TVET on employment in different specific countries, still a lot of room is available to do research. There are several limitations/gaps in previous research as mentioned above. Some studies have solely examined data from high-income nations and have not particularly addressed underdeveloped countries. Very few studies are showing systematic, comprehensive, research for the issue. Almost all are use either a classic approach to interviews, or vote-counting methodologies in which judgments about intervention programs are reached depend on the number of various assumptions discovered to produce substantial positive outcomes. None of the previous studies has been found that specifically focus on TVET's impact on employment through SKL acquisition and development, in addition to analyzing the alleviation of poverty and inequality reduction in low- and middle-income countries (LMICs).

So, there is need to work in the developing countries regarding this hot issue which can be helpful for the policymakers. "Can TVET significantly impact employment through SKL in developing countries?" is one of the research questions of this study. For the answer to this research question, direct and indirect effect has been analyzed. Further the moderation/conditional effect has also been examined for the issue being discussed. It is expected that this study is helpful for the governments of the developing countries to make the policy to enhance the employment level through TVET programs.

2.4. Vocational Education and Adult Skills (SKL)

This subsection is addressing the literature showing how the phenomenon of vocational education is linked with SKL. Theoretically speaking, human capital has observed much

more reputation than the physical capital especially after observing the impact of globalization by the world. Human resource has a great power only in the case of having skills demanded by the machinery of concerned economy. Manpower without a particular skill is not useful as compared to the skilled person. Human resources with no skill is not attaining respect in any place of the world neither in industry nor society. Now the world is worried about the ways to acquire skills for the human resources for which different strategies have been under considerations. Many problems have been occurring just due to the lack of skill like increasing poverty, enhancing inequality, and even reducing employment opportunities. Technical and vocational education and training (TVET) has been considered as the biggest source of skill acquisition and development.

One must be clear about the concept of skills acquisition before proceeding further for doing any type of analysis. Different experts have given the definitions from their own point of view. A person acquires or learns a specific skill or type of behavior requires for industry through training or education throughout in order to identify and manipulate the entrepreneurship and innovation opportunities for self (Idoko, 2007; Ibru, 2009; Chukwunenye & Igboke, 2011; Amadi, 2012; Samian & Buntat, 2012; Stohmeyer, 2007). It also assists entrepreneurs in developing self-confidence and self-esteem, as well as participating in community living judgement. (Cheston & Kuhn, 2002; Rufai et al., 2013). The entrepreneur's degree of education, skills, or information obtained via training, job experience, and social network also influences his or her ability to capitalize on entrepreneurial opportunities. (Shane, 2003; Shastri & Sinha, 2010). On the one hand, skills training and tertiary education may lead to commercial prospects and have an influence on skill acquisition. (Gatewood et al., 2004; Emaikwu, 2011). Prior experience is gained via training and/or education, that promotes active readiness. (Shane, 2003).

According to Beach (1990), skill acquisition refers to the process of broadening people's options for a healthy life, active learning, healthy life, knowledge development for a fair level of living. He goes on to say that it is independence from socioeconomic, social, and educational constraints, as well as access to and chances for being inventive, as well as having personal self-esteem and protected human rights. Human development is primarily concerned with the quality of people's lives whatever they're capable of doing. Oluremi

(2008) adds to this argument by stating that skill acquisition tries to alter the human being in order to bring out his or her prospects and make him or her a leadership, who in turn encourages and enables others to flourish and communicate a meaningful vision for society.

The UNDP's Human Development Report (1990) defines people as the real wealth of a nation. It is through skill acquisition that creativity, initiative; capability, commitment and empowerment that true development can be achieved. Asante and Opoku-Asare (1998) said skill acquisition means releasing human energy, it means providing an opportunity for people to make the maximum contribution to their own development and to the self-sustaining development of their communities. It is therefore glaring that the need to provide skills is very crucial and vital if poverty is to be reduced or eradicated. What then can motivate and empower the people to put in their best to achieve the highest level of productivity and being useful? For Adedeji (1987) education, skill, technology, capital, levels of remuneration are no doubt important. Therefore, in all ramifications, developing the human person by providing skill is the real solution to a greater part of our challenges especially it helps to reduce the poverty level.

Webster's Dictionary defines skill acquisition as a developed or acquired ability. The skills acquisition which is a vital instrument of empowerment that seeks to provide the people with different skills, vocation and entrepreneurial ability like bead making, hat making, sewing, fashion designing, shoe making and making workers interested in their job and at the same perspective improving on their existing skills. Emeka (2011) stated there are things people can do to impact their generation, they can acquire skill. Skill acquisition is not left for the poor and middle-class people. Even career women or professional women, and man, as well as the youth, can acquire these skills to make versatile and self-sustaining and independent.

Skills acquisition can also be in areas of making detergents, odor controls used in toilets for mopping the floor and bathrooms, production of Izal, Rob, Soda soaps, basket caps, school bags, and a whole lot of skills. Eze (2004) emphasized that the eradication or reduction of poverty is one of the central of poverty is one of the central objectives of contemporary development policy. The international community, and its determination to

overcome poverty have been highlighted by the sustainable activities of the International Development Donors such as the United Nations (UN), The European Union (EU), the World Bank, the International Monetary Fund, etc. are all ready and ever since they have been empowering nations and people.

The awareness for skills acquisition training and supports in order to stimulate activity and reduce business failure has been increased among stakeholders in the industry, business and government of many countries because entrepreneurs could be born or made (Abdullah et al. 2009). Training for skills is also an energetic source of emerging human capital (Brana, 2008; Ikegwu et al., 2014). Rufai et al. (2013) and Dasmani (2011) find that as they are not exposed to formal schooling while in training, skills graduates are unable to find work because they lack the interpersonal contact self-efficacy and self-necessary by industries. Several studies, however, has claimed that skill training and tertiary education may contribute to activity or self-employment (Stohmeyer, 2007; Salman, 2009; Amadi, 2012). Training in skill acquisition is observed to have a beneficial influence on entrepreneurial activities in Nigeria (Ebong & Asodike, 2011; Isidore, et. al., 2012; Ibru, 2009; Ikegwu et al., 2014). Samian and Buntat (2012) discover that skill acquisition training has a beneficial influence on youth entrepreneurial activities. The development of skills is usually viewed as a way for enhancing the possibilities of teenagers who lack the means, abilities, or willingness to pursue higher education. Many people think that skill development provides important abilities for preparing teenagers for entry into the labor field and improving their prospects of a successful professional career. (Quintini & Martin 2006); OECD ,2010).

The notion of skill acquisition and development aims to combat and reduce poverty in Nigeria, particularly in Oyo. According to the Report by the United Nations (1999), Nigeria's Human Poverty Index is just 41.6 percent, putting the country among the world's twenty-five (25) poorest countries. Additional data from the Federal Office of Statistics (1999) reveals that Nigeria's life expectancy is fifty-one (51) years, and so the notion of skill acquisition and development is going to be undoubtedly lower poverty levels in Nigeria and in Oyo State in particular. Successive governments have often stated their intention to use professional growth as the primary means of aiding underprivileged

adolescents to break free from poverty. The fundamental premise remains that skill learning backed by public money is a beneficial solution to the issue of unemployment.

Technical and vocational education and training (TVET) has a meaningful role to play in the development of skills for the workforce. TVET programs can ease the school to work transition, increase workers' productivity and help provide the market with demanded specific skilled labor. Developing countries, in particular, should invest in these types of programs due to their higher levels of unskilled labor, since some of them may benefit from these programs. The benefits of TVET programs in developing countries are well documented. Malamud (2008) shows that when accounted for selection bias, vocational education yields higher earnings for individuals than general education. Tansel (1998) also finds evidence of greater earnings for vocational high school graduates when compared to general education. Hanushek (2011) provides cross-country evidence that TVET students face a higher probability of employment after graduation when compared to similar general education students.

Technical and vocational education and training (TVET) acts an essential role in determining the intellectual human capital of a nation. It fulfills many tasks to produce brilliant, competitive and skilled human capital. The study of Usman and Tasmin (2015) identifies strategies to be used in enhancing skills-acquisition of undergraduate TVET students through improved collaboration with industries in Nigeria. The study reviews the provision of Students' Industrial Work Experience Scheme (SIWES) positions for undergraduate students. This scheme is continuously accepting positive results under the command of ITF. As entrepreneurship education is very important for the promotion of strategies in creativity and reducing poverty, it has been used as an instrument through industry collaboration. It is recommended that stack holders from the economy should join hands to assist the youth's poverty. They should provide youth skills, entrepreneurial behavior, and awareness to increase their output for generating income. So, it is concluded to provide them a platform where they can achieve such commercial and entrepreneur activities for getting more opportunities which help them to get more income for alleviation poverty in their region.

All the economies are trying to get higher economic development now a day. The most effective factor is human capital as considered by all the nations of the world. TVET has been encapsulated for strengthening the human resources of the economies. Diversified and vocationalized secondary schools are the important factors of development (Lee et al., 2016; King & Palmer, 2007). TVET has been experienced as a source of reducing unemployment (Hanushek et al., 2017; Nilsson, 2010; Schueler, 2016). TVET facilitates shifting to work from school Golsteyn and Stenberg (2017). Empirical studies show a positive relationship between evaluating returns and TVET. A number of studies have conducted analysis of cost-benefit and social returns of TVET at the employer level (Ryan, 1998; Schueler, 2016).

The advantages of TVET decrease with age as shown in recent studies (Brunello & Rocco, 2015). Some countries have TVET curriculums which are specifically occupational, but in some countries are more general. Similarly, some countries emphasize TVET at workplace, and some believe in school-based systems Eichhorst et al. (2012). The outcome of both programs is significantly different. Previous studies have shown a relationship between economic development and TVET (Baum, 2002; Budria & Telhado-Pereira, 2009; Mupimpila & Narayana, 2009; Nilsson, 2010; Spielhofer & Sims, 2004). The focus of all studies is the ability of TVET to enhance the skills of the people which will be used at workplace. There will be direct and indirect effects of TVET on economic growth (Mupimpila & Narayana, 2009). Many studies emphasize that TVET is a tool for enhancing productivity and reducing poverty (Nilsson, 2010).

Technical and vocational education and training (TVET) has also helped several East Asian nations make the transition from developing to developed status like studies on South Korea. Because the efficient system of TVET is integrated with country's educational system to train the manpower and equipped them for industrialization (Park et al., 2014; Lee et al., 2016). Many studies explore the positive effects of TVET on marginalized groups with respect to social development. CEDEFOP (2012). Furthermore, there is a positive relationship between less TVET participation and unemployment, and it results in societal instability. Children having the low ability of cognitive are more

inclined to TVET tracks Brunello (2007). NCVER (2017) also shows similar conclusions that students having low backgrounds select TVET.

In the short run, TVET has a positive impact on the transition of school-to-work smoothly Brunello (2007). Ryan (1998) provides cross-country proof that shows that TVET in the shape of apprenticeships increases the probabilities of working life. TVET graduates are to be employed quickly as compared to general graduates. Members in TVET have an improved employment percentage and wages (Kemple & Scott-Clayton, 2004; Kemple & Willner, 2008). Studies have not seen long-term effects of school to work which is the major limitation of previous studies Hanushek et al. (2017). The trend of employment with respect to TVET diminishes over time and becomes zero at the age of fifty years Hanushek et al. (2017).

Analysis of the literature, there are diverse effects while TVET systems is implemented in the countries. TVET varies from country to country as compared to general education. All around globe, TVET is divided into two categories. The first is school-based, while the second is work-based, commonly known as the education system. The first is integrated with compulsory schooling just like skills offered by vocational schools (Becker, 1964).

Choi et al. (2019) use the Program for International Assessment of Adult Competencies (hereafter PIAAC) dataset. They studied on 13 countries from OECD and 31587 individuals completed upper secondary school. The study's findings indicate that TVET graduates are more likely to be hired. The findings imply that the TVET returns on employment diminish at a very slow rate because of having an associated with vocational education and general education over the lifespan. The findings of this study corroborate two working assumptions in the TVET literature: a poor educational level and a short-term occupational premium for TVET graduates. They also discover that the step in providing of a TVET curriculum last until the age of 65.

The important implication of the above studies is that both politicians and policymakers have expectations of TVET that are much greater than those they have for general education. To support evidence-based policymaking and to adapt education and training,

including TVET, it is very important to enhance knowledge of labor markets and regarding the outcomes of the different education options. However further studies using advanced methods can be followed.

The acquisition and development of skills is a critical tool of empowerment that aims to offer individuals with various competences, vocations, and entrepreneurial abilities. It is observed that much of literature pays particular attention to TVET's ability to increase SKL that are directly applicable in the workplace. Consequently, these adult skills are likely to have direct and indirect effects on productivity and therefore, on economic growth. True improvement in the developing nations may be realized via adult skill acquisition, which increases innovation, competence, dedication, and empowerment. Workers with higher ability or skills could more easily find gainful employment outside of the public enterprises. Last but not the least, current literature provides the insights about the importance of adult skills and acquisitions for poverty alleviation and unemployment. Finally, this study is an effort to work in developing countries to see how TVET is related with skill acquisition and how it is affecting poverty, inequality, and employment through SKL acquisition and development in the developing countries. Mediating and moderating effects of TVET on poverty alleviation, inequality and employment have also been examined. Policymakers can, therefore, find assistance with this study while implementing TVET in any shape in their respective developing countries.

2.5. Gap Analysis

Overall, the literature on TVET just explores the direct impact of TVET on poverty alleviation, inequality and employment separately in different specific countries and found positive effects of TVET on employment, poverty reduction and reducing inequality. Some studies focused only high-income countries. Only few studies systematically and comprehensively dig into this issue and highlight the importance of TVET. As far as methodology is concern, some researchers use traditional approach for synthesizing while some studies use surveys and vote-counting methods based on certain assumptions and found significant results. According to our shallow knowledge, no

previous study focuses, specifically, on TVET's impact on employment, poverty alleviation and inequality reduction through SKL for low- and middle-income countries.

CHAPTER 3

METHODOLOGY AND DATA

This chapter describes the methods used in this study to achieve the research objectives which have already been stated in the introduction section of chapter one. Organization of the chapter is in a way that background regarding theoretical/ conceptual frame with related studies has been explained in section 3.1 of this chapter. Section 3.2 explains the econometric models and methodology. We have constructed models showing the relationships between/ among variables for the purpose of answering the research questions of this study. Specifically, these models show the impacts of TVET on poverty, income inequality and employment. Few other models have also been constructed to estimate direct, indirect and conditional effects of TVET on above mentioned issues through adult skill in the developing countries. Section 3.3 explains the estimation methods to find out the results for the objectives of the study. Data, its definitions and description of all dependent, independent and controlled variables are discussed in section 3.4 whereas, the sources of data has been mentioned in section 3.5.

3.1 Background

Technical and vocational education and training (hereafter TVET) intends to equip persons for industrial or commercial occupations. It may be obtained either formally in trade schools, technical secondary schools, or in on-the-job training programs or, more informally, by picking up the necessary skills on the job. During the past four decades, only, China has been committed to develop vocational education, which aims to cultivate many highly skilled laborers for the country (Du, 2010). In 2017, the number of students entering secondary vocational education reached 16 million, accounting for 40% of the total number of secondary school students in China (Ministry of Education of China, 2018).

Before highlighting the theoretical framework of the issue, it is important to go through a brief background. TVET in schools is a relatively modern development. Until the 19th

century such education, except for professions, is provided only by apprenticeship. This situation is partly due to the low social status associated with such instruction as opposed to a classical curriculum, which is considered "necessary for a gentleman." With the growth of industrialization during the 19th century, however, several European countries, notably Germany, begins introducing TVET in elementary and secondary schools. In Great Britain, however, opposition to TVET persists into the 20th century, although a few trades and junior technical schools are established by local authorities before World War II. By the late 19th century, public (common) school of TVET in the United States consists of manual training and practical arts. These programs are gradually expanded until 1917 when federal aid is provided to public schools for trade and industrial, agricultural, and homemaking courses. After World War II the demand for trained paraprofessionals in the relatively new fields of computer science, electronics, and medical services lead to an increased interest in short-term postsecondary specialized training programs in these areas as an alternative to a traditional college education.

Perspective domains of study and practice, such as TVET, are founded upon both implicit and explicit theoretical frameworks. Theoretical frameworks allow scholars to organize and synthesize knowledge and conjecture within a field and serve to describe, explain, and predict behavior and experience. The established theoretical framework that still guides TVET, also known as career and technical education, is based primarily on the work of David Snedden and Charles Prosser (Camp & Hillison, 1983; Doty & Weissman, 1984) from the early 1900s. Both Snedden and Prosser are concerned principally with broad political and policy issues and seem to have considered a learning theory to undergird their vision for career and technical education. Even in his later years, Prosser omits any mention of a learning theory for TVET (Prosser & Allen, 1925). Nevertheless, the implicit learning theory underpinning TVET, since before the Smith Hughes Act, has been behaviorism (Dobbins, 1999; Wirth, 1972). The foundational work on which TVET in America was built is more than three-quarters of a century old. Much has changed since the heated, sometimes rancorous, debates between David Snedden and John Dewey from 1910 to 1920 that polarizes the educational community in the United States (Wirth, 1972).

The conceptual/ theoretical framework of this study is based on the pioneer work in this domain which is the theory of human capital which advocates that education and training

increase the level of skill and productivity of workers and hence leads towards higher wages (Becker, 1962; Mincer, 1962). Beginning from the pioneering work of Becker (1964) on investment in human capital, the theoretical literature differentiates between general and firm-specific training (on-the-job training). Becker (1964) argues that when labor markets are competitive, then firms prefer to invest in specific training rather than general training. However, in case of imperfect competition such distinctions may not be relevant. Given that TVET is a type of training that is provided at schools, colleges and other technical institutions, we could apply the Becker (1964) framework to vocational education and training.

Technical vocational education and training has indisputable impact on national development which is understood to be associated with a range of socio-economic imperatives that include challenges of poverty, income inequality and unemployment. The value of TVET is being increasingly recognized by governments. Despite the abundance of natural recourses, poverty remains prevalent in developing countries. Youths are still faced with intergenerational poverty which leads them to all kinds of illegal activities and violent crimes. Poverty can be reduced when TVET is well funded which will invariably develop the nation. Implementation of TVET is focused on development needed to be conducted to general social norms on how learners and people in general are to be treated. TVET by itself does not create jobs; it is therefore important that decision makers also put in place the right policies and conditions to stimulate economic development.

Technical vocational education and training has also a strong relationship with the macroeconomic and social development. Economic and social benefits are interconnected. At macro level, different studies become successful for enlightening the relationship between TVET and economic and social development (Baum, 2002; Budria and Telhado-Pereira, 2009; Mupimpila & Narayana, 2009; Nilsson, 2010; Spielhofer & Sims, 2004). TVET increases skills which is directly required in the workplace. Subsequently, the skills are likely to have an impact, directly and indirectly, on the output and therefore, on economic growth. TVET has shown the great effects on Botswana's economic growth Mupimpila and Narayana (2009). In addition to that, different qualitative studies have emphasized that TVET is a tool for the enhancement of productivity and alleviation of poverty. Taking an example of European countries where

TVET, also known and vocational education and training, is an essential instrument for the transformation (Nilsson 2010). South Korea is a very good example from the East Asian countries that transitioned successfully from developing to developed country. Studies have shown that this country designed an efficient TVET system for the fast economic development in its educational system. TVET system has also been designed to prepare the technical human resource with the help of related trainings. This technical human resource is the key element for industrialization (Park et al., 2014; Lee et al., 2016).

On the other end for social development, many studies support for the impact of TVET on marginalized or disadvantaged groups are positive. These are the groups who have been excluded from the labor market due to non-skills or low skills CEDEFOP (2012). Social benefits are of qualitative nature as compared to quantitative benefits of economic benefits. The low skilled labors, early school leavers, immigrants and the unemployed people are generally from these marginalized groups who become a risk for society. Therefore, these social exclusions have been handled very well through engagements in the TVET programs. Instead of becoming the problems for the society, these groups are getting, now, not only the economic benefits from the TVET programs but also providing society a safety from their ends. That is the reason; one can say that the TVET programs are one of the best examples of playing a role of safety net as far as social benefits are concerned. The objectives of such TVET policies are to stabilizing these groups so that they may contribute the society instead of becoming a risk. (CEDEFOP, 2012; McCoshan et al., 2008; Nilsson, 2010). Moreover, theory tells that the social benefits and economic benefits are linked with each other. Low level of participation in the TVET programs is the source of low economic benefits in the shape of increasing unemployment. Consequently, this unemployment is leading to the negative of insignificant social effects (CEDEFOP, 2012).

Although theoretical framework is supporting the idea, even conceptually a strong relationship has been observed among the issues discussed in this study. TVET has not only directly impact on poverty with the condition of having skill but also indirectly affecting poverty through a channel of skill acquisition. Mechanism is that TVET program creates skill among the manpower. Then, skillful persons are having more chances to get

employment opportunities and earn more money resulted in the poverty alleviation. So, it means that TVET has indirect effect on poverty through skills that has been proved through the analysis to be presented in chapter four Part (A). Similar, mechanism has been observed in case of impact of TVET on inequality and employment which has been verified by the analysis done in chapter four Part (B) and Part (C). This analysis is having a great motivation for the policy makers for not only initiating new TVET programs but also strengthen the current arrangements of TVET prevailing in the concerned developing countries.

3.2 Econometric Models and Methodology

In this section we construct our econometric models that are showing relationships of TVET with poverty (hereafter POV), inequality (hereafter INQ), employment growth (hereafter EMPG) and adult skill acquisition and development (hereafter SKL). As per research questions we intend to find out the impact of TVET on the variables mentioned above. For the purpose, the econometric models have been constructed in the following sub-sections:

3.2.1 Impact of TVET on POV, INQ and EMPG Through Adult Skill Acquisition (SKL)

Technical and Vocational Education and Training (TVET) is a source of improving chances for the youths who have less resources, motivation and skills for their career. Empirical evidence supports this statement when we compare the results from the TVET programs and non TVET programs (general academic programs) in different economies. Many studies have argued that TVET provides valuable skills for entering the labor market and starting their professional career successfully. Ryan (2001) also discusses the summary for the evidence taken from the seven countries of the cross-country evidence (Germany, France, the Netherlands, the United Kingdom, Japan, Sweden, and the United States). As per Ryan (2001) findings, TVET programs especially apprenticeships have increased the opportunities of an initial working life. This is only possible because the youth have more skills due to these TVET programs.

Past few decades have seen a lot of efforts of different researcher trying to find out that TVET affects the wages and earnings of employees. This trend ultimately becomes the source of poverty alleviation and decreasing inequality. Researchers during this time try to compare the curriculum of academic and vocational education to see the market outcomes. According to the study of US-based research, it has been found that there are no returns from vocational schooling (Hotchkiss, 1993). He tries to find the impacts of TVET program on wages and employment at high school levels in 1980. But opposite of this result, the students are earning higher wages coming from the TVET programs even they have taken less proportion of suhjects of vocational education curricula (Bishop & Mane, 2004). Similarly, positive results of wages have been found by Meer (2007) although less than the results of Bishop and Mane (2004)

To see the situation regarding the discussion, in the United Kingdom, a study documents that the majority of TVET programs increase wages as compared to non TVET qualification Dearden et al. (2002). Dearden et al. (2004) find that a TVET course has an adverse effect on the earnings of those individuals adopted during employment as compared to those who have no qualification other than this. On the other end, Bibby et al. (2014) find that the wages are higher for the individuals who have TVET programs at workplace than those who have TVET programs in the classroom level. Their findings are based on data of matched administrative for comparing the returns of different curricula.

Various studies have contributed to the data of different countries to see the impact of TVET on the earnings of the employees. This is helpful to know how much importance is to include TVET programs in the academic programs. Researchers find results of the diverse nature for the data in different economies. Oostgerbeek and Webbink (2007) investigate for the TVET programs in Netherlands. Pischke and von Wachter (2008) discuss in Germany for the data between 1950 and 1970s. Similarly, for Sweden, Hall (2012) investigates impacts of TVET policy on the wages. All above three studies find no effect of TVET in Netherlands, Germany and Sweden. Although Fersterer et al. (2008) find the same results of TVET apprenticeship program in Austrian where there are no significant wage benefits as compared to school education. But in Romania, Malamud

and Pop-Eleches (2010) work on their study and find that TVET graduates are more significantly likely to be employed comparatively manual workers.

Although some of the studies found less or even zero response from the TVET programs but skills enhancement resulting from TVET programs can't be denied. However, there has not been any substantial study that has analyzed the effect on adult skills since 2017. Brunello and Rocco (2017) expose the effects of TVET on adult skills and outcomes of labor market. They use the Program for International Assessment of adult skills (PIAAC) survey. This survey has been made valuable for their study by the unique presence of information and data comparability across countries. The sample for his study is the reliable information of seventeen countries regarding vocational education for levels 3-5 of International Standards Classification of Education (ISCED). These countries are Austria, Australia, Czech Republic, Canada, Estonia, France, Finland, Germany, Ireland, Korea, Japan, Netherlands, Poland, Norway, Spain, US and UK. The findings of the study are that TVET is providing slightly lesser hourly earnings, high level of probability being currently employed and high share of the completed working life in paid employment. They have constructed the econometric models to find out the direct and indirect effects of TVET on market outcomes in the countries mentioned above. However, it encourages further research in the developing countries which have a lot of potential to achieve positive results.

The objectives of the study in hand are to investigate the impact of TVET on poverty alleviation, inequality reduction and employment outcomes through adult skills in the developing countries. Moreover, to analyze the role of income for the effect of TVET on poverty alleviation, inequality reduction and employment advantages is the agenda for future research. For achieving these objectives, certain research questions have been established. Answer to the research questions is explaining the relationship among Technical and Vocational Education and Training (TVET) and Poverty, Inequality and Employment.

Figure 3.1 shows the schematic model depicts that SKL measured by the participation in education and training by (working) adults acts as mediating as well as moderating variable between TVET and POV, INQ and EMPG. Where TVET is Technical and

Vocational Education and Training measured by the number of secondary students enrolled in technical and vocational education programs, including teacher training, POV is measured by poverty headcount ratio at $1.9 a day (2011 PPP, % of population), INQ measured using Gini index, EMPG is the growth rate of employment to population ratio. Moderation effects can be capture through the interactions of SKL and TVET which is also termed as conditional effects.

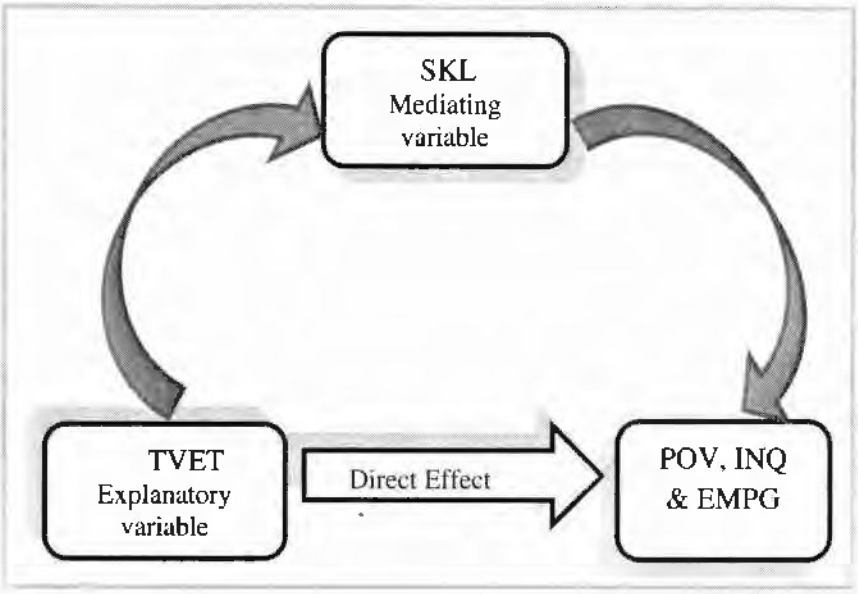
The study is an attempt to examine the process for mediation analysis. This process through which the independent variable (TVET) influences the dependent variable (poverty, POV) via mediating factors (adult skill acquisition and development, SKL). There is a real relationship between these two variables being independent and dependent variables (Hayes & Preacher, 2014). That is the reason it is beneficial to evaluate the impacts of the independent variable on the dependent variable. Similar is the case when we try to find out the impact of TVET on the other two variables [inequality (INQ) and employment (EMPG)] through mediating factor SKL. We already have discussed the evidence of the relationship among these variables in the different studies mentioned in chapter 2.

We use both mediating and moderating role of SKL for the impact of TVET on POV, INQ and EMPG because of several reasons. We use SKL as a mediating variable, to check whether TVET works through SKL and helps in poverty reduction, reduce inequality and enhance employment or TVET directly affects these socio-economic variables. Conversely, the moderating role of SKL entails that the relationship between TVET, poverty, inequality and employment is conditional and depends on the level of SKL. By considering moderating role, we recognized that the impact of SKL is not same in countries it varies according to personal capacity of individuals to understand things and cause disparities. The moderation analysis provides awareness whether the impact of TVET helps those with lower initial level of SKL or it benefits countries across all SKL levels equally.

Figure 3.1 is also showing direct and indirect relationships among TVET, POV, INQ, and EMPG. TVET influences directly the POV, INQ and EMPG on one hand, but as far as actual mechanism is concerned, it affects these three through a channel which is SKL.

TVET is responsible for preparing a skillful labor force. After achieving the TVET training the workers enable themselves to find early employment. They are also in position to get more money due to this skill in hand. It ultimately helps them to defeat the curse of poverty. In this way, one can easily observe that inequality will be reduced. More earnings enhance these relationships among TVET and POV, INQ and EMPG.

Figure 3.1. Direct, Channel and Conditional Effects of Technical and Vocational Education and Training on Poverty, Income Inequality and Employment.



Now in sub-section 3.2.2, 3.2.3 and 3.2.4. the relationships between TVET and above these three variables are discussed one by one.

3.2.2 Impact of TVET on Poverty Through Adult Skill Acquisition (SKL)

The first objective of the study is to explore the impact of TVET on the POV through SKL in the developing countries. Therefore, first we discuss the relationship between TVET and POV. SKL, measured by education attainment, acts as mediating as well as moderating variable between TVET and POV measured by poverty headcount ratio at national poverty lines. Moderation effects can be captured through the interactions of SKL and TVET which is also termed as conditional effect.

To examine the mediating role of adult skill we use the following econometric model.

$$SKL_{it} = \alpha_i + \alpha_1 TVET_{it} + \alpha_2 TVET_{it}^2 + u_{it} \quad (3.5)$$

$$POV_{it} = \beta_i + \beta_1 TVET_{it} + \beta_2 TVET_{it}^2 + \beta_3 SKL_{it} + \beta_4' X_{1it} + \varepsilon_{it} \quad (3.6)$$

For moderation analysis, we use the following specification.

$$POV_{it} = \gamma_1 TVET_{it} + \gamma_2 SKL_{it} + \gamma_3 (TVET * SKL)_{it} + \gamma_4' X_{2it} + \mu_i + \varepsilon_{it} \quad (3.7)$$

For mediation analysis, we use the system of equations (3.5 and 3.6) and for moderation analysis we use equation (3.7). It means, in the system of equations, there are two equations, the mediating equation and the main equation. In mediation equation, equation (3.5), SKL is the adult skill acquisition and development, measured by using educational attainment. TVET is technical and vocational education and training in our main equation, equation (3.6), POV is poverty measured by poverty headcount ratio at $1.9 a day (2011 PPP, % of population). $TVET^2$ is the square term of TVET (TVET_SQ). We include TVET_SQ because we observed a non-linear relationship between TVET and SKL. X_1 is the vector of control variables such as inflation (INF) and financial development (FD). We include INF to account for the purchasing power parity. Further, we include FD to account for financial development in the economy. α_i and β_i are the country specific effects. In equation (3.7), X_2 is the vector of control variables such as income inequality (INQ) and real per capita GDP growth (EG). We include INQ to incorporate the effect of income inequality. To incorporate the overall economic development in the economy we include EG. μ is country specific effects.

Direct Conditional Effect

We do not observe the direct effect of TVET on poverty due to the TVET_SQ. That is why we calculate direct conditional effects by taking partial derivative of POV with respect to TVET from the equation (3.6) as,

$$\frac{\partial POV}{\partial TVET} = \beta_1 + 2\beta_2 TVET \quad (3.8)$$

Indirect Effect

The indirect effect of TVET on POV through SKL is calculated from the regressions (3.5), (3.6) using the chain rule as follows:

$$\frac{\partial POV}{\partial TVET} = \frac{\partial SKL}{\partial TVET} \text{ X } \frac{\partial POV}{\partial SKL} \tag{3.9}$$

where,

$$\frac{\partial SKL}{\partial TVET} = \alpha_1 + 2\alpha_2 TVET \quad \& \quad \frac{\partial POV}{\partial SKL} = \beta_3 \tag{3.10}$$

Therefore,

$$\frac{\partial POV}{\partial TVET} = (\alpha_1 + 2\alpha_2 TVET)(\beta_3) \quad \rightarrow \quad \text{(Indirect Effect)} \tag{3.11}$$

Moderating/ Conditional Effect

Moreover, to calculate the conditional effect we take the derivative of equation (3.7) with respect to TVET and get $\gamma_1 + \gamma_3 SKL$. This can be seen in equation (3.11) mentioned below,

$$\frac{\partial POV}{\partial TVET} = \gamma_1 + \gamma_3 SKL \tag{3.12}$$

Our conditional hypotheses concentrated around the coefficients of γ_1 and γ_3. There exist following four possibilities:

- If $\gamma_1 > 0$ and $\gamma_3 > 0$ then TVET has a positive impact on POV, and SKL condition intensifies the positive impact of TVET.
- If $\gamma_1 > 0$ and $\gamma_3 < 0$, then TVET has a positive impact on POV and SKL conditions mitigate the positive impact of TVET.
- If $\gamma_1 < 0$ and $\gamma_3 > 0$, TVET has a negative impact on POV and SKL conditions mitigate the negative effect of TVET.
- If $\gamma_1 < 0$ and $\gamma_3 < 0$, TVET bas a negative impact on POV and SKL conditions aggravate the negative effect of TVET.

3.2.3 Impact of TVET on Inequality Through Adult Skills Acquisition (SKL)

After discussing the relationship between TVET and POV, we move towards the discussion of the second issue. Now, SKL acts as a mediating as well as moderating variable between TVET and INQ measured by income inequality (Gini index). Moderation effects can be captured through the interactions of SKL and TVET which is also termed as conditional effects.

For mediation analysis, we use the following system of equation solved simultaneously.

$$SKL_{it} = \alpha_i + \alpha_1 TVET_{it} + \alpha_2 TVET_{it}^2 + u_{it} \quad (3.13)$$

$$INQ_{it} = \beta_i + \beta_1 TVET_{it} + \beta_2 TVET_{it}^2 + \beta_3 SKL_{it} + \beta'_4 X_{3_{it}} + \varepsilon_{it} \quad (3.14)$$

For moderation analysis, we use the following econometric model,

$$INQ_{it} = \gamma_1 TVET_{it} + \gamma_2 TVET_{it}^2 + \gamma_3 SKL_{it} + \gamma_4 (TVET^* SKL)_{it} + \gamma'_5 X_{4_{it}} + \mu_i + \varepsilon_{it} \quad (3.15)$$

In the mediating equation, SKL is the adult skill acquisition. TVET is Technical and vocational education and training. $TVET^2$ is the square term of TVET (TVET_SQ). We include TVET_SQ because we observed a non-linear relationship between TVET and SKL. In the main equation, INQ is income inequality (Gini index) of country *i* in year *t*. X_3 is the vector of control variables in equation (3.14) such as real per capita GDP (RPCGDP), financial development (FD) and population growth (POPG). We include RPCGDP, FD and POPG. We include RPCGDP to account for the economic development. FD is included to account for the financial development. Finally, we include POPG. In the moderation equation, equation (3.15), X_4 is the vector of control variable such as FD and POPG. α_i, β_i and μ_i are the country specific effects. u and ε are stochastic error terms.

Direct Conditional Effect

$$\frac{\partial INQ}{\partial TVET} = \beta_1 + 2 * \beta_2 TVET \quad (3.16)$$

Equation 3.16 is showing direct conditional effect of TVET on INQ. It has been calculated by taking partial derivative of INQ with respect to TVET from the equation 3.14.

Indirect Effect

The indirect effect of TVET on INQ through of SKL is calculated from the regressions (3.13), (3.14) as follows: We differentiate partially equation (3.13) with respect to TVET and get $\alpha_1 + 2\,\alpha_2 TVET$, secondly, we differentiate partially equation (3.14) with respect to SKL and get (β_3). Then, to get equation (3.19) we multiply both terms, which $\alpha_1 + 2\,\alpha_2 TVET(\beta_3)$ represents the indirect effect of TVET on INQ. The signs of above cited indirect effects depend upon the signs and magnitudes of α_1,α_2 and β_3.

$$\frac{\partial INQ}{\partial TVET} = \frac{\partial SKL}{\partial TVET} \text{ X } \frac{\partial INQ}{\partial SKL} \qquad (3.17)$$

where,

$$\frac{\partial SKL}{\partial TVET} = \alpha_1 + 2\,\alpha_2 TVET \;\&\; \frac{\partial INQ}{\partial SKL} = (\beta_3) \qquad (3.18)$$

$$\frac{\partial INQ}{\partial TVET} = \alpha_1 + 2\,\alpha_2 TVET\,(\beta_3) \quad \rightarrow \quad \text{(Indirect Effect)} \qquad (3.19)$$

Moderation/ Conditional Effect

Moreover, to calculate the conditional effects we take the derivative of equation (3.15) with respect to TVET, and we get $\gamma_1 + 2\gamma_2 TVET + \gamma_4 SKL$. This can be seen in equation (3.20) mentioned below.

$$\frac{\partial INQ}{\partial TVET} = \gamma_1 + 2\gamma_2 TVET + \gamma_4 SKL \qquad (3.20)$$

Our conditional hypotheses concentrated around the coefficients of γ_1 $\gamma_2$and γ_4. There exist following four possibilities:

- If $\gamma_1 > 0$ and $\gamma_4 > 0$, then TVET has a positive impact on INQ and SKL conditions intensify the positive impact of TVET.
- If $\gamma_1 > 0$ and $\gamma_4 < 0$, then TVET has a positive impact on INQ and SKL conditions mitigate the positive impact of TVET.
- If $\gamma_1 < 0$ and $\gamma_4 > 0$, TVET has a negative impact on INQ and SKL conditions mitigate the negative effect of TVET.

- If $\gamma_1 < 0$ and $\gamma_4 < 0$, TVET has a negative impact on INQ and SKL conditions aggravate the negative effect of TVET.

3.2.4 Impact of TVET on Employment Growth (EMPG) Through of Adult Skills Acquisition (SKL)

In this section, we use SKL as a mediating as well as moderating variable between TVET and EMPG measured by the growth rate of employment to population ratio. Moderation effects can be captured through the interactions of SKL and TVET which is also termed as conditional effects.

To examine the direct and indirect effects of TVET on EMPG through SKL the econometrics models can be specified as under:

$$SKL_{it} = \alpha_i + \alpha_1 TVET_{it} + \alpha_2 TVET_{it}^2 + u_{it} \quad (3.21)$$

$$EMPG_{it} = \beta_i + \beta_1 TVET_{it} + \beta_2 SKL_{it} + \beta'_3 X_{5_{it}} + \varepsilon_{it} \quad (3.22)$$

To examine the moderating role of SKL for the impact of TVET on EMPG, the econometric model can be specified as under:

$$EMPG_{it} = \gamma_1 TVET_{it} + \gamma_2 SKL_{it} + \gamma_3 (TVET^* SKL)_{it} + \gamma'_4 X_{6_{it}} + \mu_i + \varepsilon_{it} \quad (3.23)$$

In the mediating equation (3.21), SKL is the adult skill acquisition. TVET is Technical vocational education and training. $TVET^2$ is TVET_SQ. Whereas in the main equation, equation (3.22), EMPG is employment growth. X_5 is the vector of control variables such as inflation (INF), economic growth (EG), merchandise trade (MT), labor force participation rate growth (LFPRG), population growth (POPG) and foreign direct investment (FDI). We include INF to account for the price level in the country and as an indicator of purchasing power parity. EG includes to account for economic growth in the country. WE include MT to account for trade openness and a proxy of real activities. α_i, β_i and μ_i are the country specific effects. u and ε are stochastic error terms. In the moderation equation, equation (3.23), TVET*SKL is the interaction term. X_6 is the vector of control variable, and we use the same variables discussed above in equation (3.22)

Direct Effect

Equation 3.24 is demonstrating direct effect of TVET on EMPG. It has been calculated by taking partial derivative of EMPG with respect to TVET from the equation 3.22.

$$\frac{\partial \text{EMPG}}{\partial \text{TVET}} = \beta_1 \qquad (3.24)$$

Indirect Effect

The indirect effect of TVET on EMPG through SKL is calculated from the regressions (3.21) and (3.22) as follows: We differentiate partially equation (3.21) with respect to TVET and get $\alpha_1 + 2\alpha_2 TVET$, secondly, we differentiate partially equation (3.22) with respect to SKL and get (β_2). Then, to get equation (3.27) we multiply both terms, which $\alpha_1 + 2\alpha_2 TVET(\beta_2)$ represents the indirect effect of TVET on EMPG. The signs of above cited indirect effects depend upon the signs and magnitudes of α_1, α_2 and β_2.

$$\frac{\partial \text{EMPG}}{\partial \text{TVET}} = \frac{\partial \text{SKL}}{\partial \text{TVET}} \text{ X } \frac{\partial \text{EMPG}}{\partial \text{SKL}} \qquad (3.25)$$

where,

$$\frac{\partial \text{SKL}}{\partial \text{TVET}} = \alpha_1 + 2\alpha_2 TVET \;\&\; \frac{\partial \text{EMPG}}{\partial \text{SKL}} = (\beta_2) \qquad (3.26)$$

$$\frac{\partial \text{EMPG}}{\partial \text{TVET}} = \alpha_1 + 2\alpha_2 TVET\ (\beta_2) \quad \rightarrow \quad \text{(Indirect Effect)} \qquad (3.27)$$

Moderation/ Conditional Effect

Moreover, to calculate the conditional effects we take the partial derivative of equation (3.23) with respect to TVET, and we get $\gamma_1 + \gamma_3 \text{SKL}$. This can be seen in equation (3.28) mentioned below.

$$\frac{\partial \text{EMPG}}{\partial \text{TVET}} = \gamma_1 + \gamma_3 \text{SKL} \qquad (3.28)$$

Our conditional hypotheses concentrated around the coefficients of γ_1 and γ_3. There exist following four possibilities:

- If $\gamma_1>0$ and $\gamma_3>0$, then TVET has a positive impact on EMPG and SKL conditions intensify the positive impact of TVET.
- If$\gamma_1>0$ and $\gamma_3<0$, then TVET has a positive impact on EMPG and SKL conditions mitigate the positive impact of TVET.
- If$\gamma_1<0$ and $\gamma_3>0$, TVET has a negative impact on EMPG and SKL conditions mitigate the negative effect of TVET.
- If $\gamma_1<0$and$\gamma_3<0$, TVET has a negative impact on EMPG and SKL conditions aggravate the negative effect of TVET.

3.3 Estimation Methods

The most frequently used procedures for panel data analysis are the one-way random effect (RE) and fixed effect (FE) models. These models assume that the differences among cross-sectional units (countries) can be captured by an intercept term, which is specific for each country. This specific intercept term is considered as random in RE models and fixed in the FE models. However, the econometric methods available for the estimation of a system of equations for unbalanced panel-data are relatively new. Biørn (2004) develops a procedure for the estimation of a one-way Seemingly Unrelated Regression (SUR) system with random effects (RE). Monte Carlo simulations show that SUR techniques are superior as compared to the standard single equation fixed effect (FE) and random effect (RE) estimators. Therefore, we estimate the three systems of equations discussed in section 3.2 using SUR with one-way random effects (RE) as suggested by Biørn (2004). This procedure has several advantages. For example, it is possible to control country-level heterogeneity in order to avoid biased estimates. Furthermore, due to time and cross-country dimensions, there is more information, less collinearity and greater efficiency in the estimates (Biørn, 2004; Baltagi, 2005).

However, to analyze the moderating/ conditional effects of TVET (SKL being a conditional variable) on POV, INQ, and EMPG (equations 3.7, 3.15 and 3.23), we prefer FE to RE with selection determined by Hausman (1978). The advantage of fixed effects (FE) specification is that it allows the individual-and/or time specific effects to be correlated with explanatory variables; thus, it doesn't require the modeling of their

correlation patterns. However, the FE estimator does not allow the estimation of the coefficients that are time-invariant.

3.4 Data and Description of Variables

This study uses the panel data of 129 developing countries for the period 1970-2019. The choice of sample depends upon the availability of data on our core variables. The use of panel data helps alleviate the problem of omitted variables by considering the country-specific and time-specific effects (Wooldridge, 2001). To meet the objectives, study uses some dependent, independent and control variables. The variables and their calculation are discussed in the upcoming subsections of 3.4.1, 3.4.2 and 3.4.3. Moreover, the sources of data are also mentioned at the end in the subsection of 3.4.4. as follows.

3.4.1 Dependent Variables

Poverty (POV)

First objective of the study is to analyze the impact of TVET on poverty (POV) through adult skills (SKL) in the developing countries. Though various approaches of measuring poverty have been used in the literature, we use the headcount ratio at $1.90 a day (2011 PPP, % of population).

***Inequality* (INQ)**

Similarly, the second objective of this study is to investigate the impact of TVET on income inequality (INQ) through the channel of adult skills (SKL). This study employs the GINI coefficient to measure inequality. It was developed by Corrado Gini in 1912. The GINI coefficient is also known as the GINI index or the GINI ratio, is a measure of statistical dispersion intended to represent the income inequality or the wealth inequality within a nation or a social group. This index summarizes the dispersion of income across the entire income distribution of a country. This index is based on the difference between the Lorenz curve (the observed cumulative income distribution) and the notion of a perfectly equal income distribution. It ranges from 0, indicating perfect equality, income equally distributed, to 1, perfect inequality, income distributed unevenly

and only one person, or a group of few persons get the largest share of income (World Bank).

Employment (EMPG)

The third objective of the study is to analyze the impact of TVET on the employment growth (EMPG) through adult skills (SKL) in the developing countries. Employment generation has been a key issue in all the economies of the world. Studies have shown different strategies to enhance the employment level. This study uses the growth rate of employment to populations ratio, 15 years or above, total (%).

Skill acquisition and development (SKL)

In all three objectives of the study, we are analyzing the impact of TVET on POV, INQ and EMPG through SKL in the developing countries. For this impact we are using the channel SKL. It is important to address the term skills. In the section 2.4 of the chapter 2, definitions have been reviewed in details and references of the different studies have also been mentioned. In our study we are taking SKL as dependent variable. Adult-Skill acquisition and development is measured, in our study, by education attainment.

3.4.2 Independent Variables

Our main variable of interest is the technical and vocational education and training (TVET). This has been used as an independent variable. Different studies have used it as a savior of many issues like poverty, inequality and unemployment. This study uses technical and vocational education and training (TVET) which is measured by the number of secondary students enrolled in technical and vocational education programs, including teacher training.

This study also uses different control variables such as inflation (INF), financial development (FD), per capita real GDP (RPCGDP), population growth (POPG), economic growth (EG), merchandise trade (MT), labor force participation rate growth (LFPRG), and foreign direct effect (FDI).

We include inflation (INF) to account for price stability and a measure of purchasing power. This study includes INF in equations (3.6), (3.22) and (3.23) that is in POV and EMPG equations. FD is included to account for financial development in POV and INQ equations.

The theoretical literature argues that financial development can help to reduce income inequality and poverty directly by providing credit and financial services to the poor that helps to increase their income through investing in productive activities as well as through interest earned from savings, and indirectly by its growth stimulating effect (Schumpeter, 1934; McKinnon, 1973). Furthermore, financial development can also indirectly reduce poverty and income inequality through enhancing economic growth and channeling the gains to the poor. One of the ways in which financial development enhances economic growth is through the mobilization of funds from their inefficient usage to efficient use (Kheir, 2019).

To capture the impact of economic development we include real per capita GDP (RPCGDP) in the equations of poverty and inequality. We include the human capital index (HC) computed as the average year of schooling and returns to education. The human capital index is included as an important determinant of economic growth because theoretical predictions show that disaggregation of labor into skilled and unskilled workers enhances the explanatory power of the neoclassical growth models. (Romer, 1986; Mankiw et al., 1992; Barro, 1991).

We include MT in EMPG equation, to account for real economic activities generate in the economy. It is calculated as the sum of merchandise import and export as a percentage of GDP. Additionally, we use the growth rate of labor force participation rate in equation of EMPG. It indicates the active working population in an economy and calculates the ratio of population at the age of 15 year to active working population. It is included because ILO reports that there is a strong relationship between LFPR and EG.

3.5 Sources of data

This study initially plans to use the data on different variables from the different sources including World Development Indicator (WDI), International Financial Statistics (IFS), and Penn World Tables (PWT) dataset. However, all the data finally, has been taken from the World Development Indicator (WDI). The details are provided in Appendix A.

Chapter 4

RESULTS AND DISCUSSION

In this chapter, the study discusses the estimation results of the impact of Technical and Vocational Education and Training (TVET) on poverty, inequality, and employment growth by investigating the role of adult skill. A detailed discussion is provided in the following sections.

(A) Technical and Vocational Education and Training (TVET), Adult Skill and Poverty

This section documents the estimation results of the impact of technical and vocational education and training (TVET) on poverty (POV) using adult skills (SKL) as a mediator and moderator in developing countries. For mediation analysis, this study estimates a system of equations following Biorn's (2004) methodology and employs a seemingly unrelated regression (SUR) method for unbalanced panel data. It uses XTSUR codes developed by Nguyen (2010) to estimate the system of equations, 3.5 and 3.6, discussed in chapter 3[1]. Further, the direct and indirect effects have been calculated for the effect of TVET on POV, SKL being a channel or mediator.

For moderation analysis, this study investigates the role of SKL as a moderator for the effect of TVET on POV, hence using the interaction term of TVET and SKL (TVET*SKL). We employ state of the art panel data method for the purpose, such as *Fixed Effects* method that has been chosen by applying the *Hausman* test and estimate equation (3.7)[2]. Further, this study estimates the direct as well as conditional effects of

[1] $SKL_{it} = \alpha_i + \alpha_1 TVET_{it} + \alpha_2 TVET_{it}^2 + u_{it}$ (3.5)

$POV_{it} = \beta_i + \beta_1 TVET_{it} + \beta_2 TVET_{it}^2 + \beta_3 SKL_{it} + \beta_4' X_{1_{it}} + \varepsilon_{it}$ (3.6)

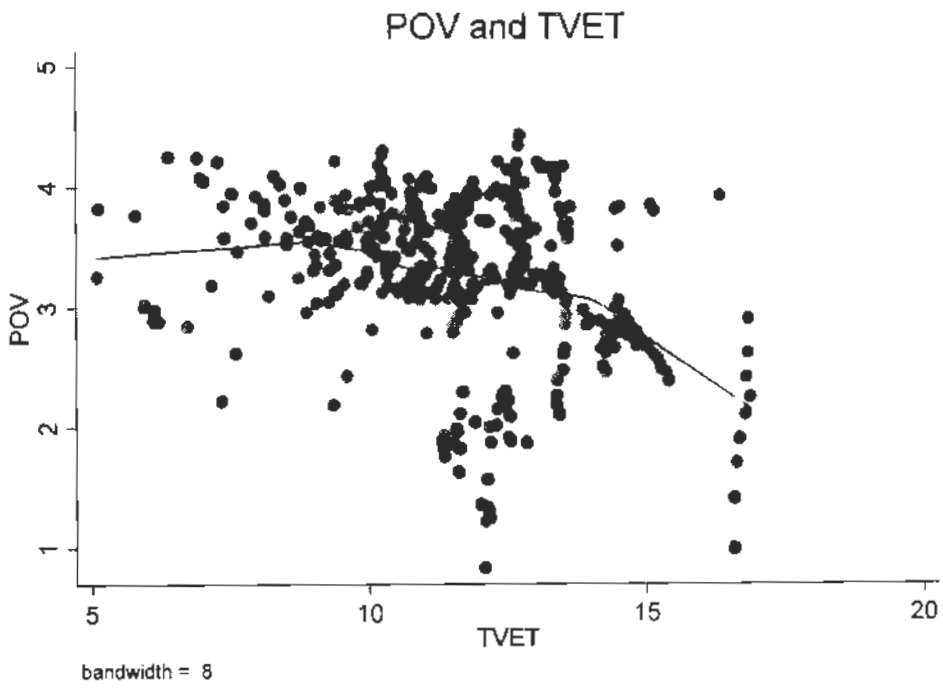
[2] $POV_{it} = \gamma_1 TVET_{it} + \gamma_2 SKL_{it} + \gamma_3 (TVET * SKL)_{it} + \gamma_4' X_{2_{it}} + \mu_i + \varepsilon_{it}$ (3.7)

TVET on POV. In addition, various control variables are used in the model specification, such as financial sector development proxied by the private credit issued by domestic commercial banks to the private sector percent of GDP (FD), inflation rate (INF), real per capita GDP growth (EG) and income inequality (INQ).

4.1 Graphical Analysis

In Figure 4.1, we plot POV and TVET, the plot confirms that as the level of TVET increases, initially, POV rises then after some level of TVET, poverty starts to decline. It explains that there exists a non-linear relationship between TVET and POV. The reason for this increase is that, initially as TVET increases, the expenses to get technical education increase. A person who always experiences poverty when he pays additional expenses becomes poorer, therefore, poverty increases. After he gets technical knowledge, he becomes a skillful person and his income increases, thus poverty reduces.

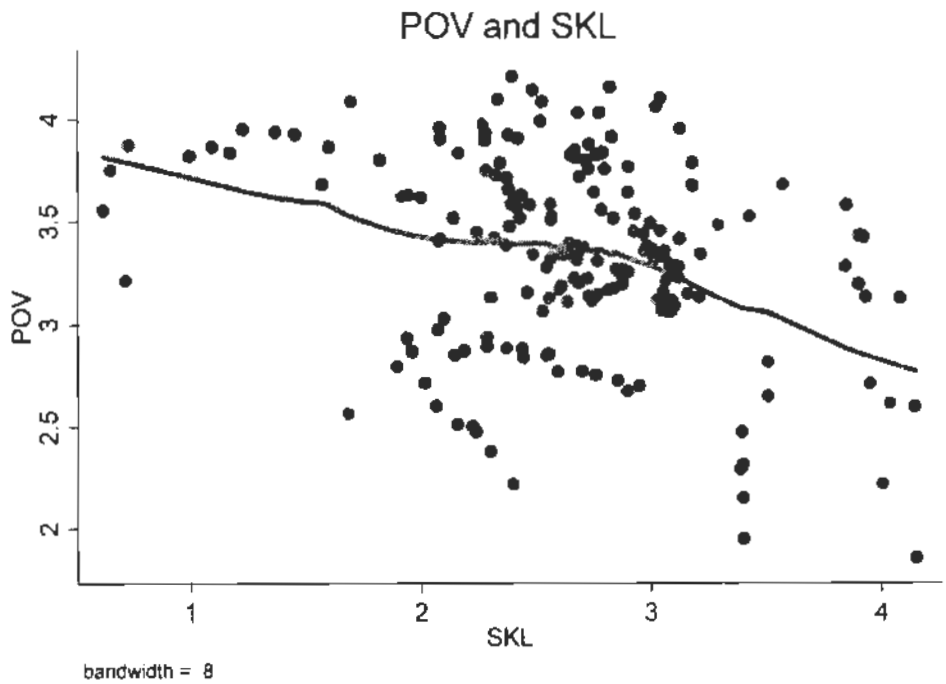
Figure 4.1: Relationship Between Poverty and TVET



In Figure 4.2, we plot POV and SKL, the plot confirms that as the level of SKL acquisition increases, poverty starts to decline which shows the negative relationship between POV

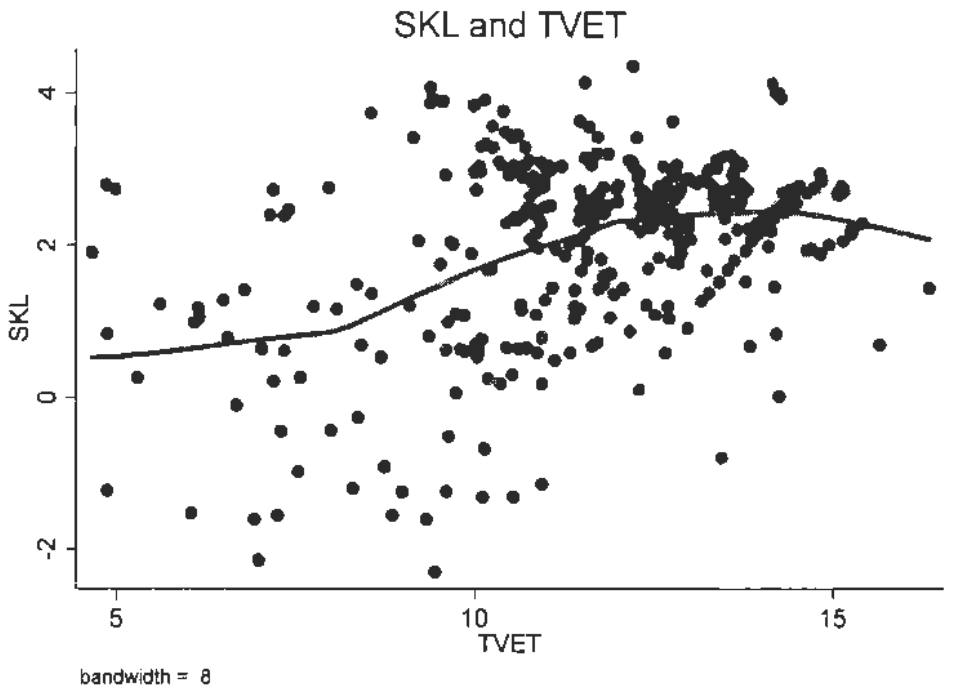
and SKL acquisition. It confirms the conceptual framework that explains the logic. According to this logic, skilled people get more opportunities to get better jobs. Resultantly, the people receive more or higher wages due to their skills and responsible for poverty reduction.

Figure 4.2: Relationship Between POV and SKL



In Figure 4.3, we plot TVET and SKL, the plot confirms that as the TVET increases, there is a SKL improvement. However, after the attainment of a certain optimum level of TVET, SKL starts to decline. It explicates that this graph also supports the phenomenon that there is a positive relationship between SKL and TVET. Additionally, more technical training creates skilled labor. However, countries where the people are already skilled, TVET is not showing the positive relation due the market saturation. It shows somehow stability of skill with increasing the TVET.

Figure 4.3: Relationship Between SKL and TVET



4.1.1 Data Analysis

Table 4.1 encompasses the summary statistics, whereas Table 4.2 includes the correlation matrix. Table 4.1 shows the total number of observed cases (N), mean, median, standard deviation (SD), minimum values (Min) and maximum values (Max) for POV, SKL, TVET, FD, INF, INQ and EG. As far as our variable of interest, the TVET obtains the highest mean value of 10.137, and INF shows highest mean value of 64.623 among the control variables. In addition, FD shows the lowest mean value of 2.916. Rest the mean value for POV, SKL, INQ and EG are 3.281, 4.288, 3.716 and 7.541 respectively. The table also depicts the highest value of median for INF 56.829 and the lowest value for FD 2.986 respectively. Additionally, the result of standard deviation depicts the measurement of data dispersion. The higher the value of standard deviation is meaning that higher is the degree of data dispersion from its mean. In addition to this, the study presents the two extremes, that is, the INF which is showing the highest value of 100.396 of standard deviation whereas INQ is showing the lowest value of 0.218 contributing the most to the sum of difference squared in the model.

Table 4.1: Summary Statistics

Variables	N	Mean	Median	SD	Min	Max
POV	636	3.281	3.352	0.630	0.470	4.434
SKL	585	4.288	4.422	0.356	2.808	4.605
TVET	3541	10.137	10.138	2.394	2.398	16.867
FD	4946	2.916	2.986	0.885	-1.093	5.115
INF	4453	64.623	56.829	100.396	0.000	4583.706
INQ	1009	3.716	3.721	0.218	3.178	4.187
EG	5408	7.541	7.592	0.993	5.086	9.882

Another section of summary statistics illustrates the results of correlation analysis. Table 4.2 shows that there is a negative correlation between POV and SKL with a correlation coefficient of -0.176. It is exactly what we have in our conceptual framework which already has been explained in chapter 3 of this study. According to this concept, if the employees are more equipped with a level of skill, they will have more opportunities for skilled employment with more earnings. This results in decreasing poverty because of high-income levels. So, the above result of this study is showing the same pattern that we propose in the hypothesis. Similarly, there is a negative correlation of POV with our variable of interest TVET having the value of correlation coefficient -0.022. It is also exactly in line with the conceptual framework that TVET is strongly beneficial for alleviating poverty. Employees with more TVET levels will be getting more rewards in the shape of wages that result in the wellbeing of the employee, commonly known as decreasing poverty.

Additionally, the correlation of POV with FD, INF and EG is observed with the values of correlation coefficient -0.501, -0.488 and -0.369 respectively. Whereas there is a positive association between POV and INQ which is 0.293. Moreover, the positive correlation of adult skill is observed with TVET, FD, INF, INQ and EG depicting the coefficient values 0.206, 0.301, 0.196, 0.053 and 0.419 respectively. Furthermore, a similar trend of positive correlation of TVET is observed with FD, INF, INQ and EG showing the values 0.265, 0.154, 0.262 and 0.358 respectively. Similarly, FD shows a strong positive association with INF, INQ and EG with the correlation coefficient value of 0.232, 0.175 and 0.661 respectively. Moreover, INF shows a negative correlation with INQ and a positive with EG with the coefficient values of -0,465 and 0.086 respectively. Finally, the results show

a positive correlation between INQ and EG with a value of 0.377 in the correlation analysis.

Table 4.2: Correlation Analysis

Variables	POV	SKL	TVET	FD	INF	INQ	EG
POV	1.000						
SKL	-0.176	1.000					
TVET	-0.022	0.206	1.000				
FD	-0.501	0.301	0.265	1.000			
INF	-0.488	0.196	0.154	0.232	1.000		
INQ	0.293	0.053	0.262	0.175	-0.465	1.000	
EG	-0.369	0.419	0.358	0.661	0.086	0.377	1.000

4.2 Impact of TVET on POV Through Adult Skill (SKL)

In this section, we analyze the relationship between TVET and POV and discuss the estimation results. We examine whether there exists any direct relationship between TVET and POV. We also examine in this regard whether the mediating role of adult skill (SKL) is existing here or not. Hence, our main objective is to analyze the relationship between TVET and POV by investigating the mediating role of SKL.

Table 4.3 explains our regression results for the impact of TVET on POV through adult skill (SKL). Our model contains two equations. Model (a) represents the estimation results of the mediating equation, whereas model (b) represents the estimation results of our main equation. The dependent variable in model (a) is SKL, a proxy for adult skill acquisition and development, aud POV to proxy poverty in model (b). The explanatory variable is TVET and TVET square term (TVET_SQ) in models (a) and (b) of Table 4.3. We use TVET_SQ because our data support non-linearity, as shown in Figure 4.1.

Table 4.3 contains the estimation results of TVET on POV through SKL. In our mediation equation, model (a), the TVET elasticity of SKL is positive and significant. It means that a one percent increase in TVET results in an increase in SKL by 0.73 percent. It crystallizes that the TVET improves SKL. The result of this model in our study shows consistency with the previous literature (Miller, 2020; Adedapo & Demokun, 2021; Xu & Sun, 2021). Similarly, the TVET_SQ elasticity of SKL is negative and significant. It implies that a higher level of TVET deteriorates the acquisition and development of adult

skill (SKL). This happens because more and more training could not contribute to SKL rather it was just a wastage of time.

Table 4.3: Regression Results of TVET on POV Through SKL

	Model	
	(a)	(b)
VARIABLES	**SKL**	**POV**
SKL		-0.150*** (0.000)
TVET	0.732*** (0.000)	0.724*** (0.000)
TVET_SQ	-0.041*** (0.000)	-0.030*** (0.000)
INF		0.013*** (0.000)
FD		-0.501*** (0.000)
	Direct Conditional Effect	**Indirect Effect**
Low TVET	0.013 (0.765)	-0.003*** (0.001)
Median TVET	-0.115** (0.011)	0.016*** (0.000)
High TVET	-0.260*** (0.000)	0.038*** (0.000)
Number of Observations	150	150
Number of Countries	129	129

Notes: *, **, and *** indicate the significance at 10%, 5% and 1% level respectively, *p-values* appear in parenthesis. The dependent variables are SKL in model (a) and POV in model (b). The main independent variables are TVET, TVET_SQ and SKL. INF and FD are control variables. All variables are in log form. The above estimation employs the SUR method for unbalanced panel data as developed by Biorn's (2004).

Elseways, in the main equation, model (b), the TVET elasticity of POV is positive. It implies that a one percent improvement in education and training enhances poverty by 0.724 percent. It elucidates that initially when people decide to improve their skill by investing in education and training activities, poverty enhances because people start to get some education which initially does not contribute to their earnings and poor becomes poorer. As discussed in the graphical analysis there exists non-linearity in the relationship of TVET and POV. That is why we include the squared term of TVET. The TVET_SQ elasticity of POV is negative and significant. It confirms that after achieving a certain

level of education and training poverty starts to decline. Our result is consistent with the empirical findings of Choi et al. (2019) and Wu (2020). Additionally, the POV's elasticity of SKL is negative and significant. It entails that improved SKL reduces poverty. This result is like Hadi et al. (2013) and Qin et al. (2019). The results imply that people having high skill are targeted by the labour market immediately as per their learned expertise. Therefore, this causes an attractive increase in their wages and decreases the level of poverty in the developing countries.

Another objective of this analysis is to explore the mediation of SKL for the impact of TVET on POV. That is why we compute the direct and indirect effects. However, in this case, we do not observe the direct effect because of the squared term of TVET as discussed above. That is why we compute the direct conditional effects by taking the partial derivative of equation (3.6)[3], presented in the lower panel of Table 4.3. For this, we use three levels of TVET: low (25^{th} percentile), median (50^{th} percentile) and high (75^{th} percentile) At lower level of TVET, the coefficient is positive but insignificant. However, as the level of TVET increases the coefficient becomes negative and highly significant. It implies that the level of TVET helps to reduce POV. Further, we compute the indirect effect by taking derivative of equation (3.5) and (3.6)[4]. For this we use three levels of TVET: low (25^{th} percentile), median (50^{th} percentile) and high (75^{th} percentile).

The results of indirect effects are presented in the lower panel of Table 4.3. At low level of TVET, the direct conditional effect is insignificantly positive. However, indirect effect is negative and significant. It means that partial mediation exists. It clarifies that TVET reduces POV when it works through SKL at low level of education and training. The results of the study are consistent with previous studies like Gvaramadze (2010), Brunello and Rocco (2017), Miller, (2020).

On the contrary, at average and high levels of TVET, the direct conditional effect is negative and significant, as shown in Table 4.3, whereas the indirect effects are positive and significant. The significant coefficients of indirect effect confirm the partial mediation

[3] See footnote 2
[4] See footnote 2

of SKL, however, with a positive sign. It implies that, as the level of TVET improves and reaches at some medium and high level, TVET enhances POV when it works through SKL. This fact is surprising for us and hard to interpret. As we discuss earlier that TVET and POV holds a non-linear relationship. The reason behind this in current population settings is more technical training creates skilled labor; however, countries where the people are already skilled, TVET is showing a positive relation due the market saturation. This market saturation does not create more opportunities for the people to make them able to earn better wages and contributing significantly to poverty reduction. Nevertheless, it shows somehow stability of skill with increasing the TVET.

As far as the control variables are concerned, we employ various control variables in both columns of (a) and (b). The impact of INF on POV is positive and significant. It elaborates that when inflation increases by one percent, POV is enhanced by less than one percent. It happens because inflation disturbs the purchasing power, resulting in poverty enhancement. The results are in line with Cardoso (1992). Moreover, the FD elasticity of POV is negative and significant. It clarifies that financial development in the country reduces poverty. The results support the hypothesis that financial development creates more comfortable and accessible opportunities towards finances and their management. Resultantly, financial development leads a step towards the well-being and betterment for the members of the society.

Summary

According to Tarabini and Jacovkis (2012) "Education not only generates economic benefits such as increasing salaries, productivity and growth, but also produces social benefits related to social cohesion, political participation, and even to fertility and health". This study addresses the importance of TVET policy which seems fruitful to strengthen the economy with capable, qualified and competitive personnel. In this regard the aim is to train people to be able to participate in poverty reduction, reducing inequality, increasing employment and enhancing sustainable growth.

In addition, to strengthen the national development, it is very important to assess the TVET policy from time to time. Many economies are now much interested to expand

TVET programs and arrangements for young people, at all levels in tertiary as well as upper-secondary, to handle the youth unemployment. Skill acquisition is the central policy in all developing countries in this era of competition. There is a need for individuals in these economies to have certain skills level if they want to attract investment for the growth point of view (OECD, 2012). Moreover, the level of skill is a strong source of acquiring human capital in the long run. Therefore, this section of current study investigates the impact of TVET on the challenging issues of alleviating poverty considering the mediating as well as moderating mediating roles of adult skill in developing countries. Purposefully, in case of mediating effects, to estimate a system of equations Biorn's (2004) methodology is followed that employs a seemingly unrelated regression (SUR) model for unbalanced panel data. We use XTSUR codes developed by Nguyen (2010) for the estimation.

The findings of the study affirm that a significant negative nonlinear relationship between TVET and POV is observed in the analysis. Moreover, in mediation equation the result of TVET elasticity of SKL is positive and significant which confirms that the TVET improves adult SKL. Similarly, the TVET_SQ elasticity of SKL is negative and significant. It implies that higher the level of TVET ultimately deteriorates poverty due to availability of more opportunities of employment and earnings. Contrarily, in the main equation, model (b), the TVET elasticity of POV is positive. It elucidates that initially when people decide to improve their skill by investing in education and training activities, poverty enhances because people start to get some education which initially do not contribute to their earnings and poor becomes poorer.

Furthermore, as there exists nonlinearity in the relationship, the TVET_SQ elasticity of POV is negative and significant. It confirms that after achieving a certain level of education and training poverty starts to decline. Additionally, the SKL elasticity of POV is negative and significant. It entails that improving adult skill reduces poverty. Likewise, the results of indirect-conditional effect show that at low level of TVET, the direct effect is positive however, indirect-conditional effect is negative and significant. Concludingly, it is observed that the increasing trend of TVET encourages the employees in terms of better opportunities of earning which ultimately results in fascinated rewards and wages.

This will definitely lead to high rate of employment due to the impact of TVET and reducing poverty in the society.

4.3 The Moderating Role of SKL for the Impact of TVET on POV

In this section, we analyze the moderating role of SKL for the relationship between TVET and POV and discuss the estimation results. Table 4.4 encompasses the results for the moderating role of SKL obtained from fixed effects estimation.

The TVET elasticity of POV is negative and significant. It implies that technical vocational education and training reduces poverty. This result is in line with Miller (2020), Adedapo and Demokun (2021), and Xu and Sun (2021). Additionally, the SKL elasticity of POV is negative and significant. It crystalizes that improved adult skill helps in poverty reduction. This happen because skilled persons are always having more opportunities to get their related skilled job resulting in more income. So, ultimately poverty will be alleviated just because of TVET. We include the interaction of TVET and SKL (TVET*SKL). The TVET*SKL elasticity of POV is positive and significant. It means, as the level of SKL increases, the negative impact of TVET on POV lowers; thus, TVET and SKL behaving like substitutes.

The relationship between INF and POV is positive but insignificant. Besides, the INQ elasticity of POV is positive and significant, which entails that poverty grows as there is more inequality in the economy. This result is like Ravallion (2004) inequality affects poverty as it reduces the pace of economic growth an increase in overall economic prosperity in the country alleviates poverty as indicated by the negative EG's impact on POV. Our result is consistent with Dhrifi (2014) and Dollar and Kraay (2000). Moreover, we use FD to investigate the impact of financial development on poverty reduction. The FD elasticity of POV is negative but insignificant.

Table 4.4: The Moderating Role of SKL for the Impact of TVET on POV

	Dependent variable
VARIABLES	**POV**
SKL	-2.007*** (0.001)
TVET	-0.497*** (0.008)
TVET*SKL	0.171*** (0.001)
INF	0.001 (0.646)
INQ	0.526** (0.022)
EG	-1.173*** (0.000)
FD	-0.11 (0.349)
Constant	17.607*** (0.000)
Number of Observations	140
Number of PID	33
R-squared	0.834
Notes: As for Table 4.3. TVET*SKL is the interaction term of TVET and SKL. EG is economic growth, and INQ is income inequality. We estimate our model using the FE method, as suggested the by Hausman test.	

As discussed, we are interested in the moderating role of SKL. Table 4.5 encompasses the conditional effects of TVET on POV, SKL being a conditional variable or a moderator. We estimate conditional effects for three levels of SKL: low, medium and high. It is noted that at a low level of SKL, the conditional effect is negative and significant. Whereas, at high and medium levels of SKL, the conditional effects are negative but insignificant.

Table 4.5: Conditional Effects

	Coefficient	95% Confidence Interval	
Low SKL	-0.252** (0.025)	-0.473	-0.032
Median SKL	-0.089 (0.243)	-0.238	0.060
High SKL	-0.017 (0.784)	-0.141	0.107

Summary of Acceptance and Rejection of Statements of Hypothesis

The results of the study are aligned with the underlying theory of the study. Furthermore, on the basis of results of seemingly unrelated regression the acceptance and rejection of hypothesis is provided in Table 4.6 given below.

Table 4.6: Summary of Acceptance and Rejection of Statements of Hypothesis

S. No	Statement of Hypotbesis	Finding
H_1	*Technical and Vocational Education and Training has a negative impact on Poverty in developing countries.*	**Not Rejected** *(significant negative impact)*
H_2	*Technical and Vocational Education and Training has a positive impact on Adult-Skill in developing countries.*	**Not Rejected** *(significant positive impact)*
H_3	*Adult-Skill has a negative impact on Poverty in developing countries.*	**Not Rejected** *(significant negative impact)*
H_4	*Adult-Skill moderates the causal relationship of Technical and Vocational Education and Training and Poverty in developing countries.*	**Not Rejected** *(significant)*

(B) Technical and Vocational Education and Training (TVET), Adult Skill and Inequality

In this section, we analyze and discuss the relationship between technical and vocational education and training (hereafter TVET) and income inequality (hereafter INQ). Income inequality is closely related to the wages of individuals; hence the understanding of wage inequalities is very important because of welfare variances among the people. Inequality is a universal feature in the world's economies, not only developed but also developing countries over the past generation are experiencing greater inequality. However, empirically, it has been proved that an increase in the supply of skilled labor reduces income inequality because the return increases with the help of TVET.

This study estimates the impact of TVET on INQ through the channel of Adult-Skill acquisition and development (hereafter SKL) in developing countries. Moreover, we use the interaction term of TVET and SKL (TVET*SKL) to analyze the role of SKL in the impact of TVET on INQ. In addition, we employ various control variables, such as financial development (FD), real per capita GDP (RPCGDP) and population growth (POPG). The discussion on all these variables has already been provided in chapter 3 of this study.

For mediation analysis, we employ the seemingly unrelated regression (SUR) method for unbalanced panel data as developed by Biorn (2004), while the fixed effects method has been used to investigate the interactive effects of TVET and SKL on POV. We use XTSUR codes developed by Nguyen (2010) to estimate the system of two equations, (3.13) and (3.14) given in chapter 3[5]. While the interactive effects are estimated using fixed-effects method for equation (3.15)[6].

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[5] $SKL_{it} = \alpha_i + \alpha_1 TVET_{it} + \alpha_2 TVET_{it}^2 + u_{it}$ (3.13)

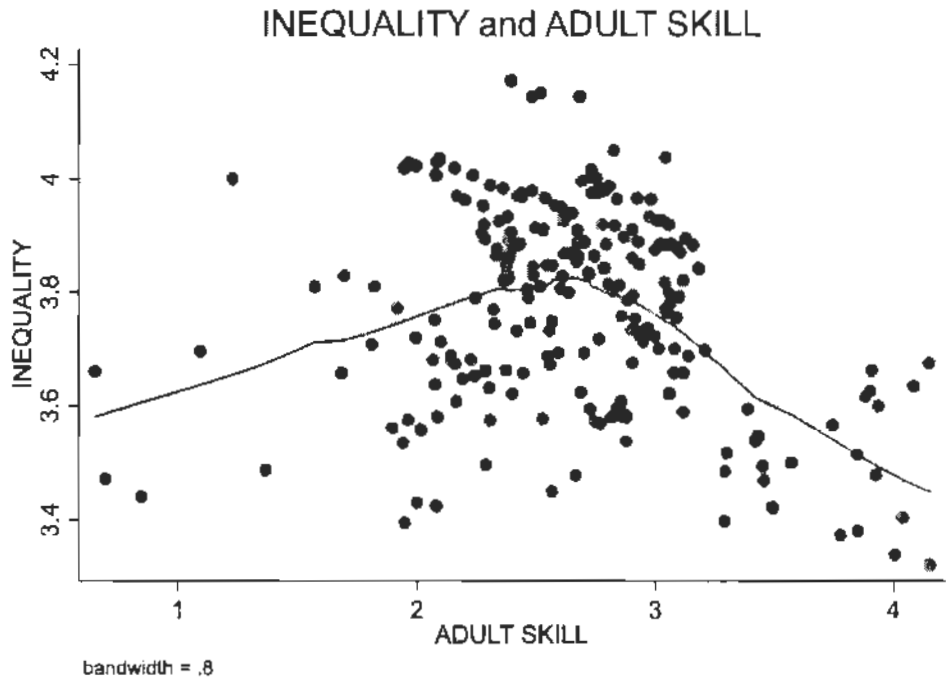
$INQ_{it} = \beta_i + \beta_1 TVET_{it} + \beta_2 TVET_{it}^2 + \beta_3 SKL_{it} + \beta'_4 X_{3it} + \varepsilon_{it}$ (3.14)

[6] $INQ_{it} = \gamma_1 TVET_{it} + \gamma_2 TVET_{it}^2 + \gamma_3 SKL_{it} + \gamma_4 (TVET^*SKL)_{it} + \gamma'_5 X_{4it} + \mu_i + \varepsilon_{it}$ (3.15)

4.4 Graphical Analysis

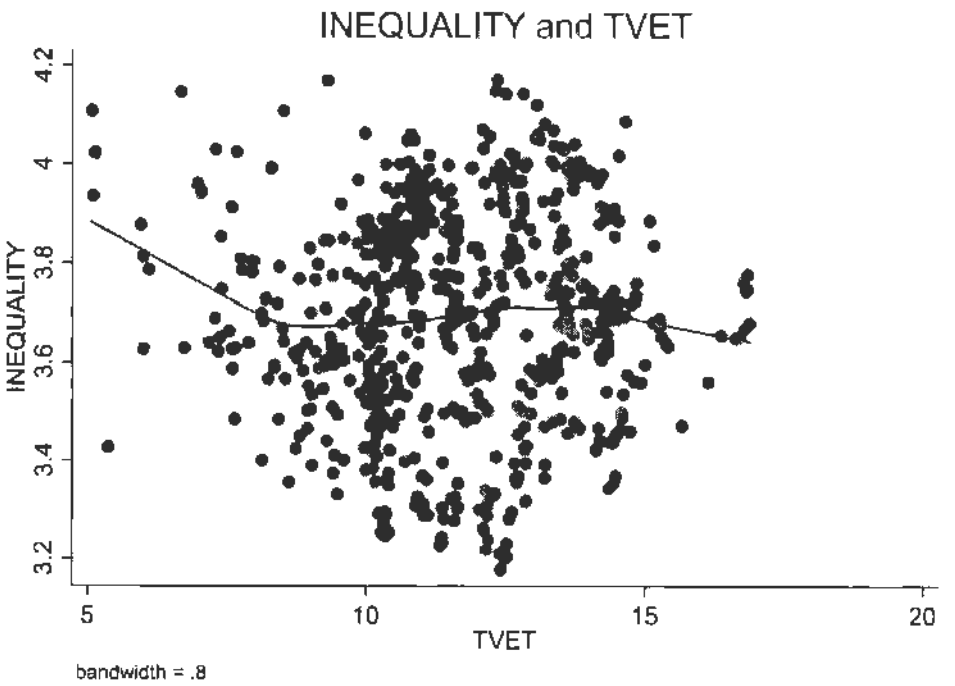
In section (A) we have already discussed the overall positive relationship between TVET and SKL, however, the relationship between SKL and INQ is delineated in Figure 4.4. The plot confirms that as the level of SKL increases, INQ starts to decline which shows the negative relationship between SKL and INQ. It means the skilled people get more opportunities to get better jobs. As a result, their wages or incomes improve which may lead to reducing income inequality.

Figure 4.4: Relationship Between Adult-Skill and Income Inequality



In Figure 4.5, we plot TVET and INQ, the plot confirms that as the TVET increases, it helps to reduce inequality. However, after attaining a certain level of TVET, inequality does not decrease significantly. It explicates that when there is a high literacy rate (technical and vocational education), and most of the people are educated in the society, everyone will be eligible due to his or her skillful education to maintain better living standards, but the opportunities for employment will be limited and may give rise to inequality.

Figure 4.5: Relationship Between TVET and Income Inequality



4.5 Summary Statistics and Correlation Analysis

Table 4.7 encompasses the summary statistics, whereas Table 4.8 includes the correlation matrix. Table 4.7 shows the total number of observed cases, mean, median, standard deviation, minimum values and maximum values for TVET, SKL, INQ, FD, RPCGDP and POPG.

Table 4.7: Summary Statistics

Variables	N	Mean	Median	SD	Min	Max
INQ	1009	3.716	3.721	0.218	3.718	4.186
SKL	585	4.288	4.422	0.356	2.808	4.605
TVET	3541	10.137	10.138	2.394	2.398	16.867
FD	4946	2.916	2.986	0.885	-1.093	5.115
RPCGDP	5408	7.541	7.592	0.993	5.086	9.882
POPG	6572	1.902	2.077	1.328	-10.955	11.534

We note that TVET obtains the highest mean value of 10.137, whereas POPG shows the lowest mean value of 1.902. Rest, the mean value for INQ, SKL, FD and RPCGDP are 3.716, 4.288, 2.916 and 7.541 respectively. The table also depicts the highest value of

median for TVET 10.138 and the lowest value for POPG 2.077 respectively. It is also observed that TVET exhibits the highest standard deviation value of 2.394, whereas INQ is showing the lowest value of 0.218.

On the other hand, Table 4.8 shows that there is a negative correlation between SKL and INQ with the value of correlation coefficient -0.123. It is exactly what we have in our conceptual framework which is already explained in chapter 3 of this study. According to this concept, if the employees are more equipped with the level of skill, they have more opportunities for skilled employment with more earnings. This results in decreasing income inequality because of more income levels. So, the above result of this study is showing the same pattern that we propose in the hypothesis. In contrast, there is a positive correlation of INQ with our variable of interest TVET having a value of correlation coefficient 0.237. It is also exactly in line with the conceptual framework that TVET is beneficial for earning healthy income in society and maintaining life standards by alleviating poverty and reducing inequality. However, after attaining a certain level of TVET, inequality does not decrease significantly. It explicates that when there is a high literacy rate (technical and vocational education), and most of the people are educated in the society, everyone will be eligible due to his or her skillful education to maintain better living standards, but the opportunities for employment will be limited and may give rise to inequality as mentioned in figure 4.5.

Table 4.8: Correlation Analysis

Variables	INQ	SKL	TVET	FD	RPCGDP	POPG
INQ	1					
SKL	-0.123	1				
TVET	0.237	0.227	1			
FD	0.218	0.241	0.304	1		
RPCGDP	0.306	0.409	0.417	0.588	1	
POPG	0.277	-0.368	0.095	-0.138	-0.285	1

Additionally, there is a positive correlation between INQ and FD, RPCGDP as well as POPG with the values of correlation coefficient of 0.218, 0.306 and 0.277 respectively. Moreover, the positive correlation of SKL is observed with TVET, FD and RPCGDP depicting the coefficient values of 0.227, 0.241 and 0.409 respectively. In addition, there is a negative correlation between SKL and POPG with a coefficient value of -0.368.

Furthermore, another trend of positive correlation of TVET is observed with FD, RPCGDP and POPG showing the values 0.304, 0.417 and 0.095 respectively. Similarly, FD shows a strong positive association with RPCGDP with a correlation coefficient value of 0.588 but a negative association with POPG with a value of -0.138 in the correlation analysis. Finally, RPCGDP is observed negatively associated with population growth with a correlation coefficient of -0.285.

4.6 Impact of TVET on INQ Through SKL

In this section, we analyze the relationship between TVET and INQ and discuss the estimation results. We examine whether this relationship is direct or if there exists some mediation of SKL. Our main objective is to check whether TVET helps to reduce inequality or not, and SKL plays some role in reducing inequality.

Table 4.9 explains our regression results for the impact of TVET on INQ through SKL. Our model contains two equations. Model (a) represents the estimation results of the mediating equation, whereas model (b) represents the estimation results of our main equation. The dependent variable in model (a) is SKL, a proxy for adult-skill acquisition and development and INQ, proxied by GINI index, in model (b). The explanatory variable is TVET and TVET square term (TVET_SQ) in models (a) and (b) of Table 4.9. We use TVET_SQ because our data support non-linearity between TVET and INQ, as shown in Figure 4.5.

Table 4.9 explains the estimation results of TVET on INQ through SKL. In our mediation equation, model (a), the TVET elasticity of SKL is positive and significant. It means that a one percent increase in technical education and training results in an increase in SKL by 0.718 percent. It crystallizes that the TVET improves adult skills (SKL). The result of this model in our study shows consistency with the previous literature (Isaac & Ayodele, 2020; Van Vu, 2020). Similarly, the TVET_SQ elasticity of SKL is negative and significant. It implies that the higher the level of TVET the level of SKL reduces. It means that countries where the people are already skilled or after the attainment of a certain optimum level of TVET, it is not showing a positive relation with SKL due the market saturation. It shows somehow stability of skill with increasing the TVET.

Else ways, in the main equation, model (b), the TVET elasticity of INQ is positive which is consistent with Keller and Grassi (2020) and Attanasio et al. (2017). It elucidates that initially when people decide to improve their skill by investing in education and training activities, inequality enhances because people start to get some education which initially does not contribute to their earnings and the poor become poorer. As discussed in the graphical analysis there exists non-linearity in the relationship between TVET and INQ. That is why we include the squared term of TVET. The TVET_SQ elasticity of INQ is negative and significant. It confirms that after achieving a certain level of education and training, inequality starts to decline. Our result is consistent with the empirical findings of Tran et al. (2020), Fasih et al. (2012) and Jinmei (2020). Additionally, the INQ's elasticity of SKL is negative and significant. It entails that improving SKL reduces inequality. This result is like Van Vu (2020), Tran et al. (2020) and Aizenman et al. (2020). The results imply that people having high skills are targeted by the labor market immediately as per their learned expertise. Therefore, this causes an attractive increase in their wages and decreases the level of inequality in developing countries.

The aim of this study is to explore the mediating role of SKL, that is why we compute the indirect effects, as shown in the lower panel of Table 4.9. At the low level of TVET, the direct effect is positive and significant as indicated by the positive elasticity of TVET on INQ. The indirect effect is negative and significant which entails that partial mediation of SKL exists. It implies due to TVET there is the increase in the level of SKL in the society that ultimately reduces inequality. Besides, at medium and high levels of TVET, the direct effect is significant. The indirect effect is positive and significant. The positive significant indirect effect confirms the partial mediation.

It is surprising that when TVET works through SKL it enhances the inequality (INQ). This happens because, after a certain degree of SKL by the people in the society, the time comes when there is no more significant impact of SKL for the reduction of inequality. The reason behind this is the saturation of SKL in society with limited available employment opportunities in the market, which ultimately enhances the inequality.

Moreover, in model (b), the RPCGDP elasticity of INQ is negative and significant. It clarifies that economic development in the country reduces inequality. Additionally, the

FD elasticity of INQ is positive and significant. It explains that financial development heightens inequality. This is surprising and hard to interpret. This happens because, during the phase of financial crises, there is excess finance in the market, due to which economic growth is not affected or contributed by financial development and ultimately inequality increases and economic growth decreases. These findings show consistency with Bhatti (2013) and Rousseau and Wachtel (2011). In addition, another justification for this output of the study is a weak form of credit protection laws and thin financial markets that do not allow the economy to grow commendably. Therefore, as our study is based on the data set of developing countries which exemplifies the absence of advanced and efficient financial markets, financial development decreases economic growth and gives rise to inequality (Demetriades & James, 2011).

Table 4.9: Impact of TVET on INQ through SKL

	Model (1)	
	(a)	(b)
VARIABLES	**SKL**	**INQ**
SKL		-0.669*** (0.000)
TVET	0.718*** (0.000)	1.750*** (0.000)
TVET_SQ	-0.041*** (0.000)	-0.084*** (0.000)
RPCGDP		-0.530*** (0.000)
FD		0.296*** (0.000)
POPG		0.304*** (0.001)
Direct Conditional and Indirect Effect		
	Direct Conditional Effect	**Indirect Effect**
Low TVET	1.044*** (0.001)	-0.008** (0.029)
Average TVET	0.917*** (0.003)	0.077*** (0.000)
High TVET	0.773** (0.012)	0.173*** (0.000)
Number of Observations	189	189
Number of Countries	129	129

Notes: As for Table 4.3. RPCGDP is real per capita GDP. POPG is population growth.

4.7 The Role of Adult-Skill (SKL) for the Impact of TVET on INQ

This subsection analyzes the role of SKL in the impact of TVET on INQ and includes the estimation results generated using the Fixed-Effect method. Finally, we compute the conditional effects. Table 4.10 incorporates the results of the moderating role of SKL. The TVET elasticity of INQ is negative and significant which clarifies that there is an inverse relationship between TVET and inequality which explains that an increase in TVET helps to increase SKL which reduces inequality (INQ). The TVET_SQ elasticity of INQ is positive and significant. It crystallizes that TVET always helps to obtain skillful people in society which ultimately decreases inequality. Additionally, the adult skill (SKL) elasticity of INQ is negative and significant which shows that skill improvement reduces inequality. Moreover, the TVET*SKL elasticity of INQ is positive and significant.

Table 4.10: Role of Adult Skill for the Impact of TVET on INQ

	Dependent Variable
VARIABLES	**INQ**
SKL	-0.518**
	(0.040)
TVET	-0.383***
	(0.004)
TVET_SQ	0.012**
	(0.019)
TVET*SKL	0.038**
	(0.050)
FD	-0.062***
	(0.006)
POPG	0.031
	(0.199)
CONSTANT	6.936***
	(0.000)
Observations	189
Countries	40
R-SQUARED	0.25
Notes: As for Table 4.9.	

We also compute the conditional effects by taking the derivative of equation (3.15) as given in chapter 3. We use three levels of SKL and TVET: low, average and high. The results of conditional effects are presented in Table 4.11. At low level of TVET, when

SKL is also at the low level, the conditional effect is negative and significant. Although the TVET*SKL elasticity is positive and significant. Similarly, at a medium and high level of skill, the conditional effect is negative and significant. It implies that as the level of SKL improves, at a low level of TVET, inequality decreases. At the medium level of TVET, the conditional effect is negative and significant at low and medium levels, while insignificant at a high level of SKL. Finally, at a high level of TVET, the conditional effect is insignificant with all three levels of SKL. It implies that when there is an excess of SKL, it is observed that there is no more significant impact of TVET on the reduction of INQ.

Table 4.11: Conditional Effects

	LOW TVET		
	Coefficient	**95% Confidence Interval**	
Low SKILL	-0.118*** (0.001)	-0.189	-0.047
Median SKILL	-0.082*** (0.005)	-0.139	-0.025
High SKILL	-0.067** (0.022)	-0.124	-0.010
	MEDIAN TVET		
	Coefficient	**95% Confidence Interval**	
Low SKILL	-0.080*** (0.003)	-0.133	-0.027
Median SKILL	-0.044** (0.011)	-0.078	-0.010
High SKILL	-0.029 (0.107)	-0.063	0.006
	HIGH TVET		
	Coefficient	**95% Confidence Interval**	
Low SKILL4	-0.037 (0.136)	-0.086	0.012
Median TVET	-0.001 (0.934)	-0.033	0.029
High TVET	0.014 (0.400)	-0.019	0.048

Summary

This chapter analyzes the contribution of TVET in reducing the income inequality (INQ) in developing countries by examining the mediating and moderating roles of adult-skill (SKL). It concludes that TVET has an inverse and nonlinear relationship with INQ. Examining the role of SKL, it documents that TVET improves SKL which in return reduces INQ, thus confirming the presence of mediation. It also examines the role of SKL as a moderator and shows that given the TVET (at low level), the impact of TVET on INQ remains negative and significant as SKL changes from low to high levels. However, for a medium level of TVET, the impact of TVET on INQ is negative and significant for only low and medium levels of SKL. Finally, for a high TVET, the impact of TVET on INQ remains insignificant for all levels of SKL. This analysis confirms that SKL can play an effective role in explaining the negative impact of TVET on INQ which is more profound for countries having low or medium levels of TVET.

4.8 Summary of Rejection/ Not Rejection of Hypotheses

The results of this analysis are aligned with the underlying theory of the study. Furthermore, on the basis of estimation results, the rejection/ not rejection of hypotheses is provided in Table 4.12 given below.

Table 4.12: Summary of Rejection/ Not Rejection of Hypotheses

S. No	Statement of Hypothesis	Finding
H_5	*Technical and Vocational Education and Training has a negative impact on Inequality in developing countries.*	**Not Rejected** *(significant negative impact)*
H_6	*Technical and Vocational Education and Training has a positive impact on Adult-Skill in developing countries.*	**Not Rejected** *(significant positive impact)*
H_7	*Adult skill has a negative impact on Inequality in developing countries.*	**Not Rejected** *(significant negative impact)*
H_8	*Adult-Skill moderates the causal relationship of Technical and Vocational Education and Training and Inequality in developing countries.*	**Not Rejected** *(significant)*

(C) Technical and Vocational Education and Training (TVET), Adult Skill and Employment

In this section, we analyze the relationship between technical and vocational education and training (hereafter TVET) and employment growth (hereafter EMPG). The reason for this is to test the theoretical considerations regarding the challenges to alleviate the poverty in the developing countries. Unemployment is very high all over the world especially in developing countries. Major reason of the problems like unemployment is lack of skills and poverty. So, it is being tried to reduce the cost of schooling in the developing countries. The study is practically important because it enables the exploration of factors which are contributing to reduce youth unemployment. However, empirically, it has been proved that an increase in the supply of skilled labor reduces unemployment because the opportunities increases for skilled persons and ultimately returns are increased with the help of TVET.

In this context, this study investigates the role of adult-skill (hereafter SKL) as a mediating and moderating variable in examining the impact of TVET on EMPG in the developing countries. We employ seemingly unrelated regression (SUR) method for unbalanced panel data developed by Biorn (2004) to study the impact of TVET on EMPG through the channel of SKL. We use XTSUR codes developed by Nguyen (2010) to estimate the system of two equations, (3.21) and (3.22), given in chapter 3[7]. This analysis provides the direct impact of TVET on EMPG as well as the indirect impact through the channel of SKL. While we use fixed effects method to analyze the interactive effect of TVET and SKL on EMPG by estimating equation (3.23)[8], also known as moderation analysis. This analysis provides the conditional effects of TVET on EMPG, SKL being a conditional variable or a moderator. The control variables being used in both the analyzes are real per capita GDP growth (EG), inflation (INF), merchandise trade (MT), labour force

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[7] $SKL_{it} = \alpha_i + \alpha_1 TVET_{it} + \alpha_2 TVET_{it}^2 + \mu_{it}$ (3.21)
$EMPG_{it} = \beta_i + \beta_1 TVET_{it} + \beta_2 SKL_{it} + \beta_3 (TVET^{*} SKL)_{it} + \beta_4 X_{5it} + \varepsilon_{it}$ (3.22)

[8] $EMPG_{it} = \gamma_1 TVET_{it} + \gamma_2 SKL_{it} + \gamma_3 (TVET^{*} SKL)_{it} + \gamma_4' X_{6it} + \mu_i + \varepsilon_{it}$ (3.23)

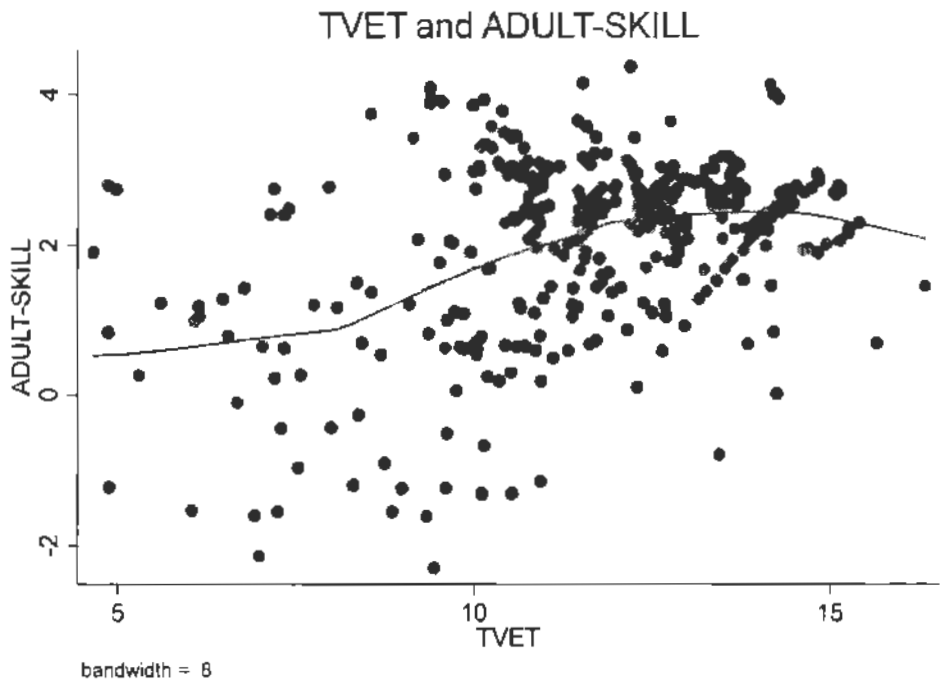
participation growth rate (LFPR), population growth (POPG) and foreign direct investment (FDI). Before explaining the regression results of both the mediation and moderation analysis in sections 4.11 and 4. 12, we discuss the graphical and descriptive analysis in sections 4.9 and 4.10.

4.9 Graphical Analysis

In this section, we describe the graphical relationship between/ among TVET, SKL and EMPG, descriptive statistics, and correlation analysis using the panel data of 129 developing countries for the period 1970-2019.

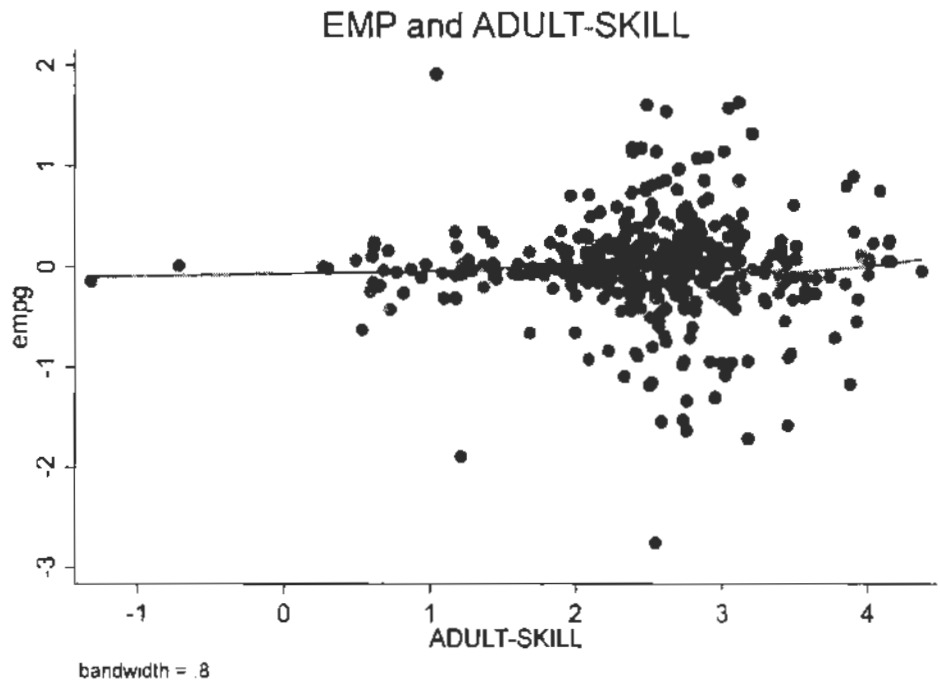
In Figure 4.6, we plot SKL and TVET, the plot confirms that as the level of TVET increases, initially, adult skill rises then after some level of TVET, adult skill becomes stable. It explains that there exists a non-linear relationship between TVET and adult skill (SKL).

Figure 4.6: Relationship Between TVET and SKL



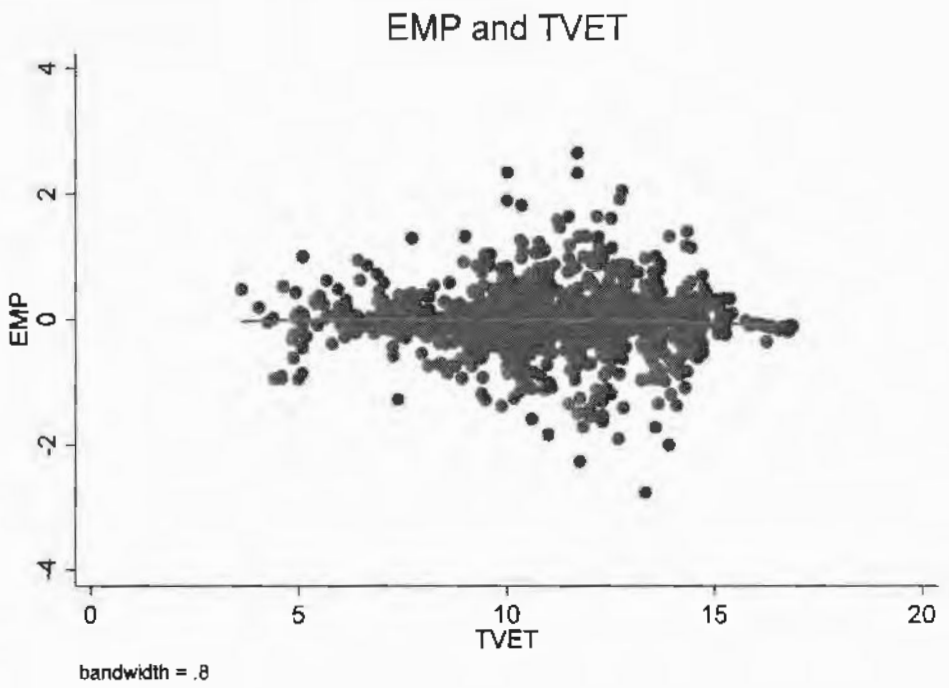
In Figure 4.7, we plot EMPG and Adult-Skill (SKL), the plot confirms that as the level of Adult-Skill acquisition increases, employment growth starts increasing gradually which shows the positive relationship between Adult-Skill acquisition and EMPG. According to this observation, skilled people get more opportunities to get better jobs. Resultantly, the people receive more or higher wages due to their skill and responsibility for employment growth.

Figure 4.7: Relationship Between Employment and Adult-Skill



Similarly, in Figure 4.8, we plot EMPG and TVET, the plot confirms that as the TVET increases, it helps to enhance employment growth (EMPG). However, as already discussed in part 2, after attaining a certain optimum level of TVET, inequality does uot decrease significantly. It shows that when there is high literacy rate, and most of the people are educated in the society, everyone is eligible due to his or her skillful education to maintain better life standards, but the opportunities for employment are limited and give rise to inequality. So, the employment growth is getting stability and not increasing due to saturation in the labor market.

Figure 4.8: Relationship Between EMP and TVET



4.10 Descriptive Analysis

In this section, Table 4.13 encompasses the summary statistics, whereas Table 4.14 includes the correlation matrix. Table 4.13 shows the total number of observed cases (N), mean, median, standard deviation (SD), minimum values (Min) and maximum values (Max) for all the variables used in this analysis. We note that TVET obtains the highest mean value 10.137, whereas LFPRG shows the lowest mean value -0.069. Rest the mean value for EMPG, SKL, EG, MT, POPG and FDI are -0.016, 2.059, 0.216, 1.56, 1.902 and 4.069 respectively. Moreover, among control variables, INF shows the high mean value of 64.623. The table also depicts the highest value of median for TVET 10.138 and the lowest value for LFPRG -0.054 respectively. Higher value of standard deviation means

higher degree of data dispersion from its mean value. We observe two extremes, that is, the TVET which is showing the highest value 2.394 of standard deviation whereas FDI is showing the lowest value of 0.096.

Table 4.13: Summary Statistics

Variables	N	Mean	Median	SD	Min	Max
EMPG	3472	-0.016	-0.013	0.375	-2.757	2.656
SKL	552	2.059	2.386	1.193	-2.303	4.37
TVET	3541	10.137	10.138	2.394	2.398	16.867
EG	5279	0.216	0.283	0.867	-13.492	9.215
INF	4453	64.623	56.829	100.396	0	4583.71
MT	5360	1.56	1.59	0.55	-0.711	3.198
LFPRG	3596	-0.069	-0.054	1.011	-9.408	7.534
POPG	6572	1.902	2.077	1.329	-10.955	11.535
FDI	5194	4.069	4.05	0.096	-0.266	5.071

For correlation analysis, Table 4.14 shows that there is a negative correlation between EMPG and SKL with the value of correlation coefficient -0.015. It is exactly what we have in our conceptual framework which already has been explained in chapter 3 of this study. According to this concept, if the employees are more equipped with the level of skill, they will have more opportunities of skilled employment with more earnings. This results in decreasing poverty because of more income level. So, the above result of this study is showing the same pattern what we propose in the hypothesis. In contrast, there is a positive correlation of EMPG with our variable of interest TVET having a value of correlation coefficient 0.034. It is also exactly in line with the conceptual framework that TVET is beneficial for earning healthy income in the society and maintain life standards by alleviating poverty. Employees with more TVET level are getting more rewards in shape of wages that results in wellbeing of the employee, commonly known as increasing employment.

Additionally, there is a positive correlation of EMPG and EG, INF, MT, LFPRG as well as POPG with the values of correlation coefficient 0.123, 0.067, 0.017, 0.79 and 0.007 respectively. In addition, a negative correlation is observed between EMPG and FDI which is -0.024. Moreover, the positive correlation of Adult-Skill is observed with TVET,

INF, MT and FDI depicting the coefficient values of 0.055, 0.089, 0.145 and 0.078 respectively. In addition, there is a negative correlation between SKL and EG, LFPRG, and POPG with the coefficient value of -0.084, -0.020 and -0.500 respectively. Furthermore, another trend of positive correlation of TVET is observed with INF and LFPRG showing the values 0.158 and 0.017 respectively. We observe that there is a negative correlation between TVET and EG, MT, POPG and FDI with the coefficient values of -0.083, -0.283, -0.045 and -0.342 respectively.

Similarly, EG shows a positive association with MT, POPG and FDI with the correlation coefficient value of .092, 0.036 and 0.185 respectively, but negative association with INF and LFPRG with the value of -0.031 and -0.026 respectively. Furthermore, INF is positively associated with LFPRG, POPG and FDI depicting the values 0.136, 0.108 and 0.005 respectively and negatively correlated with MT with the correlation coefficient value of -0.189. Moreover, MT is negatively associated with LFPRG and POPG and positively correlated with FDI showing the values of -0.045, -0.258 and 0.280 respectively. Last but not the least, LFPRG is positively correlated with POPG with the coefficient of 0.030 and negatively correlated with -0.046 coefficient values. Finally, POPG is observed to be negatively associated with FDI with the correlation coefficient of -0.0002.

Table 4.14: Correlation Analysis

Variables	EMPG	SKL	TVET	EG	INF	MT	LFPR	POPG	FDI
EMPG	1								
SKL	-0.015	1							
TVET	0.034	0.055	1						
EG	0.123	-0.084	-0.083	1					
INF	0.067	0.089	0.158	-0.031	1				
MT	0.017	0.145	-0.283	0.092	-0.189	1			
LFPRG	0.79	-0.02	0.017	-0.026	0.136	-0.045	1		
POPG	0.007	-0.5	-0.045	0.036	0.108	-0.258	0.03	1	
FDI	-0.024	0.078	-0.342	0.185	0.005	0.28	-0.046	-0.0002	1

4.11 Impact of TVET on EMP through Adult-Skill (SKL)

In this section, we analyze the relationship between TVET and EMPG and discuss the estimation results. We examine whether this relationship is direct or there exists some mediation of SKL. Our main objective is to check whether TVET helps to improve employment or not, and SKL plays some role in enhancing the level of employment.

Table 4.15 explains our regression results for the impact of TVET on EMPG through SKL. Model (a) represents the estimation results of the mediating equation discussed earlier in chapter 3, whereas model (b) represents the estimation results of our main equation. The dependent variable in models (a) is SKL, a proxy for Adult-Skill acquisition and development, while EMPG, the growth rate of employment to GDP ratio, in model (b). The explanatory variable is TVET and TVET square term (TVET_SQ) in both models (a) and (b). We use TVET_SQ because our data support non-linearity between TVET and EMPG, as shown in Figure 4.8.

The regression estimates in model (a), Table 4.15 show that the TVET elasticity of SKL is positive and significant. It means that a one percent increase in TVET results in an increase of 0.72 percent in SKL. It crystallizes that the TVET improves SKL which is consistent with the previous literature (Blinova et al., 2015; Asadullah & Ullah, 2018; Lindemann & Gangl, 2019; Hou et al., 2020). Similarly, the TVET_SQ elasticity of SKL is negative and significant which implies that higher the level of TVET the level of SKL reduces. It means that higher levels of TVET ultimately deteriorate the SKL due to saturation in the labor market as discussed earlier.

Elseways, in the main equation, model (b), the TVET elasticity of EMPG is positive and significant at 1% level (Asadullah & Ullah, 2018; Okewelle & Amaechi, 2017; Nnodim & Ogbuji, 2021). It implies that a one percent improvement in TVET enhances employment growth by 0.33 percent. Additionally, the EMPG's elasticity of SKL is positive and significant. It entails that improved SKL contributes to enhance the employment in the economy. This result is like Michelsen et al. (2018), Asadullah & Ullah (2018) and Van Vu (2020). This result implies that people having high skill are targeted

by the labour market immediately as per their learned expertise. Therefore, this causes employment growth in the developing countries.

Table 4. 15: Impact of TVET on EMPG Through Adult-Skill (SKL)

	Model	
	(a)	(b)
VARIABLES	**SKL**	**EMPG**
SKL		0.515*** (0.000)
TVET	0.720*** (0.000)	0.334*** (0.000)
TVET_SQ	-0.040*** (0.000)	
EG		0.256*** (0.000)
INF		-0.011*** (0.000)
MT		0.305*** (0.000)
LFPRG		0.229*** (0.000)
POPG		-0.206*** (0.000)
FDI		-1.176*** (0.000)
Indirect Effect		
Low TVET		0.154*** (0.000)
Average TVET		-0.049*** (0.000)
High TVET		-0.121*** (0.000)
Number of Observations	292	292
Number of Countries	129	129

Notes: As for Table 4.3. EMPG is employment growth. MT is merchandise trade. LFPRG is growth of labor force participation. FDI is foreign direct investment.

Another aim of this study is to explore the mediating role of SKL that is why we compute the indirect effects, as shown in the lower panel of Table 4.15. At low level of TVET, the direct effect is positive and significant as indicated by the positive elasticity of TVET on EMPG. The indirect effect is positive and significant which entails that partial mediation

of SKL exists. It implies that due to TVET there is an increase in the level of SKL in the society which ultimately enhances employment growth.

Besides, at medium and high levels of TVET, the direct effect is significant. The indirect effect is negative and significant. The negative significant indirect effect confirms the partial mediation. This is surprising that when TVET works through SKL it reduces employment growth. This happens because after certain degree of SKL acquisition by the people in the society, the time comes when there is no more significant impact of SKL for reduction of unemployment. The reason behind this is the saturation of Adult-Skill acquisition in the society with limited available employment opportunities in the market, which ultimately enhances the inequality by reducing earnings.

As discussed above, we use several control variables which are the important determinants of employment growth. The variables include EG, INF, MT, LFPR, POPG and FDI. In model (b), the EG elasticity of EMPG is significant positive. It clarifies that economic growth in the country exacerbates the employment level, hence employment growth. Additionally, the INF elasticity of EMPG is negative and significant. It explains that price instability dampens EMPG. This happens because increase in inflation causes low purchasing power in the society and enhances inflation due to instability and high frequency of prices' fluctuations. Additionally, the MT elasticity of EMPG is positive and significant. It explicates that merchandise trade contributes to the employment growth as it enhances real activities in the economy. This result is consistent with Gekara and Snell (2018). Similarly, the LFPR elasticity of EMPG is positive and significant. Moreover, the POPG elasticity of EMPG is negative and significant. It implies that an increase in population growth hampers employment growth.

4.12 The Role of Adult-Skill (SKL) for the Impact of TVET on EMPG

This section analyzes the moderating role of Adult-Skill (SKL) for the impact of TVET on EMPG and includes the estimation results generated using Fixed Effects method. Table 4.16 shows the results of the moderating role of SKL. Model (1) of Table 4.16 is the general model without excluding any variable from the general specification. We drop the insignificant variables with lowest t-value one by one to obtain a final or parsimonious

model as shown by model (2) in Table 4.16. In model (2) of Table 4.16, the TVET elasticity of EMPG is positive and significant. It clarifies that there is a direct relationship of TVET and EMPG which explains that an increase in TVET helps to increase Adult-Skill acquisition which enhances employment, hence, EMPG increases. The SKL elasticity of EMPG is positive and significant. It entails that skill improvement contributes to the level of employment in the economy. Moreover, the TVET*SKL elasticity of EMPG is negative and significant. It illustrates that TVET, and SKILL are substitute of each other. That is, as the level of SKL increases the impact of TVET on EMPG decreases. These results are in line with Michelsen et al. (2018), Asadullah and Ullah (2018), and Nnodim and Ogbuji (2021).

Table 4.16: Moderating Role of Adult Skill (SKL) for the Impact of TVET on EMPG

VARIABLES	(1) EMPG	(2) EMPG
SKL	0.854** (0.039)	0.879** (0.014)
TVET	0.241** (0.026)	0.234** (0.018)
TVSK (TVET*SKL)	-0.070** (0.042)	-0.078*** (0.010)
EG	0.308*** (0.002)	0.307*** (0.002)
INF	-0.001 (0.273)	
MT	0.401** (0.034)	0.357** (0.036)
LFPR	0.262*** (0.000)	0.260*** (0.000)
POPG	0.156** (0.043)	0.152** (0.019)
FDI	-0.123 (0.879)	
Constant	-3.269 (0.381)	-3.522*** (0.002)
Number of Observations	292	307
R-squared	0.678	0.678
Number of Countries	64	70

Notes: As for Table 4.15.

As the aim of this analysis is to explore the moderating role of SKL for the impact of TVET on EMPG, that is why, we compute the conditional effects of TVET on EMPG. We compute the conditional effect by taking the derivative of equation 3.23 with respect to TVET and evaluating the total derivative for low, medium, and high levels of SKL. The results of conditional effects are presented in Table 4.17. At low level SKL, the conditional effect is positive and significant. Although the TVET*SKL elasticity is negative and significant. Similarly, at medium and high level of skill the conditional effect is negative and positive respectively but insignificant in both cases.

In addition, we employ various control variables. The EG elasticity of EMPG is positive and significant. It illustrates that economic growth in a country enhances employment growth. This result is in line with Latif et al. (2018), Blinovaa, et al. (2015). Similarly, the MT elasticity of EMPG is positive and significant. It clarifies that merchandise trade hoosts employment level in the economy. The LFPRG elasticity of EMPG is positive and significant. It means that the extent to which the labor force participation is seen; it encourages the environment of two-way satisfactory business transactions, meaning that more employers welcome skilled labor and their participation in the market and society contributes to economic growth and ultimately enhances employment growth in the country. Moreover, the POPG elasticity of EMPG is positive and significant. This is surprising for us that how population growth enhances employment growth. As discussed earlier in Table 4.15 that POPG elasticity of EMPG is negative and significant, it implies that positive elasticity of POPG may be due to the incorporation of the mediating role of Adult-Skill.

Table 4.17: Conditional Effect

	Coefficient	**95% Confidence Interval**	
Low SKL	0.123* (0.060)	-0.005	0.251
Median SKL	-0.049 (0.359)	-0.055	0.153
High SKL	0.016 (0.751)	-0.085	0.118

Summary

The present study attempts to add value to the existing body of research on this topic because the world is facing a worsening youth employment crisis. The TVET programs are aimed at creating employment opportunities and imparting suitable skills needed for self-employment particularly in the rural and unorganized sectors. Just to avoid the risk of unemployment after the completion of school education, many countries have recognized the importance of vocational education programs. The main argument for providing such programs is that equipping students with specific job-related skills facilitates their entry into the labor market and thereby make them productive at an earlier point (Fersterer et al., 2008; Hanushek et al., 2017).

This section discusses the estimation results and analyzes the relationship between technical and vocational education and training (TVET) and employment (EMP). The findings confirm that as the level of Adult-Skill acquisition (SKL) increases, employment growth starts increasing gradually which shows the positive relationship between SKL and EMPG. The estimation results of TVET on EMPG through SKL are positive and significant which crystalizes that the TVET improves SKL. Moreover, the TVET elasticity of EMPG is positive and implies that vocational education and training enhances employment growth.

Furthermore, another section of the chapter discusses the moderating role of SKL for the impact of TVET on EMPG and includes the estimation results generated using FE method. The findings reveal that TVET elasticity of EMPG is positive and significant. It confirms that there is a direct relationship of TVET and EMPG which explains that an increase in TVET helps to increase SKL which enhances employment, hence, increased EMPG. The SKL elasticity of EMPG is positive and significant. It entails that skill improvement contributes to the level of employment in the economy. Moreover, the TVET*SKL elasticity of EMPG is negative and significant. It illustrates that TVET, and SKILL are substitute of each other.

4.13 Summary of Rejection/ Not Rejection of Hypotheses

On the basis of our results from above analysis, the rejection/ not rejection of hypotheses is provided in Table 4.18 given below.

Table 4.18: Summary of Rejection/ Not Rejection of Hypotheses

S. No	Statement of Hypothesis	Finding
H_9	*Technical and Vocational Education and Training has a positive impact on employment in developing countries.*	**Not Rejected** (*significant positive impact*)
H_{10}	*Technical and Vocational Education and Training has a positive impact on Adult-Skill in developing countries.*	**Not Rejected** (*significant positive impact*)
H_{11}	*Adult skill has a positive impact on employment in developing countries.*	**Not Rejected** (*significant positive impact*)
H_{12}	*Adult-Skill moderates the causal relationship of Technical and Vocational Education and Training and employment in developing countries.*	**Not Rejected** (*significant*)

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Chapter five concludes the present study with seven sections. Section 5.1 presents the Overview and Motivation of the Study. Section 5.2 describes the summary of key findings of the study. Furthermore, section 5.3 demonstrates contributions of the current research which is made for the body of knowledge in economics. Additionally, section 5.4 presents the practical implications of the study for economists, corporate investors, lenders and creditors, corporate managers, policymakers and last but not the least people of the society. Moreover, section 5.5 outlines the limitations of the study while section 5.6 suggests future research recommendations.

5.1 Overview and Motivation of the Study

Poverty eradication is not an easy task as both poverty and its eradication involve multiple human factors (Alkire, 2002). As it is defined, "poverty is, in many ways, the worst of human deprivation. It can involve not only lack of necessities of material well-being, but also the denial of opportunities of living a tolerable life" Anand and Sen (1997). Thus, it can be measured by several aspects of an individual's life Anand and Sen (1997). One of the arguments is that education is viewed as a critical means to ensure poverty reduction (Cremin & Nakabugo, 2012; Rolleston, 2011; Tilak, 2002). Education has been encapsulated as a crucial element for completing the goals as far as MDGs and PRSPs is concerned Maxwell (2003). Education "not only generates economic benefits such as increasing salaries, productivity and growth, but also produces social benefits related to social cohesion, political participation, and even to fertility and health" Tarabini and Jacovkis (2012).

Adult skills are also an important phenomenon. Terms competency and skill are used alternatively in the educational and training literature. Skill acquisition is the central policy in all developing countries in this era of competition. Individuals in these economies must have certain skills level if they want to attract investment for the growth

point of view OECD (2012). Moreover, the fate of unskilled youth is particularly poverty generally observed. The level of skill is a strong source of acquiring human capital in the long run.

In 2012 alone, more than 1 billion people were either unemployed or living in poverty. Half of the job deficits were in more developed countries. Although educational attainment has been improved, too many young people are still either unemployed, or not in education and training (ILO, 2016b). Hence, there has been a call to urgently address the global job crisis by recovering the market economy and generating job creation, especially for workers living below the poverty line (ILO, 2012, 2015).

In parallel with the poverty reduction challenge, reducing inequality and acquisition of adult skills, the world has faced serious concerns on employment and widespread work deficits (ILO, 2017). An International Labour Organization (ILO) report showed that slightly over 30 per cent of youth in developing countries had "no education qualifications at all" (ILO, 2015, p. 26).

TVET is a solution to these challenges (Arthur-Mensah and Alagaraja, 2013; Eichhorst et al., 2012; McGrath, 2002; McGrath and Powell, 2016). TVET can provide skills, knowledge and attitudes that will prepare people for work, reduce poverty, and increase the economic growth of a country (UNESCO-UNEVOC, 2012). TVET is also regarded as "a skills development and training system for developing the workforce and addressing unique issues such as rural–urban migration, unemployment, declining job opportunities in the formal sector, as well as meeting the manufacturing demands" Arthur-Mensah and Alagaraja (2013).

The major thrust of TVET is to report issues of poverty, inequality, unemployment and skills development for current and projected challenges and opportunities. In this study, an effort is made to examine the effect of TVET on the challenging issues of alleviating poverty, reducing inequality and employment in the developing countries. This is analyzed through skill acquisition and is explored the direct and indirect effects. Moreover, the role of income is the agenda of the future research for the effect of TVET on poverty alleviation, reducing inequality and employment. It is claimed that the study

offers a fruitful way to enhance the skills through TVET that is beneficial for the policy makers to handle the above-mentioned crucial problems prevailing in the developing countries. The study uses a system of equations following Biorn's (2004) methodology and employs a seemingly unrelated regression (XTSUR) model for unbalanced panel data.

5.2 Summary of Findings of the Study

Many countries try to find out the ways of poverty reduction depending upon the nature of poverty. It has been recognized by many economies that the only way to reduce poverty is TVET through SKL. The poor cannot change their fate until they do not achieve some skill to get some earnings.

This section summarizes the findings of the study which reveal that TVET is an effective way not only to achieve accurate poverty alleviation but also to get rid of intergenerational poverty. There is a significant direct, negative, non-linear, and causal relationship between TVET and POV. This implies that higher the level of TVET ultimately deteriorates poverty due to availability of more opportunities of employment and earnings. However, the TVET elasticity of POV is positive. It elucidates that initially when people decide to improve their skill by investing in education and training activities, poverty enhances because people start to get some education which initially do not contribute to their earnings and poor becomes poorer.

The study computes the conditional indirect effect and uses three levels of TVET: low (25^{th} percentile), median (50^{th} percentile) and high (75^{th} percentile). At low level of TVET, the direct effect is significant positive. However, indirect effect is negative and significant which confirms the existence of partial mediation. It concludes that TVET reduces POV when it works through adult skill at low level of education and training. On the contrary, at average and high levels of TVET, the direct effect is positive and significant. It implies that, as the level of TVET improves and reaches at some median and high level, TVET enhances POV when it works through adult skill. This fact is surprising for us and hard to interpret too. The reason behind this in current population settings is more technical training creates skilled labor; however, countries where the people are already skilled, TVET is showing a positive relation due the market saturation.

This market saturation does not create more opportunities for the people to make them able to earn better wages and contributing significantly to poverty reduction. Nevertheless, it shows somehow stability of skill with increasing the TVET.

The moderating result of the model reveals that TVSK elasticity is significant positive that is why we compute the conditional effects at three different levels of adult skill. At low level of adult skill, the conditional effect is negative and significant Whereas at high and median level of skill the conditional effect is negative and insignificant.

This section also summarizes the findings of the relationship between technical and vocational education and training (TVET) and inequality (INQ) through SKL in the developing countries. There is a significant direct, negative, non-linear, and causal relationship between TVET and INQ. Moreover, the TVET elasticity of INQ is positive. Initially when people decide to improve their skill by investing in education and training activities, poverty enhances because people start to get some education which initially do not contribute to their earnings and poor becomes poorer. However, the TVET_SQ elasticity of INQ is negative and significant. It confirms that after achieving a certain level of education and training, inequality starts to decline. Additionally, the INQ's elasticity of Adult-Skill is negative and significant. It entails that improve Adult-Skill reduces inequality.

Furthermore, mediation results of the model show that at low level of TVET, the direct effect is positive and significant as indicated by the positive elasticity of TVET on INQ. The indirect effect is negative and significant which entails that partial mediation of Adult-Skill exists. Besides, at medium and high levels of TVET, the direct effect is significant. The indirect effect is positive and significant. The positive significant indirect effect confirms the partial mediation. This is surprising that when TVET works through Adult-Skill it enhances the inequality. This happens because after certain degree of Adult-Skill acquisition by the people in the society, the time comes when there is no more significant impact of Adult-Skill for reduction of inequality.

The results of the moderation equation show the negative and significant relationship of TVET and inequality and confirms the moderating effect of Adult-Skill in the research

model. Hence, an increase in TVET helps to increase Adult-Skill acquisition which reduces inequality. In addition, at the low level, the result of conditional effect is negative and significant. Similarly, at medium and high level of skill the conditional effect is negative and significant. Finally, at high level of TVET, the conditional effect is insignificant with all three levels of skill. It implies that when there is a huge excess of Adult-Skill at its extent, it is observed that there no more significant impact of TVET for the reduction of inequality.

On the same pattern to achieve the third objective to the study a section discusses the estimation results and analyzes the relationship between technical and vocational education and training (TVET) and employment (EMP). The findings confirm that as the level of Adult-Skill acquisition (SKL) increases, employment growth starts increasing gradually which shows the positive relationship between SKL and EMPG. The estimation results of TVET on EMPG through SKL are positive and significant which crystalizes that the TVET improves SKL. Moreover, the TVET elasticity of EMPG is positive implies that vocational education and training enhances employment growth.

Furthermore, another section discusses the moderating role of SKL for the impact of TVET on EMPG and includes the estimation results generated using FE method. The findings reveal that TVET elasticity of EMPG is positive and significant. It confirms that there is a direct relationship between TVET and EMPG which explains that an increase in TVET helps to increase SKL which enhances employment, hence, increased EMPG. The SKL elasticity of EMPG is positive and significant. It entails that skill improvement contributes to the level of employment in the economy. Moreover, the TVET*SKL elasticity of EMPG is negative and significant. It illustrates that TVET, and SKILL are substitute of each other.

5.3 Contributions of the Study

This study addresses the gap by investigating the effect of TVET on the challenging issues of alleviating poverty, reducing inequality and employment through the moderated mediating role of Adult-Skill acquisition in the developing countries. The research study summarizes its contributions in the following ways which are discussed below.

1. This study differentiates itself from the previous studies conducted in huge data set of 129 developing countries whereas in contrast to this, previous studies considered only a few sectors.

2. The study claims its unique contribution because no prior studies are available which focus specifically on TVET's impact on unemployment through skills acquisition along with analyzing inequality and poverty reduction in low-income countries (LICs) and middle-income countries (MICs). However, most of the literature focuses only on the direct effects of TVET on poverty, inequality and employment for developed countries and rare work is available for the developing countries.

3. The study uses research methodology rarely used in the prior literature for mediation analysis. This study estimates a system of equations following Biorn's (2004) methodology and employs a seemingly unrelated regression (XTSUR) model for unbalanced panel data. We use XTSUR codes developed by Nguyen (2010) to estimate the equations of research model. Contrarily, previous studies have taken a traditional approach for synthesizing and have used vote-counting methods based on certain assumptions.

4. The study gives evidence of a systematic and comprehensive search for the subject challenging issue and gives insights to train people to be able to participate for poverty reduction, reducing inequality, increasing employment and sustainable growth.

5. The study stresses and fulfills a need for individuals in developing economies to have certain skills level if they want to attract investment for the growth point of view.

5.4 Practical Implications of the Study

Based on empirical findings, the study suggests its practical implications for the economists, corporate investors, lenders and creditors, corporate managers, policymakers and last but not the least people of the society. The most powerful antidote of poverty is education. According to Montecel (2013) a person who has more education and skill acquisition has less risk of falling in poverty. The Technical and Vocational Education and Training programs are found to be successful in fulfilling their objectives of

upgrading the individual by making best use of the human resources through skilling, providing employment, making available the skilled human resources to the industry, increasing the productivity and contributing to the sustainable development activities.

As discussed earlier, education plays a vital role in enhancing people's earning ability, increasing their self-esteem, contribute to improve family education, health and poverty alleviation. A robust quality assurance strategy will maintain the quality in TVET, for which post training support services are to be focused. Study on market demand, industries-based curriculum, quality training, lifelong learning would have additional positive effect on employment of the youth.

Participation in these TVET programs help to build their expectations of a better life, and largely meet these expectations. Such expectations go far beyond narrow economic considerations and include a clear sense of social responsibility as well as personal wellbeing. These TVET programs are informed by a right perspective and support graduates move towards achievement of their rights.

5.5 Limitations of the study

The present study has few limitations. Most importantly the present study could not investigate the moderated mediating role of income in the causal relationship of TVET and poverty alleviation in the developing countries. Furthermore, the moderated mediating role of income in the causal relationship in the causal relationship of TVET and inequality in the developing countries is not incorporated. Last but not the least, the moderated mediating role of income in the causal relationship of TVET and employment in the developing countries could not be addressed in the current study.

5.6 Future Research Recommendations

The researchers observed while critically reviewing the available literature that the discussion on the relation between TVET and income is at an early stage. The present study suggests investigating the moderated mediating role of income for the effect of TVET on poverty alleviation, reducing inequality and employment. Further research is required to gain both more data as well as a more nuanced understanding of the processes

and interrelations between different determinants in this domain. This calls for interdisciplinary research approaches and more fundamental research to further develop theoretical and conceptual bases that can provide coherent findings for knowledge-based policy development.

The study suggests that good quality TVET can play an enabling role of supporting poor groups to enjoy economic benefits and wider well-being. Linking TVET to human well-being implies providing quality market-relevant skillful education and training for the poor and empowering them to change their realities towards the life they value.

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Appendix A

Variables: Definition, Construction, and Source

Variable Name	Definition	Source
Adult Skill Acquisition (SKL)	The percentage of population ages 25 and over that attained or completed post-secondary non-tertiary education.	World Development Indicator
Poverty (POV)	Poverty headcount ratio at $1.90 a day is the percentage of the population living on less than $1.90 a day at 2011 international prices. As a result of revisions in PPP exchange rates, poverty rates for individual countries cannot be compared with poverty rates reported in earlier editions.	World Development Indicator
Income Inequality (INQ)	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus, a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	World Development Indicator
Employment Growth (EMPG)	Growth rate of Employment to population ratio. Employment to population ratio is the proportion of a country's population that is employed. Employment is defined as persons of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period (i.e. who worked in a job for at least one hour) or not at work due to temporary absence from a job, or to working-time arrangements. Ages 15 and older are generally considered the working-age population.	Author's self-calculation using World Development Indicator data
Technical and Vocational Education and Training (TVET)	Secondary vocational pupils are the number of secondary students enrolled in technical and vocational education programs, including teacher training.	World Development Indicator

Inflation (INF)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	World Development Indicator
Real per Capita GDP (RPCGDP)	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars.	World Development Indicator
Real per Capita GDP Growth (EG)	Growth rate of real gross domestic product (GDP) per capita.	Author's self-calculation using World Development Indicator
Financial Development (FD)	Domestic credit to private sector by banks refers to financial resources provided to the private sector by banks and other financial institutions, such as loans, purchases of nonequity securities, and trade credits and other accounts receivable as a percentage of GDP.	World Development Indicator
Population growth (POPG)	Annual population growth rate. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	World Development Indicator
Merchandise Trade % of GDP (MT)	Merchandise trade as a share of GDP is the sum of merchandise exports and imports divided by the value of GDP, all in current U.S. dollars.	World Development Indicator
Labor force participation rate (LFPR)	Labor force participation rate is the proportion of the population ages 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.	World Development Indicator (ILO estimate)
Foreign direct investment, net inflows (% of GDP) (FDI)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the	World Development Indicator

	reporting economy from foreign investors and is divided by GDP.	

Appendix B

Name of Developing Countries

Afghanistan, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, China, Colombia, Comoros, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Cuba, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Islamic Rep., Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Korea, Dem. People's Rep., Kosovo, Kyrgyz Republic, Lao PDR, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Nicaragua, Niger, Nigeria, North Macedonia, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russian Federation, Rwanda, Samoa, Sao Tome and Principe, Senegal, Serbia, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, Uzbekistan, Vanuatu, Venezuela, RB, Vietnam, Yemen Rep., Zambia, Zimbabwe.