Webology (ISSN: 1735-188X)
Volume 19, Number 2, 2022

Cost-Benefit Analysis Of Diploma Of Associate Engineers (DAE)

Dr. Mehwish Gull[1] , Tamour Abid Ch.[2] , Dr. Fasiha Altaf[3] , Prof. Dr. Abid Hussain Ch.[4]

[1]Lecturer Department of Education The University of Lahore.

Ph.D. Scholar Institute of Business Administration University of the Punjab, Lahore.

[3]Assistant Professor Department of Education Govt. College Women University, Sialkot.

[4]Dean Institute of Education and Research University of the Punjab, Lahore.

Abstract

The purpose of this study was the cost-benefit analysis of Diploma of Associate Engineers (DAE). Study was quantitative in nature. All the official documents related to costs and benefits of Diploma of Associate Engineers (DAE) were studies. Private cost including fee, expenses of books and uniform and board exams fee were gathered. Public cost included net-salary for one year, cost of training material, stationary and other costs. Benefits were taken from the employees in the form of their salary. Costs and benefits were calculated with the help of formulas of total cost, internal rate of return and cost-benefit ratio. It is concluded that there is difference between cost and benefits of Diploma of Associate Engineers (DAE). It is obvious from the findings that DAE graduate have long term benefits as compared to the students who have qualification of twelve and fourteen years education. A DAE graduate would have job of scale 14 which may promote to the next scale by enhancing their skills and qualification.

Keywords: Cost-Benefit ratio, DAE, IRR, Private cost, Public cost, Technical education.

Introduction

In response to technology advancements, global economic transformations have raised the demand for skilled personnel, and many fast expanding industries are today experiencing severe shortages

of trained labour to keep up with demand on a worldwide scale. This has resulted in a significant increase in the number of expats recruited to bridge the gap between demand and supply in industries such as manufacturing, services, and information technology (Kizu et al. 2018). One of the most significant difficulties facing developing economies is the misalignment between sluggish economic growth and rising population. In order to achieve long-term economic development, it is necessary to close the gap between the needs of the labour market and the output of the educational system (Bilboe 2011). Whenever an expansion in the labor market occurs and training is closely linked to available jobs, the financial returns from technical vocational education and training in less developed countries have been reported to be higher than the financial returns from general education (Aizenman et al., 2018; Igarashi & Acosta 2018). Rapid social, political, economic, technological, and educational transformation have all contributed to shifting perspectives on the necessity and nature of vocational and technical education, as well as on the nature of vocational and technical education itself. As the World Bank pointed out in a 2017 report, increasing the number of people employed in the Gulf States is dependent on government's capacity to boost the desirability of private sector jobs while simultaneously increasing citizens' willingness to work in the private sector.

To make economic advancement, a country's ability to generate higher-quality goods and services at reduced costs is crucial (Asghar & Siddiq, 2008; Mouzakitis, 2010). A challenge that both developed and developing countries face in this age of rapid technological development and expanding international context is the training of bright people in a professional, valuable manner. For developing countries such as Pakistan, advancements in technical education have become essential. Technical education is a broad term that encompasses all aspects of educational processes that contribute to general education, including the study of technologies and related sciences, as well as the acquisition of practical skills, attitudes, understanding, and knowledge relevant to occupations in a variety of economic and social sectors. Technical education can be defined as follows: (Khan, 2005). To make economic advancement, a country's ability to generate higher-quality goods and services at reduced costs is crucial (Asghar & Siddiq, 2008; Mouzakitis, 2010). A challenge that both developed and developing countries face in this age of rapid technological development and expanding international context is the training of bright people in a professional, valuable manner. For countries like Pakistan, progress in technical education has become a need. Technical education is a broad term that encompasses all aspects of educational processes that contribute to general education, including the study of technologies and related sciences, as well as the acquisition of practical skills, attitudes, understanding, and knowledge relevant to occupations in a variety of economic and social sectors. Technical education can be defined as follows: (Khan, 2005).

In Pakistan, the TVET sector possesses tremendous strength in order to meet the country's significant difficulties, such as closing skills gaps and lowering unemployment. On the other hand, TVET is subjected to the unfavourable perception of policy and decision makers that it is less important than general education, which has resulted in a reduction in the supply of qualified workers (Shakir, 2020). Such a negative perspective has detrimental consequences for the TVET

industry, which is regarded as of poor quality and producing low returns, hence discouraging investment in skill development (Shah & Asghar, 2017). In light of such gloomy forecasts, vocational and technical education and training (TVET) institutions are gradually experiencing inferior infrastructure when compared to general education channels; as a result, they are not receiving sufficient funds for teacher training, curriculum updates, and the equipment required for skill development (Lodhi, 2019). In the context of Pakistan, it is claimed that the current TVET system, technical education standards, curriculum, and teacher training materials do not keep pace with the growing demand for jobs on the national and international levels.. Because of the significant concentration of the private sector, which does not adhere to any minimum academic criteria, there are imbalances in the labour market as a result of the increased supply of skilled workers in the labour market (Khan & Zaib, 2017). There is a widespread belief that the existing curriculum offered by TVET institutions does not correspond to the job market demand of the national and international markets, as a result of which the vast majority of the skilled workforce remains unemployed and employers frequently report skill deficiencies (Fatima, 2020). Countries in both the developed and developing world have realised the importance of having a trained workforce in order to ensure long-term economic prosperity. As a result of significant expenditures in the skill development sector, these countries are successfully competing in the international labour market and reaping social and economic gains as a result of their efforts (Kanwar, Balasubramanian & Carr, 2019).

Historical Development of Pakistan's TVET

Through invention, all of the world's advanced nations have achieved economic wealth. Pakistan, like all other countries, has placed a strong emphasis on the necessity of technical and vocational education and training (TVET), as evidenced by government policies and economic development plans. The need for vocational, technical and scientific education was clearly identified by the nation's founder, "Quaid-eAzam Muhammad Ali Jannah," during the first education conference held shortly after the country's declaration of independence in 1947. (Shah, 2004). Unfortunately, in Pakistan, all policies and development plans were designed with the political interests of the particular ruling party in mind, which had a negative impact on the country's financial situation in the long run (Rashid & Mukhtar, 2012). In this regard, one of the projects was the previous Prime Minister's Skill Development Initiative (2006-2013), which was funded with 2 billion Pakistani rupees to prepare 1 million individuals. This programme has been criticised, and no review has been carried out to date (Chamadia & Shahid, 2018).

However, on the verge of such political ramifications, the educational system also underwent modifications to a certain extent, in accordance with the predetermined destinations. A thorough analysis of the literature revealed that a number of authors (Khan and Zaib, 2017; Hassan, Ahmad, and Siddiqui, 2019) have divided the advancement process of Pakistan's TVET into six stages, which are summarised in the table below. The inclusion of a new stage, "TVET reforms and implementation," has been made in this work in light of current TVET changes and the

implementation of those reforms. A substantial shift from general training to the term "world of work" was proposed in Pakistan's TVET history in the enclosed education strategy of 1972-1980, according to the country's TVET history. As a result, it resulted in the enrollment of agrotechnical studies, farming, and home economics courses in both metropolitan and rural communities across the country (Ali et al., 2017). On the other hand, considerable and significant development and expansion in Pakistan's TVET sector occurred in the 1970s and 1990s as a result of financial assistance from a variety of international donor organisations. Furthermore, the National Training Bureau (NTB) was tasked with directing TVET activities in the country prior to the creation of new administration structures; NAVTEC and PVTC federal and provincial levels, respectively, were tasked with this task in 2005. (Janjua & Irfan, 2008).

Deficiency in Industry-Institute Linkage

Unemployment among TVET graduates and the subsequent need for retraining among them after they have been hired by businesses is clear evidence that the connection between TVET institutions and businesses is fragile and poor (Ejiofor & Ali, 2018). The TVET system in Pakistan is underutilised, with high dropout rates and productivity that falls far short of the enrolment and admissions targets (Shakir,2020). Young girls in the underprivileged regions are particularly underrepresented in primary and secondary education as well as in technical and vocational education (TVET). National Productivity Organization (NPO) completed a capacity usage analysis of Pakistan's public TVET institutions recently, and it found that capacity utilisation in TVET institutions is considerably below expectations (Fatima, 2020). Technical institutes, for example, have a 65 percent capacity utilisation rate in Punjab, a 52 percent utilisation rate in Sindh, and 68 percent utilisation in KPK. Pakistan's TVET framework has been plagued by a variety of challenges, including outdated technologies, outdated curricula, and ineffective administration, over the years. TVET institutes pick less than 1% of the total number of students in the appropriate age group (0.6%). Region-wide economic growth has had little effect on TVET enrollment. He concluded that Pakistan has slipped behind its local and global competitors in the generation of highly-skilled mobile workers. Researchers concluded that TVET foundations need to be linked to businesses that use their products in order to combat joblessness among graduates, which has slowed the country's economic growth.

TVET and OJT graduates are unable to find work in any industry since many employers believe they lack the abilities needed to succeed in their chosen career path (Sulistiani & Yulianto, 2019). Graduates currently lack the technical education and life skills needed by employers to deal with the obstacles or challenges of business, according to the authors of the study. Collaboration, participation, teamwork, honesty, work discipline, cooperation, communication skills, and decision-making are all examples of life skills (Sulistiani & Yulianto, 2019). National Graduate Employment Blueprint 2012-2017 (Ministry of Higher Education Malaysia, 2012) describes certain major challenges, including skills that don't match, inability to handle problems, and lack of skill knowledge. When it comes to improving the talents of their pupils, educational institutions need to be more aware of this (Kohler & Drummer, 2018). Consideration of this complex subject

necessitates a particular approach from the educational establishment. In order to address this issue, educational institutions need to identify the problem and provide their pupils with more than just a strong academic performance.

There have been numerous discussions with provincial TEVTAs and boards of technical education and trade testing with the NAVTTC effectively taking the initiative. To help rebuild Pakistan's TVET industry in letter and spirit, they have agreed that an administrative framework should be put in place to ensure coordination and cooperation among all the stakeholders. The previous government has shown a willingness and commitment to promote both general and technical education and training (LFS, 2018). It was the first time in Pakistan's history that the education sector had received a larger share of the budget than it had previously. However, it is insufficient to meet the MDGs, and the TVET sector will have to put in much more effort and energy if it is to advance and develop. Not only would it boost employment, it will also improve the lives of those in need. Therefore, it should be a state priority (ILO, 2021).

Providing TVET to the country's most remote and far-flung districts is an obligation of the government, according to the United Nations Organization (2012), because the people who live in these places have it particularly tough. Vocational education and training not only improves students' employment prospects, but it also moulds them into responsible members of society who can make a positive impact on the world. In order to ensure that all Pakistanis have equal access to excellent general and TVET education, the Federal Government is responsible for ensuring that all citizens of Pakistan have equal opportunities to enrol in TVET programmes (UNESCO, 2019).

Cost-Benefit Analysis

The tool of cost-benefit analysis (CBA) has now spread over the world and is utilised for a wide range of purposes. Public-interest investments necessitate a cost-benefit analysis, which takes into account the total cost and value to society. Because of this, numerous government agencies are demanding the adoption of CBA in regulatory reforms. (Boardman, Greenberg, Vining, & Weimer 2011).

Non-formal learning methodologies and literacy programmes must be included into national education plans in developing countries like Pakistan because vast numbers of young people are not enrolled in formal schooling. Reviving, modernising, and harmonising TVET are all necessary steps toward transforming it into a mainstay of youth development and human capacity building in Pakistan (UNESCO, 2009). To get the most out of Pakistan's technical education system, it's important to weigh the benefits and drawbacks of various options. A cost-benefit analysis (CBA) is a process for determining the advantages and expenses of a potential project (or policy or programme). These are then averaged across all people in a specific society to estimate the net social gain or loss for that particular civilization (Pearce et al., 2003). Benefits and costs of a proposed project are measured in terms of their additional impact on human wellbeing by

comparing them to what would have happened in the absence of the initiative (Campbell & Brown, 2003).

Cost-Benefit Analysis

This type of study is based on microeconomic theory, welfare economics and financial theory, among other things (Boardman & Vining, 2011; Nas, 1996). For CBA, social well-being and efficient resource allocation are at the heart of microeconomic theory.. As stated by Nas (1996), a public initiative can have an impact on the well-being of three groups. Project beneficiaries, those who pay for it, and those whose lives are impacted are all covered in this definition. The primary objective of a CBA is to identify the parties affected by the project, evaluate the losses and gains, and establish whether or not the project is feasible from a society standpoint. (Nas, 1996).

Net Benefit

It is known as net benefits if the annual benefit stream is greater than the annual cost stream. Human well-being or utility gains are considered a benefit, whereas human well-being or utility losses are considered a cost. WTP (willingness to pay) or opportunity costs can be used to estimate the value of a product or service. The policy's outcomes are valued using the WTP technique, whilst the resources required to put the policy into action are valued using the opportunity cost method (Boardman & Vining, 2011).

Formula

$PDVB= B_{1/(1+r)^1} + B_{1/(1+r)^2} + B_{1/(1+r)^3} + \ldots\ldots\ldots\ldots\ldots\ldots B_{t/(1+r)^n}$

Where:

PDVB = present discounted value of benefits (work life earning)

B = future benefits/earnings

r = discounted rate

t = time period

These strategies will be utilised to determine whether or not this initiative is worth it financially, as well as how long it will take to recoup its investment. The net present value of the benefits of technical education is the net present value of the benefits that technical graduates receive as a result of their training.

Internal Rate of Return (IRR)

NPV is equal to zero at the breakeven discount rate, or internal rate of return. Solving the following equation yields the IRR (NOU, 1997).

Formula

$IRR = C0/(1+r)^0 + C1/(1+r)^1 + C2/(1+r)^2$

Where

IRR= Internal rate of Return

r = discounted rate
C0 = the costs of the first year in college
C1 = the costs of the second year in college
C2 = the costs of the third year in college
The NPV and IRR techniques will yield the same results in practise (NOU, 1998a). IRR can be used to pick projects when there is just one alternative to the status quo, according to Boardman and Vining (2011). (p. 158). Therefore, if the IRR is larger than the discount rate, the project should go on; if it is not, the decision should be based on whether the IRR is greater than the acceptable discount rate (Boardman & Vining, 2011).

Benefit-Cost Ratio

The benefit-to-cost ratio is a common metric used by analysts when assessing initiatives. For each year or period of time, a benefit-cost ratio can be used to determine whether or not a project is viable (Nas, 1996). Generally speaking, the ratio can be defined as follows: (NOU, 1997).

Formula

BCR= B/C

For the benefit to outweigh the cost, the current value of savings must exceed the current value of the expenditures, as stipulated by rule (NOU, 1997). Comparison of mutually exclusive projects could yield the largest ratio (Pearce, Atkinson, & Mourato, 2006). A number of well-documented difficulties have been associated to the benefit-cost ratio, even though it is widely used and accessible. This rule is particularly sensitive to differences in the way costs and benefits are defined (Pearce, Atkinson, & Mourato, 2006). Furthermore, the proportionality rule is incorrect when used in situations that are incompatible. The cost-benefit ratio can be altered, say Boardman and Vining (2011). Due to the limitations and criticisms of this ratio, Boardman and Vining (2011) recommend that "analysts avoid using benefit-cost ratios and instead rely on net benefits to assess programmes" (p. 34).

Statement of the Problem

Human resource development has a positive impact on economic growth and productivity. Emancipation and social mobility are achieved, as well as greater political stability, because of this. People's productive potential is heavily influenced by their ability to learn and enhance their skills, two of the most important aspects of HRD (Javied & Hyder, 2009). In order to meet the demands of a rapidly expanding economy, it is necessary to have a large and diverse pool of workers with a wide range of specialised skills, including technicians, technologists, engineers, research experts, and creative scientists. One of the most striking examples of this is the rapid growth of the economies of Asian countries like China, Japan, Malaysia, and Australia. In order to generate income and contribute to a country's economic and social development, individuals can benefit from technical and vocational education and training (National Skill Strategy, 2008).

Capacity to absorb labour has decreased over time in the economy (Labour Force Survey 2008-09). A major challenge for policymakers is to establish conditions in which the country can produce employment opportunities.

According to Agrawal and Agrawal (2017), television education and training (TVET) is seen as a way to give disadvantaged families with lower social status a chance to better themselves. Vocational education has a higher return on investment than academic education in India, however the attitudes of TVET remain skewed in the country's society. Students' decisions to participate in TVET programmes were significantly affected, according to Ayub (2017), by the low social status of TVET in Pakistan and the fact that parents were more likely to urge their children to do so when they were less educated and had lower income and occupation levels.

It appears that Pakistani students and their parents have little interest or regard for technical education. This unfavourable attitude stems from a lack of knowledge among students, parents, teachers, and administrators about technical education. Most people in Pakistan have no idea how important technical education is in today's world. Despite several studies on technical education, few have examined the costs and benefits of technical training at all levels.

Significance of Study

The results of this study will help Pakistan's technical education and training chiefs better grasp the costs and benefits of the Diploma of Associate Engineers. According to CEDEFOP's European Centre for the Development of Vocational Training (CEDEFOP), DAE provides numerous advantages, including greater wages for employees, more profitability and opportunities to make money by using part-time talents (2011). Cost-benefit studies of DAE will give the government insight into how well the system and its programmes are working and allow them to justify their existing funding levels or any future changes. Understanding DAE's costs and advantages can help businesses make wise investments in training. It is possible to make well-informed decisions about education and the value of a certificate if students, parents, teachers, and school administrators are aware of the costs and benefits of technical education. Using the findings of this study, it may be possible to assess the costs and advantages of various initiatives.

For the first time, it is becoming clear that DAE has an important role in a country's economic growth. Two of DAE's most defining characteristics are its focus on the workplace and the curriculum's emphasis on the acquisition of employable skills. Because TVET colleges can meet the needs of students from a wide range of socioeconomic and intellectual backgrounds, they can prepare them for meaningful employment and long-term financial stability. As a result, DAE initiatives can directly benefit the most vulnerable members of society, including the youth, the poor, and the underprivileged. All stakeholders must be mobilised in a concerted effort to create synergies in order to create synergies and share future responsibilities for regional cooperation and integration as well as socio-economic development in areas such as infrastructure, technological advancements, energy, trade, tourism, agriculture, and good governance. The primary objective of

this study is to conduct a cost-benefit analysis of technical education diplomas for associate engineers in Punjab, Pakistan.

Objectives of the Study

Following were the objectives of the study. To;

1. Calculate the private and public costs of Diploma of Associate Engineers (DAE)?
2. Calculate the internal rate of return of Diploma of Associate Engineers (DAE)?
3. Find out the benefit-cost ratio of Diploma of Associate Engineers (DAE)?

Research Questions

Following research questions were formed from the present study.

1. What are the private and public costs of Diploma of Associate Engineers (DAE)?
2. What is the internal rate of return of Diploma of Associate Engineers (DAE)?
3. What is the benefit-cost ratio of Diploma of Associate Engineers (DAE)?

Research Design

Quantitative approach was used to conduct the study. The researchers' purpose regarding this research was to analyze the cost and benefits of Diploma of Associate Engineers (DAE) Working under TEVTA.

Population and Sample of the Study

All the official documents related to costs and benefits belongs to Diploma of Associate Engineers (DAE) in Punjab were studied in the form of fee, amount of Books/ Uniform for 3 Years and Board Exams Fee for 3 Years as private cost. In public cost Net Salary for one Month, training material, stationary and other costs were included. Whereas, benefits were taken from the employees in the form of their salary.

Instrumentation

In order to calculate the costs and benefits of Diploma of Associate Engineers (DAE) researcher calculated the costs and benefits of program (DAE) through formulas. The net present discounted value, internal rate of return, and benefits-costs ratio, were calculated to compare the cost-benefits of the proposed program.

Data Collection and Analysis

Data were collected from the researcher personally. Data were analysed by using formulas. Research questions were analysed through formulas of, Internal rate of return of costs and benefits, and Cost-benefit ratios.

Results

What are the costs (private and public) of Diploma of Associate Engineers (DAE)?

Table 1 Year wise Private Costs of (DAE) Graduate

Private Costs	1st Year Cost	2nd Year Cost	3rd Year Cost	Total Cost
Fee First Year	13200	-	-	13200
Fee Second Year	-	9500	-	9500
Fee Third Year	-	-	9500	9500
Amount of Books/ Uniform for 3 Years	5000	5000	5000	15000
Board Exams Fee for 3 Years	2050	2050	2050	6150
Total Cost	**20250**	**16550**	**16550**	**53350**

Private cost in the form of students' fee, and other expenditures are given in above table 1. It is shown that students' fee for first year was 20250/-, second year was 16550/- and fee for third year was 16550. The total private cost of a student was 53350/- paid by the student for the diploma.

Table 2 Year wise Public Cost of (DAE) Graduate

Public Cost	Amount
Net Salary of Employees for One Month	1435939 Yearly= 14,359,39 × 12=17,231,268
Training Material	300,000
Stationary	100,000
Other Cost	100,000
Total Cost	17,731,268

Public cost of DAE was given in above table which included the total net salary of the employees per year was 17,231,268/-, expenses on training material was estimated 300,000/-, stationary expenditures were approximately 100,000/- and other costs were 100,000/- approximately. Therefore, total public cost of the institute was 17,731,268/- per year.

Table 3 Year wise Average Costs of (DAE) Graduate

Years	1st Year Cost	2nd Year Cost	3rd Year Cost
Per Student Cost	20250	16550	16550

Total Public Cost Per Year	17,231,268	17,231,268	17,231,268
Sum	17,251,518	17,247,818	17,247,818
Total No. of Students in College	187	187	187
Average Cost= Sum/No. of Students	17,251,518/187	17,247,818/187	17,247,818/187
Average Cost Per Year	**92254**	**92234**	**92234**

Per student cost by adding private and public cost divided by total number of enrolled students was given in above table. Average cost of a student was 92254, 92234 and 92234 respectively per year.

What is the internal rate of return of Diploma of Associate Engineers (DAE)?

Present value of benefit, cost benefit ratio, and rate of return techniques are used to investigate the economic benefit of the program. The net present value of benefit of technical education is the present net benefit of DAE graduates due to receiving technical education.

Present Discounted Value of Cost

Formula

$PDVC = C1/ (l+r)^1 + C2/ (l+r)^2 + C3/ (l+r)^3$

Where

PDVC = present discounted value of costs

r = discounted rate

C1 = the costs of the first year in college

C2 = the costs of the second year in college

C3 = the costs of the third year in college

Therefore “r” as per practice assumed 7%

C1= 92254

C2= 92234

C3= 92234

By putting in formula,

$PDVC = C1/ (l+r)^1 + C2/ (l+r)^2 + C3/ (l+r)^3$

$PDVC = 92254/ (1+7\%)^1 + 92234/(1+7\%)^2 + 92234/(1+7\%)^3$

PDVC = 86218.69 + 80560.74 + 75290.41

PDVC = 242069.83

Table 4 Benefits

Year wise Salary	Starting Salary	Annual Increment	10% Budget Increment	Total
1st Year	25000×12=300,000	1200	-	301,200
2nd Year	26200×12=314,400	1200	2620	318,220
3rd Year	30,020×12=360,240	1200	3,002	364,442

Present Discounted Value of Benefits

Formula

$PDVB= B_{1/ (1+r)}{}^{1}+ B_{2/(1+r)}{}^{2} + B_{3/(1+r)}{}^{3}$

Where:

PDVB = present discounted value of benefits (work life earning)

B = future benefits/earnings

r = discounted rate as per practice 7%

t = time period

Solution

B1 = 301,200

B2 = 318,220

B3 = 364,442

$PDVB= B_{1/ (1+r)}{}^{1}+ B_{2/(1+r)}{}^{2} + B_{3/(1+r)}{}^{3}$

$PDVB = 301,200/(1+7\%)^{1} + 318,220/(1+7\%)^{2} + 364,442/(1+7\%)^{3}$

PDVB =281495.32 + 277945.67 + 297493.23

PDVB = 856934.22

What is the benefit-cost ratio of Diploma of Associate Engineers (DAE)?

Benefit-Cost Ratio

Analysts often evaluate projects based on the benefit-cost ratio. A benefit-cost ratio can be employed to establish the viability of a project during any given year or over a time span (Nas, 1996). The ratio can generally be defined as described below (NOU, 1997).

Formula

BCR= B/C

Solution

BCR= B/ C

BCR= 856934.22/ 242069.83

BCR= 3.54

The rule is that the ratio should be larger than or equal to one, which basically means that the present value of the benefits should be larger than the present value of the costs to be profitable (NOU, 1997). One could also choose the largest ratio when comparing projects that are mutually exclusive (Pearce, Atkinson, & Mourato, 2006).

Discussion

It was the goal of this study to examine the costs and benefits of TEVTA-employed Diploma of Associate Engineers (DAE) in Punjab. Analyzing the costs and advantages of a potential project is done through the use of a cost-benefit analysis (CBA) (or policy or programme). A society's net social gain or loss is then calculated by averaging these results across all of its citizens (Pearce et al., 2003). According to human well-being, incremental costs and benefits of a planned project are contrasted to what would have happened if that project had not been undertaken (Campbell & Brown, 2003).

Cost-benefit analysis (CBA) is now widely employed around the world for a wide range of purposes. Investments that benefit society as a whole require a cost-benefit analysis, which is especially critical for public-interest investments. Because of this, numerous government agencies are demanding the adoption of CBA in regulatory reforms. (Boardman, Greenberg, Vining, & Weimer 2011). The benefits and expenses of the Diploma of Associate Engineers (DAE) programme are found to differ. Researchers discovered that DAE graduates' three-year benefits and present discounted value of cost (PDVC) combined amount to a total of Rs 856934.22. It is clear from the findings that DAE graduates enjoy long-term advantages over students who just graduated with a bachelor's degree and an F.Sc. degree. Those who have earned a DAE degree have entry-level jobs on the 14th scale, with the possibility of moving up to the next level as they gain experience and education. If Pakistan is to get the most out of its technical education system, it must weigh the benefits and drawbacks of several options. The value of the benefit-cost ratio is found to be greater than one. For a project to be financially successful, a benefit-cost ratio greater than or equal to one is required. This rule was proposed by researchers Pearce, Atkinson, and Mourato (2006). Their findings reflect the study's findings (NOU, 1997). When comparing projects that are mutually exclusive, one could also choose the biggest ratio.

Conclusion

TEVTA's Diploma of Associate Engineers (DAE) curriculum offers distinct advantages and disadvantages. It has been determined that the costs and benefits of earning a Diploma of Associate Engineers differ (DAE). According to the data, graduates of the DAE programme enjoy long-term advantages over students with a 12- or 14-year degree. Jobs at scale 14 can advance employees' abilities and qualifications to the next level, although graduates in Punjab with the F.A./FSc. and graduation qualifications cannot get work at scale 14.

Recommendations

Following recommendations were formed in this study.

1. Technical education is not promoted in Pakistan due to lack of awareness about the benefits of technical education. Therefore, it is recommended that awareness campaigns should be started through seminars, workshops and media (social and electronic).
2. It is recommended that overall costs and benefits of all Government of Technologies (GCTs) should be calculated by TEVTA and its promotion might be done to educate society about future benefits of DAE which will motivate students and parents towards technical education.
3. It is recommended to establish a National Skills Fund, for financing special initiatives and innovative training schemes for raising the existing skill level and to enhance the pool of skills development.
4. Government should create their job opportunities and also ensure job security for DAE graduates. Government should establish such rules to prefer DAEs. Hence unemployment decreases and technicality will increase.

References

Ali, A., Ahmed, I, & Shah, H.(2017). Exploring factors influencing employability of vocational training graduates in Pakistan: A factor analysis. Global Regional Review, 2 (1), 389 – 404.

Aizenman J, Jinjarak Y, Ngo N, Noy I (2018). Vocational education, manufacturing, and income distribution: international evidence and case studies. Open Econ Rev, 29, 641–664. https://doi.org/10.1007/s11079-017-9475-7

Agrawal ,T., & Agrawal, A. (2017). Vocational education and training in India: A labour market perspective. J Voca Educ Train, 69, 246–265. https://doi.org/10.1080/13636820.2017.1303785

Asghar, W., & Siddiq, S. H. (2008). Apprentice training in Pakistan: A comparative study of apprenticeship practices in Punjab and European countries. International Journal of Training Research, 6(2), 1-19.

Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. (2001). Cost-benefit analysis: Concepts and practice (2nd ed.). New Jersey: Prentice Hall.

Bilboe W (2011) Vocational education and training in Kuwait: vocational education versus values and viewpoints. Intern J Train Res 9:256–260

Campbell, H., & Brown, R. (2003). Benefit-Cost analysis: Financial and economic appraisal using spreadsheets. Cambridge: Cambridge University Press.

Chamadia, S., & Shahid, M.(2018). Skilling for The Future: Evaluating Post-Reform Status of "Skilling Pakistan" and Identifying Success Factors for TVET Improvement in the Region. Journal of Technical Education and Training, 10(1),1-14.

Fatima, G., Bashir, R. , Ashraf, S., & Nayab, D.(2020). Financial autonomy for unemployed and disadvantaged adolescents with disabilities through Punjab Vocational Training Institutions. Journal of Accounting and Finance in Emerging Economies, 6(2), 635-641.

Hassan, N., Ahmed, M., & Siddiqui, R, G. (2019). Role of national vocational and technical training commission (NAVTCC) in the implementation of national skills strategies (NSS) 2009-2013. Pakistan Journal Of Distance and Online Learning, 5(2), 235-246.

International Labor organization. (2021). World Employment and Social Outlook – Trends. Retrieved from https://www.ilo.org/global/research/globalreports/weso/trends2021/lang--en/index.htm

Igarashi T, Acosta P (2018) Who benefts from dual training systems? evidence from the Philippines. World Bank Policy Research Working Paper, (No. 8429). http://documents.worldbank.org/curated/en/576691525362185723/Whobenefits-from-dual-training-systems-evidence-from-the-Philippines.

Javied, Z., & Hyder, A. (2009). Impact of training on earnings: Evidence from Pakistani industries. Asian Social Science, l5 (11), 76-85.

Janjua, Y. & Irfan, M.(2008). Situation Analysis to Support the Programme Design Process for National Skills Strategy of the Islamic Republic of Pakistan. Gtz Deutsche Gesellschaft für Technische Zusammenarbeit GmbH. SEBCON (Pvt) Limited Socio-economic and Business Consultants, Islamabad

Kanwal, A., Balasubramanian, K & Carr, A. (2019). Changing the TVET paradigm: New models for lifelong learning. International Journal Of Training Research,17(1), 54-68.

Khan, M. A. (2005). Human resource development, competitiveness and globalization: A South Asian perspective. SAARC Journal of Human Resource Development,

43(1), 15-54.

Khan, & Zaib, M. (2017). Comparative analysis of TVET sector in Pakistan. Retrieved from https://www.voced.edu.au /search/site/all creators %3A%22Khan%2C%20Mansoor%20Zaib%22

Kizu T, Kühn S, Viegelahn C (2018) Linking jobs in global supply chains to demand. Inter Labo Rev 158:213–244.

Kohler, T., & Drummer, J (2018).The technical and vocational education and training: Issues, concerns and prospects. Retrieved from https://link.springer.com/book/10.1007/978-3-319-73093-6

Lodhi, A. (2019). Budget allocates Rs32 billion for school education. The Express Tribune. Retrieved from https://tribune.com.pk/story/1992730/1-budget-allocates-rs32-billion-school education/

Ministry of Education Malaysia. (2015). Malaysia Education Blueprint 2015-2025. Retrieved from http://www.moe.gov.my/cms/upload_files/files/Poster HEB Bahasa Inggeris(1).pdf.

Pearce, D., Groom, B., Hepburn, C., & Koundouri, P. (2003). Valuing the future: Recent advances in social discounting. World Economics, 4(2), 121-141.

Pearce, D. W., Atkinson, G., & Mourato, S. (2006). Cost-benefit analysis and the environment: recent developments. Paris: OECD.

Rashid, K. & Mukhtar, S. (2012). Education in Pakistan: Problems and their solutions. Retrieved from https://www.semanticscholar.org/paper/Education in-Pakistan%3A-Problems-and-their-Solutions-RashidMukhtar/aed676ff4a9e96a9cf9e25c280b1823efa96c686.

Shah, I. H. (2013). Problems and Prospects of Technical Education in Pakistan (Unpublished doctorate dissertation). University of Arid Agriculture Rawalpindi.

Shah, S, A. (2017). Comparative analysis of TVET Sector in Pakistan. Gesellschaft für Internationale Zusammenarbeit (GIZ). Retrieved from file:///C:/Users/user/Desktop/material%20phd/Comparative%20Analysis%20of%20TVET%20Sector%20in%20Pakistan.pdf

Shakir, R, A.(2020). Need for robust TVET sector. Retrieved from https://tribune.com.pk/story/2202026/need-robust-tvet-sector

Sulistiani,S., & Yulianto, B.(2019).Employability skills of vocational graduates: Implementation of curriculum IQF Level 2. Advances in Social Science, Education and Humanities , 387(1), 6-10.

Nas, T. F. (1996). Cost-benefit analysis: theory and application: Thousand Oaks. Calif: Sage Publications.

NOU. (1997). Utility-Cost Analysis. In Ministry of Customs, F.-O. (ed.). Public sector feasibility considerations. Oslo: Norway's public reports.

UNESCO (2019). Right to Education. Retrieved from https://www.right-toeducation.org/sites/right-to-education.org/files/resource-attachments/RTEUNESCO_Right%20to%20education%2