

**SKILL MAPPING AND HUMAN RESOURCE PLANNING FOR  
PROPOSED SPECIAL ECONOMIC ZONES: JOB CREATION  
FOR UNEMPLOYED YOUTH OF PAKISTAN**

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## **LIST OF ABBREVIATIONS**

ADB	Asian Development Bank
BRSP	Balochistan Rural Support Program
BSEZ	Bostan Special Economic Zone
B-TEVTA	Balochistan TE&VT Authority
CPEC	China-Pakistan Economic Corridor
DMPT	Directorate of manpower training
EPZs	Export Processing Zones
FGDs	Focus Group Discussions
GIEDA	Gwadar Industrial Estate Development Authority
GOB	Government of Balochistan
GOP	Government of Pakistan
GPA	Gwadar Port Authority
CHTED	College Higher & Technical Education Department
ICD	Industries & Commerce Department
ILO	International Labor Organization
KIs	Key Informants
LIEDA	Lasbela Industrial Estate Development Authority
L&MPD	Labor & Manpower Department
LFS	Labor Force Survey
LMIS	Labor Market Information System
NAVTTTC	National Vocational & Technical Training Commission
NGOs	Non-governmental Organization
NSEP	National Strategic Education Plan
NSIS	National Skills Information System
NVQF	National Vocational Qualifications Framework
P&D	Planning & Development Department
SEZs	Special Economic Zones
SWD	Social Welfare Department
SWOT	Strength Weaknesses Opportunities Threats
TEVTAs	Technical Education and Vocational Training Authorities
TTB	Trade Testing Board
TTCs/VTCs	Technical/Vocational Training Centers
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational Scientific & Cultural Organization
UNHCR	The United Nations Refugees Agency
WDD	Women Development Department

# INTRODUCTION

## 1.1 Context of the study

The province of Balochistan has been facing the problem of slow process of human resource development for its existing, proposed and potential industrial set-ups since years. The increasing trends of unskilled youth population result in confronting with problems like poverty, unemployment, social and economic backwardness. The low levels of human capital formation and the persistency in the phenomena of no relevancy of technical and vocational skills supply according to the needs of industries are likely indicators for many socio-economic issues, including youth underdevelopment, the provincial population face since years. The problems of low levels of skills and human capital formation of the provincial youth appeal researchers and policy makers to devise an empirically proven skilled-based human resource policies for job creation of unemployed youth of Balochistan (Afza, Razzaq, Gul and Ahmed, 2020; Ahmed et al., 2018).

The major portion of provincial workforce is reported illiterate, unskilled and incompetent in the context of existing and proposed industries in Balochistan. The skills levels of provincial labor force are reported quite lower as compared to the TVET demands for skills and labor market competency requirements for industrial development on special economic zones (SEZs), export processing zones (EPZs) and CPEC projects of Balochistan (Khan and Ahmed, 2019).

The issue of skills deficiency in relevant TVET skills, for the needs of existing, proposed and potential industries of each SEZ/EPZ may likely disrupt the promises of job creation and decent earnings for unemployed youth of Balochistan. Thus, skills mapping and human resource planning on empirical ground are needed to likely materialize job creation via proposed and potential industries of SEZs/EPZs for unemployed and dispersed youth of Balochistan.

The literature suggest that human capital formation policies are devised for the labor demands of different categories of industrial set-ups in different sectors of an economy. The technical and vocational skills provision mechanisms are run in line with the industrial development across the developed and developing states of the world (ADB, 2014; Sudira, 2019). The occupational segregations of labor force are also distributed to the categories of different industries as per the relevancy of required skills (ILO, 2020). Notwithstanding, the provincial TVET system provide skills irrespective of proper categorization of the industries in Balochistan. The literature and reports pertaining to Balochistan TVET sector provide no evidences of TVET skills provisions on the basis proper categorization of industries that require skilled labor force for the labor market needs of human capital to grow and produce the outputs.

This study is an attempt to map TVET skills and human resource planning to ensure job creations as the labor markets demands of relevant skills for employment opportunities in existing, proposed and potential industries of three selected SEZs/EPZs of Balochistan. The mapping of skills as per the industrial categories of Balochistan may likely help policy maker to devise human resource planning that is easy to implement, has the capacity of skills relevancy, linking TVET skills provision with labor demands of industries and may ensure employment opportunities for the unemployed youth of Balochistan.

## **1.2 Problem Statement**

Skills provision and human resource development are direly required for human resource planning to ensure job creation in the context of industrial development on SEZs/EPZs in Balochistan. Yet no skills related human resource planning is conducted to specify TVET skills in common and specific categories in the context of existing, proposed and potential industries for job creation to the unemployed and unskilled labor force of Balochistan. The Labor Force Survey (2018-19) indicates deficiencies of skilled labor force for industry and manufacturing sectors of Balochistan. The existing and proposed industries on SEZs/EPZs could materialize economic fortunes for provincial unemployed youth (i.e., population of 15-29 years of age) only if relevant TVET skills are identified and mapped accordingly for the needs of local labor force in existing, proposed and potential industrial set-ups. For instance, The Bostan Industrial Zone (i.e., a proposed and partially developed SEZ in Balochistan) is going to be established in Balochistan with the industrial units like, food processing, motor bike assembling units, electric appliances units and pharmaceutical units along with other industries. The provision of relevant skills for these proposed industries is deficient by the formal TVET institutes in Balochistan. This is the case with other SEZs/EPZs in Balochistan as well. Additionally, the provincial youth face unemployment and skills deficiency to get jobs and earn livelihood earning in labor markets of Balochistan. The persistency of unskilled labor force may likely take the provincial youth to more disadvantageous and marginalized positions in job creation opportunities once generated by industrialization on SEZs and EPZs in Balochistan. This situation of mass unemployment among provincial youth has the chances to increase of poverty trap, social unrest and more socio-economic hardships for them and their families. Thus, TVET skills mapping in the context of TVET stakeholders, specifying to selected industries of SEZs/EPZs of Bostan, Hub and Gwadar, may likely benefit skills based human resource planning that may ensure employment for decent work and livelihood earning for unemployed youth of Balochistan.

## **1.3 Study Purpose**

This study is an attempt to map TVET skills and formulate human resource planning for prospective job creation in the context of selected existing, proposed and potential industries on three SEZs and EPZs of Bostan, Gawadar and Hub of Balochistan. The study will give a baseline mechanism to comprehensively augment the supply and demand aspects of TVET skills, identification and mapping of skills from the perspectives of diversified stakeholders of TVET system for human resource planning specific to selected industrial development in the province. The study focuses upon mapping TVET institutional set-ups (both public and private) of the province. The study covers both the demand and supply aspects of selected TVET skills mapping for existing, proposed and potential industries of SEZs/EPZs of the province. From each of the three categories of industries, one industry is selected to map the TVET skills accordingly. The output of the study constitutes upon formulating and to recommend policy options of skills based human resource planning for selected existing, potential and proposed industries and their occupations of SEZs/EPZs and that may likely ensure job creation for unemployed youth of Balochistan.

## **1.4 Objectives of the Study**

In the context of the above-mentioned purpose, this study aims at achieving the following objectives.

1. To map TVET institutional set-up for skills development in Balochistan.
2. To sketch the existing, proposed and potential industrial set-ups of three SEZs/EPZs for skills mapping in Balochistan.
3. To identify demands for technical, vocational, common and specific TVET skills for selected industries of SEZs/EPZs in the province.
4. To explore the existing TVET skills deficiency for selected industries of SEZs/EPZs in Balochistan.
5. To recommend policy implications for skills mapping and human resource planning for SEZs/EPZs to ensure job creation for unemployed youth of Balochistan.

## **1.5 Research Questions**

The following questions are attempted to get the objectives of this study.

1. What is TVET institutional set-up for skills development pertaining to SEZs/EPZs in Balochistan?
2. What kind of technical, vocational, common and specific TVET skills are required for selected industries in existing, proposed and potential categories of Balochistan?
3. How are the estimates of jobs creation by the selected existing, proposed and potential industries for TVET skilled labor force in Balochistan?
4. What are the estimates of TVET skills deficiency for selected existing, proposed and potential industries in Balochistan?
5. What are policy implications for skills mapping and human resource planning for SEZs/EPZs to ensure job creation for unemployed youth of Balochistan?

## **1.6 Scheme of the Study**

The next section gives brief literature review. The section 3 covers research methodology adopted for this study. The second last section cover results and discussion of the study. The final section is devoted to conclusion and policy recommendations for TVET skills mapping in Balochistan.

## LITERATURE REVIEW

The human capital theories of Becker (1964), Mincer (1974), and Schultz (1974) all emphasize for planning and investment in human capital formation for labor force development and economic growth and development. Several theories have been proposed for the foundations of HRD including psychological, economic and system theories. For economic progress, HRD comprised of organizational development, need for industry, required for different economic tasks and responsibilities, and business focused skills and expertise. On the same ground, HRD is examined in two economic theories- theory of firm and human capital theory. HRD has been redefined with economic expansion, rapid technological change and resource use and system of workplace. For the last 70 years, human resource development is concerned with providing workers the basic knowledge and expertise required for their jobs. Investment in education among all the HRD activities is considered foremost important in human capital theory for economic growth and development including industrialization.

### 2.1 Concept, Types and the Process of Skills Acquisition

Technical & Vocational Education & Training (TVET) refers to *“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 occupants in various sectors of economic and social life”* (UNESCO, 2001; and ILO, 2001). TVET is composed of skills development that are workable, functional, applied to the tasks or functions of overall production process in an industrial or agriculture producing unit. These skills are categorized as vocational skills and technical skills. Technical education and training are post-secondary practical-based courses of study, having minimum duration of a month and maximum four to five years, composed of technical abilities necessary for performing a task and work as supervisory staff. However, vocational trainings are lower-levels courses of studies, not based post-secondary education requirements, to train labor force perform skilled and semi-skilled works in different trades. Another shadow of difference between technical and vocational skills is that technical skills help enhance general education levels specific to that trade of a person and vocational training does not enhance general education abilities of a person (Khan and Ahmed, 2019; UNESCO-UNEVOC, 2017; ILO, 2001, 2016).

The TVET system is composed of training trades and education labor force in hard and soft skills for the duration of as minimum as one week up to maximum of five years by TEVT institutes across the globe. It is also categorized as, technical training, technical education, vocational training and vocational education. Another version of TVET is termed as vocational education and training (VET) that consists upon vocational aspects of education and training (Khan and Ahmed, 2019; UNESCO-UNEVOC, 2016).

On policy levels in Pakistan, the Government of Pakistan has announced its first ever National TVET Policy (2015) having eight objectives for skills development across the country. The provincial technical and vocational training authorities are made functional to regulate, strengthen, manage and centralize the diversified and distributed nature of TVET supply by different organizations and department in a province. At national levels, national vocational and technical training commission (NAVTTTC) under the federal ministry of educational and professional training is also established for commissioning the overall TVET sector in Pakistan. To ensure international best practices in TVET



sector and international acceptability of the TVET certificates and diplomas of Pakistan, NAVTTC has launch quality framework of National Vocational Qualification Framework (NVQF) to promote competency based training and skills development that are in line with international standards of vocational and technical adroitness and professionalism (NAVTTC, 2020, B-TEVTA, 2020; P-TEVTA, 2021; Ahmed et al, 2019).

In Balochistan, TVET system consists upon three tiers of technical education, vocational training, and technical training and disseminated with the help of TVET institutes affiliated with different TVET departments, commissions, authorities and donors funded non-governmental organization (NGOs). For details, refer to the first part of results and discussion of this study.

Notwithstanding, the statistics of LFS (2018-19) indicates that national labor force in all the provinces do not fulfill the technical and vocational skills in proportions to the needs of labor market requirements in manufacturing, technicians and professional jobs, skilled agriculture, crafts and related trades, and plants and machinery endowed industries in the country. The data shows that only 7.3% of the labor force are skilled and semi-skilled and do not meet the real skills demands of many sub-sectors of the economy of Pakistan (Khan and Ahmed, 2019; Ahmed et al, 2018; Hisam, 2016). Thus skills development for agriculture, industry and services sectors are essential inputs to maintain economic growth in all the sub-sectors of these three major sectors of an economy.

According to Pirzada (2020), the countries like Pakistan must invest in skills development 21st century skills as per the European VET system to help increase economic growth of developing countries. Therefore, the investment in TVET sector enhances competitiveness and productivity in any sector of the economy specifically industrial development of a developing country.

## **2.2 Skills Development as Pre-Requisite for Industrial Development on SEZs/EPZs**

The literature for TVET based human resource development for industrial zones of Balochistan is cascaded and not focused on specific industries in the categories of existing set of industries across the province. The reports of Board of Investment (2017; 2019) indicates the importance of relevant skills as one of the pre-requisites for industrial development on all the proposed SEZs/EPZs of Pakistan. The absence of literature concerned regarding skills mapping in the context of industrialization of SEZs/EPZs for Balochistan gives no policy guidelines to investors and policy makers the inputs of skilled human resource that is necessary for industrial development in Pakistan (Ahmed, et al, 2018; Khan and Ahmed, 2019).

The policy mechanism in the context of skills development for industrial needs of SEZs/EPZs and other megaprojects of China-Pakistan Economic Corridor (CPEC) for skilling of provincial labor force may likely divert the directions for effective development planning in Balochistan. To get the targets of foreign direct investment (FDI) in industry and other sectors of the economy, SEZs/EPZs provides competitive and comparatively easy and profitable business environment to investors in Pakistan. The export growth is possible with industrial development on SEZs/EPZs in Pakistan. The industrial development and its productivity depends skilled and developed human resource among capital and conducive business environment in Pakistan. Thus, it may be implied that skilled labor force may likely enhance industrial development on SEZs/EPZs in Pakistan (BoI, 2019; Ahmed. 2020).

Similarly, the foundation and improvement of SEZs/EPZs also affect the direction, nature and extent of skills development of an economy. Manufacturing and industrial advancement is considered as the most dependable systems for development of an economy if complemented by adequate capital and

human resource development via extensive mechanism of skills development (Yankov, 2016). Subsequently, in last couple of decades, numerous countries are receiving technical and mechanical advancement wanting to improve their economy including the role of SEZs/EPZs for contributing fundamentally in the gross domestic product, technical advancement and modernization (Khan, 2016).

The industrial development and impressive growth of Chinese and Russian economies for the last two decades speaks volumes of the importance and significant roles of technological advancements, application of highest levels technologies in every economic sector, and the increased ratios of skilled labor force to accrue economic wonders for their economies. The economy of Japan is one of the most effective examples to endow technologically skilled labor and advanced technologies in all manufacturing sectors to maintain economic growth for the last 50 years (Brautigam, 2013; Maslikhina, 2016).

It is shown in one of the studies of Zeng (2019) that careful development and implementations of SEZs and industrial parks endorse the gadgets of proper human resource planning and extensive form of required technical and vocational skills for industrial development and organizational transformation in an economy. The outcomes of such implementations are fairly diverse internationally in the context Asian and Latin American countries, mostly notably those of the Sub-Saharan African countries for industrial development. The studies of Aggarwal (2019) has mentioned that proper and careful human development, particularly skills development to make the endowed with modern technologies, planning and implementation are integral part in a three-pillared methodological system for SEZs success factors of (i) SEZs should be aligned with the national growth agenda; (ii) strategic dynamism for making capital and labor complementary inputs and (iii) strategic implementation of the developmental plans

The studies of SOSNOVSKIKH (2017) and Wahyuni (2019) have investigated the cases of how SEZs and industrial parks are created, implemented and developed in Russia and China, respectively. In both the studies, the factors of skilling labor force, technological application and relevant skills identifications and preparing labor force according to the industrial demands in these SEZs/EPZs paved ways for increasing growth in economic development, exports diversification, employment generation, skills and knowledge development and innovation in trade, commerce and sectoral development in both the countries.

### ***Labor Force Dynamics and the Need of Skills Mapping for Balochistan***

The HR capacity and composition of recent labor force of Pakistan indicate that manufacturing sector employs around 25% of the total labor force. Agriculture and fisheries, once the backbone of our economy, accommodates almost 10% of employment. Rest employees account for all the subsectors of service sector of our economy (LFS, 2017-18). The situational analysis of vulnerable jobs shows that around 27.3 million informal sector workers are most vulnerable to losing their jobs due to the prevailing economic lockdowns and future dynamite changes in the wake of functionality of CPEC projects across the country. As this unskilled labor force are mainly engaged in these sectors most likely to be adversely affected by shifting of economic activities from unskilled work demands to highly skilled demanding economic activities after the start of industrial development on dozens of SEZs and EPZs across the country.

The industrial development on proposed SEZs and EPZs of Balochistan will also bring labor market changes for unskilled labor force to face huge unemployment for the labor force (Afza et al, 2020). The

situational statistics of Pakistan's 27.3 million informal sector workers show that 8.88 million work in the wholesale and retail trade sector will be affected, 6.22 million in the manufacturing sector will be laid-off, the jobs of 4.43 million workers in construction will be distorted, 4.37 million workers in community and social services' sectors will be lost, and 3.14 million workers engaged in the transport, storage and communication sector will adversely be affected due to the contemporary pandemic of COVID-19 in Pakistan. These statistics do not show promising labor market outcomes of employment and earnings for unskilled labor force of the province of Balochistan (Naeem, Andlib, Razzaq and Afzal, 2020).

One of the studies of Khan and Ahmed (2019) has identified the skills gap of 250 plus TVET skills in different trades and occupations for 12 CPEC projects of Balochistan. It is shown in the study that youth of the province are unskilled and can not avail job creation opportunities in industrial units once these units are made functional for producing manufacturing goods from the locations of SEZs and EPZs in Balochistan. The above studies imply for conducting a comprehensive study to identify relevant TVET skills to map out human resource planning in the context of industrialization on SEZs and EPZs that ensure job creation and employment opportunities for unemployed youth of Balochistan.

The skill deficiency level in the youth of Balochistan in line with the industrial HR requirements for SEZs and EPZs may place Balochistan at disadvantage position on the prospective industrial development and local and FDI investment on proposed locations of SEZs and EPZs in comparison with other provinces of Pakistan (Ahmed and Khan, 2019). Thus, skills mapping for the existing, proposed and potential industrial development is necessary for provincial industrial development sustainability and export promotions through the economic activities of SEZs and EPZs in Balochistan.

### ***Skills in Technical and Vocational Trades for Industries of SEZs/EPZs***

SEZs/EPZs under CPEC are likely to bring economic growth, increase FDI, job creation, trade and businesses development along with technical, structural, and institutional impacts on Pakistan's economy. The industrialization on SEZs/EPZs provide working atmosphere that allow labor to do productive works by improving their efficiency and working capacity. Chinese government has established a number of training institutions to improvise the occupational and technical skills of the domestic labor. The Chinese CPEC authorities have started to establish technical and vocational training center at Gwadar, Balochistan, for imparting TVET skills necessary for the industries requirements of proposed SEZs/EPZs in the province. The Chinese investors, government organizations, universities and companies have started human resource development of Pakistani labor force in areas like, science and technologies, social sciences, arts and humanities, cultural studies, hard and soft skills, and vocational and technical skills since the start of CPEC project in Pakistan. The sole purpose is to upgrade skills deficiencies of national labor force and human resource development in Pakistan. However, the existing incapacity of national TVET institutes to train the labor force to meet industrial needs of SEZs/EPZs and ineffective implementation of labor laws to provide social protection to the local workforce in CPEC projects are obstacles towards providing the better working conditions in case of Pakistan (Khan, 2019).

The governments, throughout the world, emphasis upon establishing SEZs/EPZs like, Arab Gulf States, China, Russia, Korea and Taiwan, to create and expand trades, create job opportunities and make occupations for local labor force. The job creations and employment opportunities are

dependent upon the provision of right set of skills to be inculcated into the labor force. To achieve the economic benefits of employment and earning, returns from industrialization of SEZs/EPZs, and achieve growth in economic development, the provisions of skills development across the labor force is one of the significant resource to materialize the socio-economic benefits of SEZs/EPZs (Sosnovskikh, 2017; BoI, 2019; Ahmed & Khan, 2019).

To support the above arguments for the importance of technical and vocational skills, the thesis of Sakka (2014) has focused upon the significant role of human capital development for the success of SEZs/EPZs of Dubai, Arab Emirates. The study has highlighted in direct and indirect ways, in multidimensional set-ups, and data proven evidences that FDI growth and progress of economic growth of Dubai was made possible by the legal permissions to skilled migrants and free allowing policies to equip labor force with new and innovative skills, implementation of technological progress and accumulating skilled labor force from Asian and other countries of the world. The study further explores that the Emirate economy will progress more if economic advancements are in line with progressive investment in education and training, free migrant policies for skilled migrants and human capital formation in applied technological advancements in trade and industry.

Similarly, the study of Payne (2000) has provided the evidences that skill-base shifting via strong and progressive human development policies like, aligning TVET skills sets with industry labor demands, are likely factors to enhance industrialization over the years. The skills development policies from the old dates of 1950s to 1980s and beyond are analyzed to put the case that dynamic policy options for shifting the technical and vocational skills sets benefit the economies across the globe.

### ***The Evidences of Job Creation by SEZs/EPZs***

The literature presents both theoretical, evidence-based and policy-oriented contents to support the arguments that economic activities via SEZs/EPZs creates jobs for job seekers and labor force across the globe. In this regards, the study of (Dzung, 2017) suggests that every policy for establishing SEZs/EPZs has the objectives of job creations and employment opportunities for unemployed and job seekers labor force in an economy. The study further elaborates that SEZs/EPZs are aimed at impacting the overall economy via the channels of job creation, skills upgradation and technical and knowledge-based advancement.

The study of Aggarwal (2007) has integrated the labor markets outcomes of SEZs into a single framework and shows that jobs are created in millions, employment opportunities are expanded, wages of labor force are increased, and skills are upgraded in those regions where SEZs are established and functional as compared to those regions where SEZs are dysfunctional and not established at all. The study confirms the benefits of SEZs in non-monetary terms as well and specified that services like, transportations, education and health of the people around SEZs are reported more to avail as compared to other regions. The benefits in terms of hygienic facilities, food and nutrition are also reported to be higher for people involved in economic activities of SEZs as compared to off-areas of SEZs. Thus, human capital formation and skills development are in strong relationships in different perspectives in terms of industrialization on a SEZs across the globe.

In terms of empirical evidence in numbers, one of the studies of Malik (2019) has reported that SEZs of CPEC is probably going to make around 575,000 immediate and more than 1 million backhanded jobs in four SEZs to be set up in Pakistan's Khyber Pakhtunkhwa (KP), Punjab, Sindh and Balochistan territories. The upcoming second step of CPEC will have enormous work/job creations, employment

opportunities and market prospects for national labor force. The VAVTTC (2018) statistics reveal that relevant TVET skills are approved as per NVQF and implemented across the provinces to start competency based trainings in relevance to the labor needs of the existing and proposed industries of nine SEZs/EPZs of Pakistan. The statistics show that 500,000 Pakistani youth (i.e., from 15 to 29 years of age) will be trained up-till 2025 to meet the skilled labor requirements of different sectors of national economy.

The empirical studies of Eckermann (2012) and (Cizkowicz, 2015) showing millions of jobs created by industrialization on SEZs of Middle East and North Africa and Poland, respectively, are success stories to validate the arguments of evidences of job creation and increased employment opportunities by the establishment and functionality of SEZs. The Cambodian case of success story of SEZs is reported by Menon (2015) as another evidence to support the argument that industrialization development creates jobs of about 68,000 with higher wages for technical and vocational skilled labor force.

### ***Skills-based HR Planning for SEZs/EPZs***

The contents of the above mentioned sub-parts of literature review put forth the case to justify reviewing skills related HR planning for SEZs/EPZs in multiple ways. The case of trade development, rapid industrialization and job creations for youth are reported to have occurred after the establishments of SEZs of borders of Taiwan, China and other East Asian economies (Krainara, 2018). The Thailand case of skills based HR policies for the success of border based SEZs is reported by Krainara (2016) and examined the Thai strategy in support of delineating HR policies to focus upon TVET skills as necessary policy option for the development of SEZs, job creation and employment, and industrialization. The Indian case of establishing SEZs also endorsed technical and vocational education and training to ensure jobs and employment and robust economic growth by industrial development is reported by Nallathiga (2007) and its SEZs Act-2005 played active role in building policy options for skills-based HR planning to its success stories.

The study of Naeem (2020) has mentioned the developed countries' ever-growing export-oriented industrialization over the last three decades. It also asserts for policy options to include relevant skills in IT, innovation, and TVET for formulating SEZs/EPZs policies for industrialization under the ongoing CPEC project of Pakistan. The study of Nasreen (2020) presents her views that SEZs and its variants like industrial zones and technological parks could only ensure real terms of economic benefits if proper HR planning are done and implemented at the time industrial production process to boost exports, revenue generation, raising employment, value chain management and bring socio-economic development for Pakistan and other developing states of the region. Furthermore, to get the complete benefits from SEZs, a keen and smart human resource growth planning is needed, which must be consistent with Pakistan's economic and industrial growth over the next decade. The proclaimed SEZs are in areas like agriculture, food/fruit processing, and manufacturing, IT, textiles, and other industries would all require varying degrees and types of TVET and skills expertise of labor force in Pakistan.

The human resource activities and skills determinants about the labor market needs of Shenzhen Special Economic Zone in Southern China is presented by Ding (1997) in 158 foreign-invested enterprises. The findings suggest that enterprises have shifted away from centralized job selection and placement, lifetime jobs, and equal wage toward open labour markets at the managerial and non-managerial levels, contractual employment where salary and retention are dependent on individual

employee and business success, and wage arrangements that consider variations in qualifications, training, and work/job demands. Human resource strategies and activities in Foreign-invested Enterprises usually follow a mix paradigm, integrating elements of Western-style HRM.

The creation of SEZs in South Africa during 2014 was officially approved by the South African government (Rogerson, 2014). Following the acknowledgement of the persistence of deep-rooted structural and spatial disparities in the region, the emphasis placed on Special Economic Zones reflects a strong return to spatially-based economic interventions. The capacity of SEZs is evaluated in light of home-grown experience with the underwhelming success of so-called Industrial Development Zones (IDZs) since 2001. Although it is clear that re-visiting the concerns of how to solve "uneven geographical growth" is essential, it is difficult to argue that SEZs would be a surefire success.

The study of Gebrewolde (2019) has suggested that policies for successful SEZs must accommodate the macroeconomic goals of wider growth plan, boosting national productivity, refining employee retention programs, investment in corresponding infrastructure, knowledge sharing, and reshaping the trade facilitations as preamble points for the development of an economy. In line with this argument, one of the studies of Ahmad (2018) recommends macroeconomic goals of industrialization and HR planning to policy makers for establishing SEZs and EPZs under CPEC in Pakistan.

The set of different policies oriented to establishing SEZs that include innovative policies, plans, strategies and methods (for instance, in taxes, legislation, labor laws, HR planning, and public private partnership aspects) are reported by Crittle (2008) and emphasized upon getting the objectives of highly successful job-creation resources, particularly for women joining the labor force that may help enhancing export productions and balancing terms of trades of developing countries of the world. As an evidence to this study, the author, Ngo (2016) uses panel data from 64 provinces in Vietnam from 2001 to 2006 to provide analytical information on the trends and disparities in provincial economic performance based on industrialization in SEZs. The findings suggest that SEZs with augmented HR planning resulted more in terms of productions, export growth and job creations for Vietnam. Similarly, it is reported by Sigler (2014) that nearly 70,000 jobs (5% of the overall jobs) of Panamanian economy was made possible through proper HR planning for two Panamanian SEZs.

### ***The Need of Skills Mapping and HR Planning for SEZs/EPZs of Balochistan***

The text of Pakistan Vision-2025 suggests for competitive labor force endowments in people through skill development and human capital formation for socio-economic development of Pakistan (Planning Commission, 2016). The document of "National Skill Strategy" has planned for skill formation through provincial technical and vocational training authorities (TEVTAs) and national commission on technical and vocational training (NAVTTTC) regional offices and skill development programs but human resource planning, in the context of SEZs and EPZs, are neglected and not formulated for prospective job creation opportunities for unemployed youth of Pakistan (NAVTTTC, 2017). All these national documents emphasize upon inclusive HR and skills development policies to equip the bulge of youth for upcoming economic activities under the SEZs and EPZs under the flagship of CPEC projects.

Notwithstanding, the documents and national vocational qualification framework (NVQF) of NAVTTTC (2020) has identified around 140 TVET skills for the requirements of skilling labor force across

Pakistan. Yet, the labor force survey reveals that only less than 3% of Pakistan's labor force are technically skilled (LFS, 2018-19). The deficiency in TVET skills of national labor force are likely to not materialize decent work and adequate livelihood earnings for provincial of Balochistan.

The studies also highlight that TVET skills, its identification and mapping are necessary for designing optimal human resource policies for job creation and employment benefits to the unemployed youth in prospective CPEC projects of Balochistan (Khan and Ahmed, 2019). The Youth Policy (2015) of Government of Balochistan has identified two major issues of unemployment and deficiencies of TVET skills at provincial level. The recent initiations of SEZs and EPZs of the province and relevant policies present the dire needs of skilling provincial youth to get employment and earn in upcoming economic opportunities of industrialization.

Human resource planning for the industrial setup of SEZs and EPZs for job creation for unemployed youth of Balochistan seems an appealing area of exploration to be highlighted and bring forth for broader socio-economic prospects for provincial population in the wake of SEZs and EPZs proposed under the game-changer CPEC mega project and achieving the targets of sustainable development goals (SDGs) for Balochistan. As, it is also quoted in this regard that, "*...special economic zone (SEZ) is a specifically delineated duty-free enclave and shall be deemed to be foreign territory for the purposes of trade operations and duties and tariffs. In other words, SEZ is a geographical region that has economic laws different from a country's typical economic laws. Usually the goal is to increase foreign investments. SEZs have been established in several countries, including China, India, Jordan, Poland, Kazakhstan, Philippines and Russia...*" (Topno, 2005).

So, it is interesting to look critically at the capacity and strength in fields like, technical and scientific activities, professional, and other expertise, in which only 3% of our employed labor force is working at national level. It would be an economic failure not to form relevant human resource development in this emerging area of employment opportunities in wake of CPEC projects and its SEZs and EPZs in provinces like, Balochistan.

In short, the basic structure of industry-wise and occupational division of overall employment diaspora will likely change in wake of CPEC projects and its probable SEZs and EPZs within next 10 years, thus we need to use our capacity for preparing youth human resource development accordingly. Else, we would not be able to bring our provincial economy at competitive advantage, in respect to SEZs and EPZs and its economic productivities, in comparing with China in the output of CPEC projects and its evolving economic opportunities in Balochistan. Plus, not having a TVET based HR policy for bulge of unemployed youth will increase the chances of social unrest and socio-economic miseries potentially enough for disrupting the promise a prosperous life for provincial youth in future in Balochistan (Khan and Ahmed, 2018; Ahmed and Khan, 2019).

### ***Gap in the Literature***

The establishment of SEZs and EPZs is considered the backbone for industrial development in years to come, and skill formation and human resource planning for all the expected industrial sectors are strongly needed for yielding due socio-economic benefits from expected industrial development in Balochistan. The provincial TVET sector and national TVET provision provide skills pertaining to common categories of skills and not in line with the labor market demands of the existing, proposed and potential industries of SEZs/EPZs in the province. The provincial TVET set-up presents a sort of very weak implementation of generic human resource planning that contains no mechanism for

relevant skills identification to map technical and vocational skills and estimates for skill development and job creation phenomena about existing, proposed, and potential industries of SEZs/EPZs to curb youth unemployment in Balochistan. This acute problem has probability to hamper the prospective/expected economic gains and demands for skills mapping to the industrial needs of Balochistan to benefit local labor force once CPEC economic activities get started to contribute for the socio-economic development of Balochistan. This problem, if not fixed, may also hamper economic gains for Balochistan in industrial units on SEZs and EPZs in comparison with Chinese investors and other non-provincial stakeholders. Similarly, the bulge of provincial youth (i.e., population of 15-29 years of age) facing TVET skills deficiency and unemployment, as two major economic problems, also require for skilling Balochistan in relevant fields to industrial HR needs for SEZs/EPZs of the province. Furthermore, skills mapping and HR planning have also not been formulated for job creation specifically for relevant TVET skills for different industrial clusters in SEZs/EPZs of Balochistan. The study focuses to fill the literature gap of skills mapping and formulating human resource planning for job creation prospects in SEZs and EPZs for the unemployed youth of Balochistan.



## **RESEARCH METHODOLOGY AND DATA COLLECTION**

### **3.1 Research Design**

The research design is composed to cover the inter-related and complex nature of many stakeholders involved in TVET system of Balochistan. The research design contains mixed research method and its components, means of data collection, field survey schedule, tools of data collection, identifying selected industries, identifying provincial TVET system, the target respondents, and defining skills types/categories following Wheeldon (2010) with the multidimensional approach Williams (2007). as required for getting the objectives of this study.

### **3.2 Research Methodology**

This study is based upon mixed research methods to explore the objectives of the study. It has two main components (i.e., Desktop Survey and Field Survey) and each component contains different phases of exercises and all these are described in detail below. The Desktop Survey and Field Survey are being conducted in different phases (Wheeldon, 2010; Williams, 2007; Ahmed & Khan, 2019; See Appendix A for detail).

### **3.3 Components of Collection Data**

Desktop survey provides base-line information and data collection from primary and secondary sources of TVET related literature and reports. The second component of research method, that is field survey, contains both the simultaneous and sequential phases of research methodology. These include multiple field visits to Bostan, Hub and Gwadar SEZs/EPZs and their industrial set-ups, three focus group discussions (FGDs) are conducted for accomplishing this report. Three comprehensive Field Visits are conducted by the research team led by PI that have covered all the three SEZs/EPZs located in districts Lasbala, Pishin and Gwadar of Balochiustan. Besides, the target districts of SEZs/EPZs, an additional physical cover area of at least three adjacent districts are also visited to accomplish this report. Meetings with head of departments (HoDs) are done also done. Visits to selected industries and visits to labor markets for getting data and information from TVET qualified individuals are also conducted for this study.

### **3.4 Tools of Data Collection**

A set of five research questions depicted in research objectives are put forth are for getting information and data in three FGDs. The set of five questions for FGDs is given in the Appendix (A) of this report. For mapping the lists of different categories of TVET skills, human resource and/or employed key informant that industry is contacted to map relevant TVET skills/trades for the remaining set of data collection in the labor markets following Khan and Ahmed (2019) for Balochistan.

#### ***Respondents***

The respondents of this study are key informants (KIs) from B-TEVTA, TVET departments, NAVTTC, GIZ, authorities of SEZs/EPZs, investors, TVET implementers, TVET institutes, TVET NGOs/INGOs for FGDs, TVET qualified individuals in labor markets.

### ***Defining Skills for this Study***

Within the broader context of skills conceptualization, this study confines defining the skills in four categories for selected industries of SEZs/EPZs of Balochistan. These categories are functionally defined in the following way in the context of this study.

*Vocational Skills:* The vocational skills are those skills that apply to a practical profession or work required by the selected industries of this study. The duration of vocational training is confined from three months to twenty-four months disseminated and regularly given by TVET allied departments in Balochistan (I&CD, 2021; NAVTTC, 2021; B-TEVTA, 2021; SWD, 2021; UNESCO-UNEVOC, 2017; ILO, 2001).

*Technical Skills:* The technical skills are those skills applied to a technical profession or work required by the selected industries of this study. The duration of technical training is confined from three months to five years of degree program disseminated and regularly given by TVET allied departments, polytechnic colleges, and engineering/agriculture universities of Balochistan (I&CD, 2021; NAVTTC, 2021; B-TEVTA, 2021; H&TED, 2021; UNESCO-UNEVOC, 2017; ILO, 2001).

*Common Skills:* The common skills are those skills apply to generic HR and work requirements of the selected industries of this study. These types of jobs neither part of vocational nor technical pertaining to skills mapping for a specific industry under this study (UNESCO-UNEVOC, 2017; ILO, 2001).

*Specific Skills:* The category of specific skills is sub-set of total number of both the technical and vocational skills that apply to a practical profession and/or technical jobs and required by the selected industries of this study (UNESCO-UNEVOC, 2017; ILO, 2001).

### **3.5 Details of Mixed Research Methodology**

It constitutes two surveys of Desktop and Field surveys with different phases and skills mapping exercises for collection of data and information necessary for accomplishing the objectives of this study. See Appendix-A for detail.

## RESULTS AND DISCUSSIONS

The results and discussions are presented here as per the arrangements of five objectives/questions set for this study. The details are given below accordingly.

### 4.1 Mapping TVET System in Balochistan: Objective # 1

The TVET system consists upon provincial and federal TVET departments, authorities and commission. The supply of TVET skills are disseminated through both public and private skills development institutes financed and commissioned by the registered, affiliated and financed by above mentioned TVET departments, authorities and commissions. The TVET of Balochistan consists upon both the private and public sector TVET institutes and other stakeholders (Khan and Ahmed, 2019). The details of TVET system of Balochistan is mapped in the following.

***The Structure of Public TVET Organizations:*** Mainly, there are four public sector departments, namely, the Colleges, Higher and Technical Education Department (CHTED), Social Welfare, Special Education, Literacy, Non-Formal Education and Human Rights Department (Social Welfare Department or SWD); Labor and Manpower Department (L&MPD); Commerce and Small Industries Department (C&SID); the Women Development Department (WDD), the NAVTTC regional directorate, and one partially functional B-TEVTA for the provision of TVET skills and education both for females and males in the province. Brief discussion of these departments with their related aims and objectives are explained beneath (Baluchistan, 2011; C&SID, 2017; CH&TED, 2017; L&MPD, 2017; NAVTTC, 2016; SWD, 2017; WDD, 2017).

***The Structure of Private TVET Organizations:*** There are more than three hundred institutions registered with L&MPD for the promotion of vocational trainings in the province. However, more than 70% of these are non-functional. These institutions are working for limited number of conventional trainings subject to getting funds and/or sponsorship by NGOs and organizations like, NAVTTC, BRSP, Mercy Corp, and UNICEF, to mention a few. These institutions are private and run by NGOs like community based social organizations. They only provide vocational trainings in basics of computer and IT, beautician, tailoring and knitting, cooking, and handicrafts mostly for women and three months' basic courses in electrical, mechanical, computer and IT, and wood works for men in rural and urban setups of their respective locations in the province. No regular programs for the mentioned vocational trades have been run, regularly, by these TVET institutions. There has been discontinuity in functioning of these institutions and their programs throughout the institutional existing period till the time of registration cancellation by the affiliate patron department (FGD 1, 2021; BRSP, 2017; L&MPD, 2017; NAVTTC, 2021).

Other three out of the four TVET departments do not have such mechanism for registration of the private sector to work for provision of vocational and technical trainings in the province. However, a few number of NGOs are registered with SWD and working for vocational trainings to the vulnerable groups of imprisoned and children in very selective and limited extent (SWD, 2017).

Most of the TVET skills programs are non-regular, cover very limited and very generic

in nature, do not focus upon specific TVET skills requirements for the selected industries of exiting, proposed and potential industries of Balochistan. The job creation for unemployed youth of Balochistan as one of the prime objectives implies for provision of specific TVET skills, extension of the scope of TVET skills supply and more investment in TVET institutes for enlarging the overall provincial TVET system in Balochistan (FGD 1, 2021; Field Survey, 2021)

**Balochistan TVET Details from NSIS:** There are 8 Government Colleges of Technologies for male, 3 for female and 1 as co-education, thus making a total of 12 GCTs in the province. The number of vocational institutes are 155, 28 and 4 for male, female and co-education system, respectively, in the province. However, there is a contrast of the number of TVET institutes given by NSIS and the field survey visits and observations through TVET departments/authorities by the researchers of this study. The following Table (1) shows the details of TVET institutes and number of TVET technologies in the province.

*Table 1: Distribution of Public & Private Sector TVET Institutions*

Name of Department	No. of Male TVET Institutes (functional + non-functional)	No. of Female TVET Institutes (functional + non-functional)	Total no. of TVET Institutes (functional + non-functional)
Department of Labor & Manpower	14	6	20
Department of Social Welfare	6	38	44
Department of Education	8	1	9
Department of Commerce & Small Industries	60	69	129
NAVTTC Regional Office Quetta	Mostly Co-educational	Mostly Co-educational	35

Source: Khan and Ahmed (2019) and Ahmed, Shakeel and Khan (2021) and PI Calculations

*Table 2: TVET Skills Deficiency: Comparison with National & Provincial Level*

TVET Trades by Qualifying Time	Total No. of TVET Trades: National Level: (Both Male & Female)	Total No. of TVET Trades: Provincial Level (Both Male & Female)	Total No. of TVET Trades for Female	Total No. of Missing TVET Trades: Provincial Level: (Only Female)
3/6 Months	98	15	8	7
1 year	38	24	7	17
2 years	9	1	1	0
3 years	33	9	3	6

Source: Khan and Ahmed (2019) and Ahmed, Shakeel and Khan (2021) and PI Calculations

Table 3: Private TVET Institutes

Organizations (Affiliations)	Registered Institutes	TVET Programs	Status (Non)/Regular	Skills Deficiency to Selected Industries
Mercy Corp	23	6	Non-regular	90%
BRSP	35	3	Non-regular	85%
Concern	8	4	Non-regular	90%
UNICEF	5	5	Non-regular	90%
L&MPD	356	6	Non-regular	80%
NAVTTTC	206	13	Regular	75%
Others	108	7	Non-regular	95%

Source: NAVTTTC (2021); BRSP (2020), Khan and Ahmed (2019) Ahmed, Shakeel and Khan (2021) and PICalculations

### ***Categorization of Provincial Industries for Skills Mapping: Objective # 2***

There are three types of industries identified with the help of desk-top survey and field work conducted by the authors. These are categorized into existing, proposed and potential industries for this study. The list of existing industries is got via field work and visits to provincial departments like, I&CD and acquired from the official records of Small Industries Wing of I&CD of Government of Balochistan (I&CD, 2021). The list of proposed industries recorded from the official documents of respective SEZs/EPZs via its concerned authorities (P&D, 2021; BoI, 2021; I&CD, 2021). The list of potential industries is identified in FGDs 1 and 2, field visits, informal interviews, members of Chambers of Commerce, LIEDA, GIEDA and other TVET stakeholders in the province. The following three Tables (1 & 2) enlist all the three categories of existing, proposed and potential industries pertaining to above mentioned SEZs/EPZs of Balochistan.

#### *Existing industrial set-up:*

The Statistics Branch, Directorate General Office, Industries and Commerce, GoB (2019) has industrial database for industrial profile and distribution across different districts of the province. The details are given below to know the existing industrial clusters and set-up of Balochistan that may give directions for skills mapping and HR planning for the purpose of other objectives of this study (Table 4).

*Table 4: Types & Number of Existing Industries across Balochistan*

S. No.	Types of Industries	No. of Industries	S. No.	Types of Industries	No. of Industries
1	Flour Mills	41	10	Chromite Washing	24
2	R.C.C Pipe Making	20	11	Rice Mill	97
3	Snuff/Tobacco Factory	4	12	Cotton Ginning	2
4	Ice Factory	37	13	Sea food	68
5	Block Factory	26	14	Asflat Plant	3
6	Marble Factory	72	15	Fish Baker	10
7	Salt Factory	2	16	Steel mills	14
8	Textile	16	17	Boat Maker	26
9	Engineering	8	18	Chromite Washing	24

Source: Authors Calculations from Official Records of I&CD, 2021

*Proposed and Potential Industries of SEZs/EPZs:*

The following table shows the list of proposed and potential industries for Bostan SEZ, Gwadar EPZ and Hub SEZ of Balochistan. The results of desktop survey, FGDs (1 & 2) and field visits helped identified the the following set of proposed and potential industries for TVET skills mapping and human resource planning for the purpose of this study (Tables, 5, 6 & 7; FGDs, 1 & 2; Field Visits, 2021; Planning Commission, 2021, I&CD, 2021; Ahmed & Khan, 2019).

*Table 5: Proposed & Potential Industries of Bostan SEZs*

SEZs/EPZs	Proposed Industries	Potential Industries
Bostan SEZ	Fruit processing & halal food	Chromite and mining processing
	Agriculture machinery	
	Pharmaceutical	Dry fruit processing
	Motor bikes assembly	
	Chromite	Cold storage/ware houses
	Cooking oil	
	Ceramic industries	Meat and poultry industry
	Ice and cold storage	

Source: Authors' Compilation from FGDs, 1 & 2; Field Visits, 2021; Planning Commission, 2021, I&CD, 2021; BoI, 2019; Ahmed & Khan, 2019.

Table 6: Proposed & Potential Industries of Gwadar EPZs

SEZs/EPZs	Proposed Industries	Potential Industries
Gwadar EPZ	Warehouses	
	Small Size Industries	
	Medium Size Industries	Small boat making
	Noise & Pollution Intensive Industries	
	Cement Industries	Tourism and hospitality
	Manufacturing Industries	
	Textile Industries	
	Food Industries	Date processing & seafood preservation
	Petro Chemical Industries	
	Energy and coal mines industry	
	Pharmaceutical	
	Heavy ship breaking industry	Olive oil extraction
	High-tech services	
	Cement manufacturing	Small Boat Making
	Food & confectionary Industries	
	Chemical industries	Balochi hands-craft industry
	Plastic & Paper manufacturing	
Ceramics, Marble Processing, and Mineral Grinding	Shipbreaking parts processing industry	
Printing & packaging industry		

Source: Authors' Compilation from FGDs, 1 & 2; Field Visits, 2021; Planning Commission, 2021, I&CD, 2021; BoI, 2019; Ahmed & Khan, 2019

Table 7: Proposed & Potential Industries of Hub SEZs

SEZs/EPZs	Proposed Industries	Potential Industries
Hub SEZ	Textile	Fisheries value addition
	Pharmaceutical	
	Heavy ship breaking industry	Olive oil extraction
	High-tech services	
	Cement manufacturing	Small Boat Making
	Food & confectionary Industries	
	Chemical industries	Balochi hands-craft industry
	Plastic & Paper manufacturing	
	Ceramics, Marble Processing, and Mineral Grinding	Shipbreaking parts processing industry
	Printing & packaging industry	

Source: Authors' Compilation from FGDs, 1 & 2; Field Visits, 2021; Planning Commission, 2021, I&CD, 2021; BoI, 2019; Ahmed & Khan, 2019

#### *Selection of Industries for Skills Mapping:*

The very wide scope of all the industrial landscape of the three categories for skills mapping constrained the authors to select limited number of industries covering all the three categories mentioned above. The criteria for selecting each of three industries from the categories of existing, proposed and potential industries are pertained to Bostan SEZ, Gwadar EPZ and Hub SEZ, respectively. The authors have selected one industry that are existing, proposed and potential for each of three SEZs/EPZs to cover the wide range of geographic, economic, social and other attributes pertaining heterogeneously to each of these zones. The parameters like, TVET skills provision, TVET skills demands, job creations prospects, functionality of the industry, TVET skills relevancy, economic importance, availability of data and volume of industrial set-ups and many more socio-economic and industrial aspects are taken into consideration during the whole process of this research study (Table 8; FGDs 1, 2 & 3, 2021; L&MPD; I&CD, 2021; BoI, 2021; GIEDA, 2021; LIEDA, 2021). Thus, the three industries of snuff/tobacco, sea-food and ship breaking industries are selected for skills mapping of existing industrial set-ups of the province. The food processing, steel and iron, and marble and mineral industries are taken to map skills for proposed industries, and the chromite, small boat making and fisheries/olive oil extraction industries are selected as per research methodological criteria for skills mapping of potential industries for SEZs/EPZs of Balochistan. The study has employed multi stake holder and multidimensional approach for selection of these industries in broader categories of industrial set-up of Balochistan. The parameters like, TVET skills relevancy, TVET supply and demand, development work for accommodating these industries on priority basis on location of SEZs/EPZs, infrastructure development for these industries, functionality of selected industries, availability of the raw materials for these industries, and many more aspects of skilling that are descriptively related to job prospects for unemployed



youth of Balochistan (FGDs 1, 2 & 3, 2021; L&MPD; I&CD, 2021; BoI, 2021; GIEDA, 2021; LIEDA, 2021; District Profiles Pishin/Lasbela/Gwadar, 2012; Field Visits, 2021; Personal Communications, 2021, I&CD, 2021; BoI, 2021).

*Table 8: Selection of Industries for Skills Mapping*

SEZ/EPZ	Existing Industry	Proposed Industry	Potential Industry
Bostan SEZ	Snuff/tobacco factory	Food processing	Chromite
Gwadar EPZ	Sea food	Steel and iron producing industry	Small boat making
Hub SEZ	Ship breaking	Marble & mineral grinding	Fisheries and olive oil extraction

Source: I&CD, 2021; LIEDA, 2021; GIEDA, 2021; District Profiles of Three Districts, 2021; Field Survey and FGDs conducted by Authors

### ***Skills Mapping, TVET Needs and Estimates of Job Creation for Selected Nine Industries: Objectives # 3 and 4***

To get these objectives #3 and 4, the following section reports skills mapping of selected industries in existing, proposed and potential categories of industries set for this study. This section describes skills mapping of existing industries of snuff/tobacco, sea-food, and shipbreaking units/industries (sub-sections: 4.3.1-4.3.3), skills mapping of proposed industries of food processing, steel and iron producing, and marble/mineral manufacturing enterprises/units (sub-sections: 4.3.4-4.3.6) and lastly skills mapping of potential industries of chromite processing, small boat making and fisheries/olive-oil extraction industries (sub-sections: 4.3.7-4.3.9), respectively. The TVET skills mapping for each of the mentioned industries are listed into the four types of technical, vocational, common and specific skills and tabulated accordingly. Following these lists for each industry, this study also reports estimations to job creation by vocational/technical and common/specific skills types for each of the above nine specific industries. Following the pattern of discussion so, the last section maps TVET skills deficiency estimates to base the case for skills-based HR planning to ensure job creation for unemployed youth of Balochistan in the context of existing, proposed and potential industries of SEZs/EPZs in Balchistan.

#### *Skills Mapping for Three Selected Existing Industries:*

The findings are discussed for skills mapping of snuff/tobacco, sea-food, and shipbreaking units/industries (4.3.1-4.3.3) in the following.

#### *Skills Mapping for Snuff/Tobacco Industry:*

The details of results and discussion of skills mapping for snuff/tobacco industry. Selected from the category of selected three existing industries are given below in tabular and explanatory form.

*Table 9: Total Number of TVET Skills for Snuff/tobacco Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	Snuff/tobacco Factory	40	11	4	15
Gwadar EPZ	Sea food factory	-	-	-	-
Hub SEZ	Ship breaking factory	-	-	-	-

Source: I&CD, 2021; District Profile Pishin, 2012; Field Survey and FGDs conducted by Authors

*Table 10: Total Number of Common/Specific Skills for Snuff/tobacco Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	Snuff/tobacco factory	40	14	10	24
Gwadar EPZ	Sea food factory	-	-	-	-
Hub SEZ	Ship breaking factory	-	-	-	-

Source: I&CD, 2021; District Profile Pishin, 2012; Field Survey and FGDs conducted by Authors

*List of TVET Skills for Snuff/Tobacco Factory:* The list of snuff and tobacco industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way.

*The List of Vocational Skills:* Snuff and tobacco cultivators, harvesters, horticulturists, packaging experts, snuff/tobacco identifications, supply chain managers, cutting and categorization experts, tobacco makers, brand managers, distributors, and office management (Table, 9).

*The List of Technical Skills:* snuff grinding machine operator, electricians, IT experts, snuff/tobacco technicians (Table, 9).

*The List of Common Skills:* Manager, Assistant Manager, HR, Security supervisor & guards, finance & audit manager, supply chain managers, cutting and categorization experts, brand managers, distributors, office management, machine operator, electricians, and IT/computer operators (Table, 10).

*The List of Specific Skills:* Snuff and tobacco cultivators, harvesters, horticulturists, packaging experts, snuff/tobacco identifications, cutting and categorization experts, tobacco makers, snuff grinding machine operator, grinding machines mechanics and electricians (Table, 10).

*Estimated Number of Job Creation by Snuff/Tobacco Industry:* The study explored that at least two skilled labors are hired to work in a snuff/tobacco factory in Pishin (Field Survey, 2021). Since there are 24 categories of jobs available in a functional snuff/tobacco factory, out of which 15 jobs are based on TVET skills. So, 13 TVET skilled labor out of 48 total hired force are needed for the snuff/tobacco factory to work functionally. The total labor demand side reflects 48 job opportunities in overall employment and 26 job opportunities for TVET skills based employment to the snuff/tobacco factory in district Pishin (Field Survey, 2021). The data of existing industries exhibits 40 units of snuff/tobacco factories in the province, so the total number of job created by snuff/tobacco industries is estimated 1920 ( $=40 \times 48$ ) for youth in Balochistan. The TVET based jobs employment are created approximately 1248 ( $=26 \times 48$ ) by the 48 snuff/tobacco factories in Balochistan (I&CD, 2021).

The estimated statistics about potential job creation in snuff/tobacco industry depends upon the potential number of snuff/tobacco factories to be installed in this industry. The results of the study have identified an approximation of 1000 snuff/tobacco factories in the province (FGDs 1 & 2; Field Survey, 2021). Thus the provincial snuff/tobacco industry could alone create jobs for an approximation of 48,000 ( $=48 \times 1000$ ) labor including 26,000 ( $=26 \times 1000$ ) TVET skilled job opportunities for unemployed youth of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Snuff/Tobacco Industry:* The provincial TVET system provides skills for common categories of both the technical and vocational skills for snuff/tobacco industry in a very limited number for skilling the labor force of Balochistan. The deficiencies in vocational skills and technical skills for this industry are reported 82% and 50%, respectively, by the formal TVET sector of Balochistan (Table 11). The case of deficiencies for common and specific skills requirement for snuff/tobacco industry is reported 50% and 80%, respectively, by the formal TVET institutes in Balochistan (Table 12). Similarly, the supply/provision of specific skills for this industry has no records through formal TVET system by any TVET institution affiliated with provincial or federal TVET authorities/departments/commissions to skills development for snuff/tobacco industry in Balochistan. There is huge snuff/tobacco TVET skills deficiency gap identified in case of skills development for this industry. The investment and provision of TVET skills for snuff/tobacco industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021; B-TEVTA, 2021; NAVTTC, 2021). The TVET related policy options may include provision of TVET skills related to technical/vocational skills in both the common and specific categories of snuff/tobacco skills requirement for materializing employment opportunities in the existing industry and functional industry of Balochistan.

*Table 11: Deficiency of Formal TVET Skills for Snuff/Tobacco Industry*

Deficiency of Formal TVET Skills for Snuff/tobacco Industry SEZ/EPZ	Existing Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	Snuff/tobacco factory	40	2 out of 11 = 18% (82% Deficiency)	2 out of 4 = 50% (50% Deficiency)
Gwadar EPZ	Sea food factory	-	-	-
Hub SEZ	Ship breaking factory	-	-	-

Source: I&CD, 2021; B-TEVTA, 2021; NAVTTC, 2021; District Profile Pishin, 2012; Field Survey and FGDs conducted by Authors.

*Table 12: Deficiency of Formal Common/Specific Skills for Snuff/tobacco Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	Snuff/tobacco factory	40	7 out of 14 = 50% (50% Deficiency)	2 out of 10 = 20% (80% Deficiency)
Gwadar EPZ	Sea food factory	-	-	-
Hub SEZ	Ship breaking factory	-	-	-

Source: I&CD, 2021; B-TEVTA, 2021; NAVTTC, 2021; District Profile Pishin, 2012; Field Survey and FGDs conducted by Authors

### *Skills Mapping for Sea Food Industry:*

The details of results and discussion of skills mapping for sea food industry, selected from the category of selected three existing industries, are given below in tabular and explanatory form.

*Table 13: Total Number of TVET Skills for Seafood Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ		-	-	-	-
Gwadar EPZ	Sea food industry	10	14	13	27
Hub SEZ	Sea food industry	4	14	13	27

Source: LIEDA, 2021; I&CD, 2021; District Profiles Gwadar/Hub, 2021; Field Survey and FGDs conducted by Authors

*Table 14: Total Number of Common/Specific Skills for Seafood Industries*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ		-	-	-	-
Gwadar EPZ	Sea food industry	10	23	27	50
Hub SEZ	Sea food industry	4	23	25	50

Source: LIEDA, 2021; I&CD, 2021; District Profiles Gwadar/Hub, 2012; Field Survey and FGDs conducted by Authors

*List of TVET Skills for Sea Food Industry:* The TVET skills necessary for the sea food industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way.

The list of vocational skills: fish cutting, fish briner, fish salter, fish weigher, shellfish packer, ship's cook, fish customer service agent, sea food cook, sea food housekeeping attendant, ships/boats supervisor for sea-food maritime fisher-men, sea-food packaging, sea-food management, sea food restaurant workers, and sea food chefs (Table 13).

*The List of Technical Skills:* maritime experts, sea food marketing specialists, sea animals' physiotherapists, sea foods sales associates, sea food supervisors, sea food accounting bookkeeper, sea-food animal husbandry, sea food production or line supervisor, aquaculture farmer, sea food health&safety supervisor, sea-food weight& scale technician, maritime tape measure experts, and sea food products experts (Table 13).

*The List of Common Skills:* cannery laborer, fish plant laborer, shellfish laborer, fish processing, able seaman/woman, food service attendant, sea food cleaner, sea food/meat clerk, watch keeper, fish frier, seasonal workers, safety workers, sea food warehousekeepers, cashier, fish-processing plant worker, rehabilitation counsellor, security supervisor, fish processors, office management, financiers, audit staff, cash accountants, and common laborers (Table 14).

*The list of specific skills:* fish cutting, fish briner, fish salter, fish weigher, shellfish packer, ship's cook, fish customer service agent, sea food cook, sea food housekeeping attendant, ships/boats supervisor for sea-food maritime fisher-men, sea-food packaging, sea-food management, sea food restaurant workers, sea food chefs, maritime experts, sea food marketing specialists, sea animals' physiotherapists, sea foods sales associates, sea food supervisors, sea food accounting bookkeeper, sea food animal husbandry, sea food production or line supervisor, aquaculture farmer, sea food health & safety supervisor, sea-food weight & scale technician, maritime tape measure experts, and sea food products experts (Table 14).

*Estimated number of job creation in sea food industry:* The study has explored that average of one skilled labors that is hired to work in a sea food industrial unit in Gwadar and Hub areas of Balochistan. Since, there are a total of 14 sea food industrial unit functional to sell sea foods in Gwadar and Hub industrial zones of the province (Tables, 13 & 14; Field Survey, 2021; I&CD, 2021; Personal Communication, 2021). So, the estimates of available jobs in a functional unit are 27 and 50 for vocational/technical and common/specific categories of skills requirements, respectively. Since there are approximately 14 sea food units, at small enterprises levels, in Gwadar and Hub industrial areas. The average employment created by such a small sea food enterprise is calculated  $14 (=14 \times 1)$  in Gwadar and Hub collectively, for a single TVET skills trade (Field Survey, 2021). The total number of employment created by 14 sea food enterprises are estimated to 700 ( $=14 \times 50$ ) for all the TVET skills holders pertaining to sea food industry in the province. The statistics collected from the field survey observations show that most of the jobs are given by the apprenticeship associated with fisher families and sea food restaurant families in Gwadar and Hub areas of Balochistan. More jobs will be created if this very local sea food industry is prioritized in terms of TVET skills policy formulations and its implementations to create jobs for unskilled youth of the 600km coastal areas of Balochistan (FGD 1, 2 & 3, 2021; Field Survey, 2021; I&CD, 2021).

The estimated statistics about potential job creation in sea food industry, in future, depends upon the naturally and coastal potentials sea food production along the 600km long coastal areas of Balochistan. This longest coastal and full of sea food products are one of the main raw materials and sea food providers to the propose and potential industrial set-ups of in SEZs/EPZs of Balochistan. The results of the study have acquired an estimation of approximately of more than 2000 sea food enterprises that could be started along the coastal regions under the industrial set-ups of Gwadar and Hub (FGDs 1 & 2; Field Survey, 2021). Thus, only this sea food industry may likely create jobs for an approximation of 1,400,000 ( $=700 \times 2000$ ) in future, for unemployed youth of Balochistan.

However, the jobs creation potential of this sector depends mainly upon investment in enhancing the number of enterprises of sea food industry and extensive provision of relevant TVET skills pertaining to the skills demands of sea food industry in vocational/technical and common/specific in nature to provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Sea Food industry:* The provincial TVET system provides skills of both the technical and vocational skills but in very limited number for skilling the labor force of sea food outlets in Balochistan. The deficiencies in vocational skills and technical skills for this industry are reported 71% and 80%, respectively by the formal TVET sector of Balochistan (Table 15). The case of deficiencies for common and specific skills requirements for this industry is reported 66% and 65%, respectively, by the formal TVET institutes in Balochistan (Table 16). The nature this huge skills deficiency gap identified for sea food industry may likely be one of the causes of unemployment for youth of Balochistan. The investment and provision of TVET skills pertaining to sea food industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2 & 3, 2021; Personal Communication, 2021). The provincial TVET policy options may include provision of relevant skills and demand oriented trades for sea food industry may likely ensure employment opportunities in the proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 15: Deficiency of Formal TVET Skills for Sea-food Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ		-	-	-
Gwadar EPZ	Sea food industry	10	8 out of 14 = 57% (43% Deficiency)	7 out of 13 = 54% (46% Deficiency)
Hub SEZ	Sea food industry	4	8 out of 14 = 57% (43% Deficiency)	7 out of 13 = 54% (46% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*Table 16: Deficiency of Formal Common/Specific Skills for Sea-food Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ		-	-	-
Gwadar EPZ	Sea food industry	10	18 out of 23 = 78% (22% Deficiency)	15 out of 27 = 56% (44% Deficiency)
Hub SEZ	Sea food industry	4	18 out of 23 = 78% (22% Deficiency)	15 out of 27 = 56% (44% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*Skills Mapping for shipbreaking industry:*

The details of results and discussion of skills mapping for shipbreaking industry, selected from the category of selected three existing industries, are given below in tabular and explanatory form.

*Table 17: Total Number of TVET Skills for Shipbreaking Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	-	-	-	-	-
Hub SEZ	Shipbreaking	80 (Year: 2020)	24	27	51

Source: LIEDA, 2021; I&CD, 2021; District Profile Lasbela, 2012; Field Survey and FGDs conducted by Authors

*Table 18: Total Number of Common/Specific Skills for Shipbreaking Industries*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	-	-	-	-	-
Hub SEZ	Shipbreaking	80 (Year: 2020)	24	51	75

Source: LIEDA, 2021; I&CD, 2021; District Profile Lasbela, 2012; Field Survey and FGDs conducted by Authors

*List of TVET Skills for shipbreaking industry:* The TVET skills necessary for shipbreaking industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way. The list of vocational skills: rerolling scrap diploma, shipbreaking diploma, ship repairing diploma, ship surveying, shipbreaking management skills, vocational ship management, iron chain experts, ship control operators, shipbreaking technicians, shipbreaking mechanics, shipbreaking contractors, shipbreaking yard managers, ship crane operators, ship crane drivers, ship crane manual labor, shipbreaking components identifiers, ship security, indoor shipbreaking diploma, shipbreaking scrap managers, shipbreaking scrap sellers, shipbreaking scrap manual workers, shipbreaking tools manager, shipbreaking tool procurement, and ship motorboat repair (Table, 17).

*The list of technical skills:* rerolling scrap technicians, rerollable scrap/steel technicians, shipbreaking heavy vessel mechanics, shipbreaking metallurgists, shipbreaking technical operators, shipbreaking steel and iron welders, shipbreaking steel erector, shipbreaking steel and wood parts fabricator, shipbreaking weight & scale technician, shipbreaking rolls/shears experts, shipbreaking grinders and drill technicians, shipbreaking motors operators, shipbreaking drivers/helpers,



shipbreaking steel press mechanics, shipbreaking crane operators and loaders, shipbreakingsafety practitioners, shipbreaking machinery experts, shipbreaking chemical analysts, shipbreaking material identification experts, shipbreaking wood and steel/iron parts experts, shipbreaking quality control experts, shipbreaking technicians, shipbreaking engine and turbine mechanics, navigational and maritime diplomas, shipbreaking tanker operators, shipbreaking oil and raw-material managers, and shipbreaking tools repair mechanics (Table, 17).

*The list of common skills:* electricians, mechanics, safety experts, crane operators, fabricators, welding labor, manual labor, unloader, steel fabricators, wood fabricators, rubber fabricators, chemists, rolling operators, warehouse keepers, cashiers, bookkeepers, audit and cash staff, truck drivers, shipbreaking manual workers, office management, plumbers, watchman, sub-contractors and contractors, and shipbreaking raw material sellers (Table, 18).

*The list of specific skills:* shipbreaking heavy vessel mechanics, shipbreaking metallurgists, shipbreaking technical operators, shipbreaking steel and iron welders, shipbreaking steel erector, shipbreaking steel and wood parts fabricator, shipbreaking weight & scale technician, shipbreaking rolls/shears experts, shipbreaking grinders and drill technicians, shipbreaking motors operators, shipbreaking drivers/helpers, shipbreaking steel press mechanics, shipbreaking crane operators and loaders, shipbreaking safety practitioners, shipbreaking machinery experts, shipbreaking chemical analysts, shipbreaking material identification experts, shipbreaking wood and steel/iron parts experts, shipbreaking quality control experts, shipbreaking technicians, shipbreaking engine and turbine mechanics, navigational and maritime diplomas, shipbreaking tanker operators, shipbreaking oil and raw-material managers, shipbreaking tools repair mechanics, shipbreaking diploma, ship repairing diploma, ship surveying, shipbreaking management skills, vocational ship management, iron chain experts, ship control operators, shipbreaking technicians, shipbreaking mechanics, shipbreaking contractors, shipbreaking yard managers, ship crane operators, ship crane drivers, ship crane manual labor, shipbreaking components identifiers, ship security, indoor shipbreaking diploma, shipbreaking scrap managers, shipbreaking scrap sellers, shipbreakingscrap manual workers, shipbreaking tools manager, shipbreaking tool procurement, and ship motorboat repair (Table, 18).

*Estimated number of job creation in shipbreaking industry:* The study has explored that average of three to four skilled labors are necessary to work in a functional shipbreaking unit Gadani near Hub areas of Balochistan. The data shows that there are around 80 ships scrapped in average from 2018 to 2020 at Gadani coastal area of Balochistan (FGD2, 2021; Personal Communication, 2021; Field Survey, 2021). The estimates of available jobs in a shipbreaking unit are 51 and 75 for vocational/technical and common/specific categories of skills requirements, respectively. Since there are approximately 80 ships breaking and scrapped in average, the average employment created in 2020 by shipbreaking industry is reported 240 (=80x3) in Balochistan (Field Survey, 2021). The total number of employment created by 80 ships scrapped activities for the year 2020 is estimated around 6000 (=

80x75) in the province. The field survey's observations and discussions with key experts show that most of the jobs advanced both technically and vocationally and full of health hazards and dangerous that likely cause damages to lives and limbs and skins and breathing diseases to the skilled and unskilled labor associated with labor markets of shipbreaking industry in Balochistan (Field Survey, 2021; Personal Communications, 2021; FDGs 1/2, 2021). The job creation potentials of this industry are prospective for local and migrated labors from other provinces of Pakistan in terms of both earning and employability if and only health safety rules and obligations are implemented as per the defined policies for labor rights preservations by the respective departments and investors in Balochistan (FDGs 1, 2 & 3; 2021; Field Survey, 2021; Lasbela Chamber of Commerce, 2021).

The estimated statistics about potential job creation in shipbreaking industry, in future, depends upon the implementations of safety rules for labors, potential of more opportunities for enhancing shipbreaking industry and providing relevant TVET skills to the provincial labor force of SEZs/EPZs in Balochistan. The study observes the potential of shipbreaking industry to reach to 150 ships scrapping and breaking per year in Balochistan (FDGs 1 & 2; Field Survey, 2021). Thus the provincial shipbreaking industry could create jobs for an approximation of 33,750 (=3x75x150) in future, based on average job creation of 225 (=3x75) by a ship scrapped and breaking activity for unemployed youth of Balochistan. The prospects of the estimated job creation for employing the provincial youth are likely dependent upon provision of relevant TVET skills and trades for shipbreaking labor demands in Balochistan (Authors' Calculations, 2021; FDGs 1 & 2).

*Mapping Deficiency of Formal TVET Skills for Shipbreaking industry:* The provincial TVET system provides TVET in a very limited number for skilling the labor force of shipbreaking industry in Balochistan. The deficiencies in vocational skills and technical skills are reported 72% and 63%, respectively, for the shipbreaking industry by the formal TVET sector of Balochistan (Table 19). The case of deficiencies for common and specific skills requirements are reported 83% and 66%, respectively, for shipbreaking and scrapped industry by the formal TVET institutes in Balochistan (Table 20). The estimates of skills deficiencies are shown mostly in the three categories of vocational, technical and specific TVET skills for shipbreaking industry in the province. However, the provincial common TVET skills to shipbreaking industry provides relevant skills to the labor force of Balochistan. The investment and provision of relevant TVET skills for the categories of more deficient skills may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021). The TVET related policy options may include provision of TVET skills as per labor market demands for the shipbreaking and scrapped industry to ensure employment opportunities in the proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 19: Deficiency of Formal TVET Skills for Shipbreaking Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	-	-	-	-
Gwadar EPZ	-	-	-	-
Hub SEZ	Shipbreaking	80 (Year: 2020)	7 out of 25 = 28% (72% Deficiency)	10 out of 27 = 37% (63% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*Table 20: Deficiency of Formal Common/Specific Skills for Shipbreaking Industry*

SEZ/EPZ	Existing Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	-	-	-	-
Gwadar EPZ	-	-	-	-
Hub SEZ	Shipbreaking	80 (Year: 2020)	7 out of 25 = 28% (72% Deficiency)	10 out of 27 = 37% (63% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*List of TVET Skills for the Food Processing Industry:*

The food manufacturing process is the transformation of raw ingredients into edible end products for human consumption. Foods processing industries have been classified into the following four categories. Vocational skills, technical skills, specific skills, and common skills.

*Table 21: Total Number of TVET Skills for Food Processing Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	Food Processing Industry	4	15	24	43
Gwadar EPZ	-	-	-	-	-
Hub SEZ	-	-	-	-	-

Source: LIEDA, 2021; I&CD, 2021; District Profile Pishin/Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

Table 22: Total Number of Common/Specific Skills for Food Processing Industry

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	Food Processing Industry	4	31	26	57
Gwadar EPZ	-	-	-	-	-
Hub SEZ	-	-	-	-	-

Source: LIEDA, 2021; I&CD, 2021; District Profiles Pishin/Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

*The list of vocational skills:* ice-creammaking, noodlesmaking, jamjellymaking, bakery workers, confectionery workers, beverage workers, bottling skills workers, food/drink producer, advanced food mechanical operators, food computation, food chemical properties analyst, food manufacturing production worker, food quality assurance, food stock manager, food hygiene experts, food allergens, food/meat chefs, and hotel & restaurant workers (Table 21).

*The list of technical skills:* flour mills workers, dry-fruit makers, meat units workers, beverages making experts, food technology engineer, food scientists, food hygiene and safety work, food assistant engineer, food maintenance assistant, food operations manager, plant manager, food process technician, food control specialist, food safety specialist, food laboratory manager, food control supervisor, food quality assurance, food quality control technician, food microbial control supervisor, food fermentation, food freezing, food modified atmosphere, food packaging, and food pasteurization skills (Table 21).

*The list of common skills:* food production workers, food safety workers, food assembly line workers, food quality standards experts, food menu items waiters, food hazard analysts & control points, food preparation, food machine operators, food manual labor, meat product experts, meat safety guidelines inspectors, meat waste materials dispatchers, meat general maintenance, meat/food equipment operators, meat quality controller, meat/food electricians, food/meat washing mechanics, meat chopping/coring/pulping-knives masters, meat cutting technicians, food/meat pasteurizing labor, meat/food packaging workers, food/cake decoration and presentation managers, food manufacturing operator, food/meat storage supervisor, food/meat transporters, and food visual examination experts, store keepers, general managers, food/beverages suppliers and distributors, and food/beverages IT experts (Table 22).

*The list of specific skills:* food preservations, food/beverage processing instructors, nutritional regulators, food risk analyst food safety checker, food/beverages sensory evaluator, food/beverages data skills monitor, food data analyst, food/meat/beverages diseases experts, food/meat safety consumption dietitians, food/meat preservation technicians, food/meat craft trade workers, bakery workers, food/meat retail management skills, inspectors of food/meat/beverages products,

baker, confectionery workers, beverage workers, bottling skills workers, food microbial control supervisor, food fermentation, food freezing, food modified atmosphere, food packaging, baker, confectionery workers, beverage workers, bottling skills workers, and food pasteurization skills (Table 22).

*Estimated number of job creation in the food processing industry:* The study has explored that average of one skilled labor is hired to work in a functional food production unit in Quetta areas of Balochistan. There are a total of 4 food processing industry working for food processing mostly located in Quetta industrial zones of the province (Tables, 17 & 18; Field Survey, 2021; I&CD, 2021; Personal Communication, 2021). The estimates of available jobs in a functional food processing industry are 43 and 57 for vocational/technical and common/specific categories of skills requirements, respectively. Since there are approximately 4 producing units in Quetta, at small enterprise levels, near SEZ of Bostan. The average employment created by a functional food processing industry unit is reported 4 (=4x1) in Quetta (Field Survey, 2021). The total number of employment created by 4 food processing industry is estimated around 16 (= 4x4) in the province. The statistics and field survey's observations show that most of the jobs are highly advance in vocational or technical terms of job responsibilities for the food processing industry workers. However, more jobs will be created if the food processing industry techniques via TVET skills provisions are given in specific categories of skills required for this industry of Balochistan (FGD 1, Field Survey, 2021; I&CD, 2021).

The estimated statistics about potential job creation in food processing industry, in future, depends upon the potential number of food products in Balochistan. The results of the study have acquired an estimation of approximately of 1000 food processing units (FGDs 1 & 2; Field Survey, 2021). Thus the provincial food processing industry could create jobs for an approximation of 16,000 (=16x1000) in future, based on average job creation of 16, for unemployed youth of Balochistan. However, the jobs creation potential of this sector depends upon many reasons including provision of relevant TVET skills, pertaining to the skills demands of food processing industry, to provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Food Processing Industry:* The provincial TVET system provides skills of both technical and vocational skills but in very limited numbers for skilling the labor force of the food processing industry in Balochistan. The deficiencies in vocational skills and technical skills for this industry are reported 63% and 62.5%, respectively by the formal TVET sector of Balochistan (Table 23). The case of deficiencies for common and specific skills requirements for the food processing industry is reported 65% and 38.5%, respectively, by the formal TVET institutes in Balochistan (Table 24). The nature of this huge skills deficiency gap identified for food processing industry may likely be one of the causes of unemployment for youth of Balochistan. The investment and provision of TVET skills for the skills provision pertaining to food processing industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021). The TVET related policy options may include provision of TVET skills as per skills demands of the food producing industry on extensive level to fulfill the skills requirements necessary for the development of

food processing industry to ensure employment opportunities in the proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 23: Deficiency of Formal TVET Skills for Food Processing Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	Food processing industry	4	7 out of 19 = 37% (63% Deficiency)	9 out of 24 = 37.5% (62.5% Deficiency)
Gwadar EPZ	-	-	-	-
Hub SEZ	-	-	-	-

Source: Calculations from Field Survey and FGDs conducted by Authors

*Table 24: Deficiency of Formal Common/Specific Skills for Food Processing Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	Food processing industry	4	11 out of 31 = 35% (65% Deficiency)	16 out of 26 = 61.5% 38.5% Deficiency)
Gwadar EPZ	-	-	-	-
Hub SEZ	-	-	-	-

Source: Calculations from Field Survey and FGDs conducted by Authors

*Skills Mapping for steel and iron producing industry:*

The details of results and discussion of skills mapping for steel industry, selected from the category of selected three proposed industries, are given below in tabular and explanatory form.

*Table 25: Total Number of TVET Skills for Steel Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	Steel & iron producing	13	17	35	52
Gwadar EPZ	-	-	-	-	-
Hub SEZ	-	-	-	-	-

Source: LIEDA, 2021; I&CD, 2021; District Profile Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

Table 26: Total Number of Common/Specific Skills for Steel Industries

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	Steel & iron producing	13	29	34	63
Gwadar EPZ	-	-	-	-	-
Hub SEZ	-	-	-	-	-

Source: LIEDA, 2021; I&CD, 2021; District Profile Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

*List of TVET Skills for steel industry:* The TVET skills necessary for the production in steel/iron industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way. The list of vocational skills: steel/iron shuttering, steel/iron designers/fabricators, layout and fitting work, construction site, erected metal experts, banded steel and loaded rail cars operators, trailers, steel safety workers, steel safety equipment security, transporter, pneumatic powered impact wrenches, corner reamers, turnbuckles, plumb bobs, oxy-acetylene torches, steel supply chain experts, and steel/iron business entrepreneurs (Table, 25).

*The list of technical skills:* heavy mechanical engineers, structural design engineers, metallurgists, steel beams run forklift operators, steel pipe makers, steel pipe manual labor, steel welder, steel erector, structural steel welder, structural steel fabricator, weight & scale technician, tape measure experts, fabricating machines including rolls/shears experts, grinders and drill presses technicians, forklifts operators, tow motors operators, drivers/helpers. boom lifts operators, band saws/steel press mechanics, welding machined and thread machine operators, crane operators and loaders, steel safety practitioners, blueprint reading surveyors, operators for machinery to cut/bend/rebar/tag, chemical analysts, material identification experts, mechanical testing technicians, non-destructive testing (NDT) experts, metallography engineers, mechanical engineers, steel/iron load experts, and quality control experts (Table, 25).

*The list of common skills:* safety rules, steel computer numerical control (S-CNC), steel works and labors, loaders, crane operators, industrial HV drivers, steel fabrication/shuttering labor, steel/iron cutting labor, welders, fabricators, hands tool experts, general metallurgy experts, steel warehouse maintainers, steel packaging/finishing labor, rolling machine setters, rolling operators, iron/steel tenders, stainless/aluminum coating chemists, metallurgist, steel/iron safety equipment maintainers, trucks unload labor, steel/iron janitorial staff, warehouse keepers, office management HR, financiers, audit staff, cash accountants, electricians, and plumbers (Table, 26).

*The list of specific skills:* heavy mechanical engineers, structural design engineers, metallurgists, steel beams run fork lift operators, steel pipe makers, erected metal experts, oxy-acetylene torches, steel supply chain experts, structural steel fabricator, weight & scale technician, tape measure experts, fabricating machines including rolls/shear experts, grinders and drill press technicians, forklifts and tow motors operators, drivers/helpers. boom lifts operators, band saws/steel press mechanics, welding machined and thread machine operators, crane operators and loaders, steel safety practitioners, blueprint reading surveyors, operators for machinery to cut/bend/rebar/tag, chemical analysts, material identification experts, mechanical testing technicians, non-destructive testing (NDT) experts, metallography engineers, mechanical engineers, quality control experts, steel/iron load experts, heavy equipment mechanics/operators, steel pulleys/hooks/equipment operators, steel/iron alignment technicians, heavy equipment electricians (Table, 26).

*Estimated number of job creation in steel industry:* The study has explored that average of four to five skilled labors are hired to work in a functional steel production unit or mill in Quetta and Hub areas of Balochistan. There are a total of 13 steel production units working for steel production mostly located in Quetta and Hub industrial zones of the province (Tables, 25 & 26; Field Survey, 2021; I&CD, 2021; Personal Communication, 2021). The estimates of available jobs in a functional steel mill are 52 and 63 for vocational/technical and common/specific categories of skills requirements, respectively. Since there are approximately 13 steel and iron producing units, at small enterprise levels, in Quetta and Hub industrial areas. The average employment created by a functional small steel/iron mill is reported 65 (=13x5) in Quetta (Field Survey, 2021). The total number of employment created by 13 steel/iron producing mills is estimated around 845 (= 13x65) in the province. The statistics and field survey's observations show that most of the jobs are highly advance in vocational or technical terms of job responsibilities for the steel/iron mills workers. However, more jobs will be created if the steel/iron producing techniques via TVET skills provisions are given in specific categories of skills required for steel/iron mills industry of industry of Balochistan (FGD 1, Field Survey, 2021; I&CD, 2021).

The estimated statistics about potential job creation in steel industry, in future, depends upon the potential number of steel mills to be installed in SEZs/EPZs of Balochistan. The results of the study have acquired an estimation of approximately of 1200 steel/iron producing units/mills (FGDs 1 & 2; Field Survey, 2021). Thus the provincial steel and iron producing industry could create jobs for an approximation of 1,014,000 (=845x1200) in future, based on average job creation of 845 by a functional steel/iron mills, for unemployed youth of Balochistan. However, the jobs creation potential of this sector depends upon many reasons including provision of relevant TVET skills, pertaining to the skills demands of steel and iron producing industry, to provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Steel industry:* The provincial TVET



system provides skills of both the technical and vocational skills but in very limited number for skilling the labor force of steel mills in Balochistan. The deficiencies in vocational skills and technical skills for this industry are reported 71% and 80%, respectively by the formal TVET sector of Balochistan (Table 27). The case of deficiencies for common and specific skills requirements for steel industry is reported 66% and 65%, respectively, by the formal TVET institutes in Balochistan (Table 28). The nature of this huge skills deficiency gap identified for steel industry may likely be one of the causes of unemployment for youth of Balochistan. The raw material exports of iron mineral, scrap, raw steel products from the province of Balochistan may also be counted as one of the consequences of low skills development to work for value addition of the raw scrap and iron minerals of Balochistan. The investment and provision of TVET skills for the skills provision pertaining to steel industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021). The TVET related policy options may include provision of TVET skills as per skills demands of the steel/iron producing industry on extensive levels to fulfill the skills requirements necessary for the development of steel and iron mills industries to ensure employment opportunities in the proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 27: Deficiency of Formal TVET Skills for Steel Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	Steel & iron producing	13	5 out of 17 = 29% (71% Deficiency)	7 out of 35 = 20% (80% Deficiency)
Gwadar EPZ	-	-	-	-
Hub SEZ	-	-	-	-

Source: Field Survey and FGDs conducted by Authors

*Table 28: Deficiency of Formal Common/Specific Skills for Steel Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	Steel & iron producing	13	10 out of 29 = 34% (66% Deficiency)	12 out of 34 = 35% (65% Deficiency)
Gwadar EPZ	-	-	-	-
Hub SEZ	-	-	-	-

Source: Field Survey and FGDs conducted by Authors

*Skills Mapping for marble and mineral grinding industry*

The details of results and discussion of skills mapping for marble and mineral grinding industry, selected from the category of selected three proposed industries, are given below in tabular and explanatory form.

*Table 29: Total Number of TVET Skills for Marble & Minerals Grinding Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	-	-	-	-	-
Hub SEZ	Marbles and mineral grinding	250	26	35	61

Source: LIEDA, 2021; I&CD, 2021; District Profile Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

*Table 30: Total Number of Common/Specific Skills for Marble & Minerals Grinding Industries*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	-	-	-	-	-
Hub SEZ	Marbles and mineral grinding	250	25	37	62

Source: LIEDA, 2021; I&CD, 2021; District Profile Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

*List of TVET Skills for steel industry:* The TVET skills list of steel industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way.

*The list of vocational skills:* miners, pipe fitter, shuttering/gypsum carpenter, plaster mason, helpers, mason helper, block/concrete/tile mason, scuff folder, helper scuff folder, marble mason, foreman, plumber, painter/polisher, aluminum worker, ceiling worker, marble fixer, welder, marble/granite fabricator, drivers, conductors, trolley men, and store keeper, supply chain managers, marble cutting/grinding, marble categorization experts, and office management (Table, 29).

*The list of technical skills:* Excavator operator, HTV driver, grader operator, excavator operator, concrete pump operator, hydraulic mechanic, diesel mechanic, aluminum fabricator, gypsum mole making technician, curtain wall operator, marble/stone operator, Five axis milling operator, CDM Electrical & machine Operator, fiber glass portion machine technician, hydraulic maintenance expert, phonematic maintenance expert, UV plate bed Printers maintenance expert, power

mill programmer, Pai & CNC controller maintenance expert, glass fibrin/forsid polymer expert, mold metal designer, mines/mineral engineers, GRC production engineer, marble fabrication engineer, cutting laser source maintenance expert, metal spring operator, gravity aluminum casting technician, CNC station operator, manual lathe work station operator, cleaving operator, PVC fabric technician, HVAC technician, bulldozer operator, and forklift operator (Table, 29).

*The list of common skills:* pipe fitter, carpenter, mason, mason helper, block/concrete/tile mason, helper scuff folder, foreman, plumber, painter/polisher, aluminum worker, ceiling worker, welder, drivers, conductors, trolley men, store keeper, supply chain managers, manager, assistant manager, HR, security supervisor & guards, finance & audit manager, electricians, and IT/computer operators, and office management (Table, 30).

*The list of specific skills:* miners, pipe fitter, shuttering/gypsum carpenter, excavator operator, HTV driver, grader operator, excavator operator, concrete pump operator, hydraulic mechanic, diesel mechanic, aluminum fabricator, gypsum mol making technician, curtain wall operator, marble/stone operator, Five axis milling operator, CDM Electrical & machine Operator, fiber glass portion machine technician, hydraulic maintenance expert, phonematic maintenance expert, UV plate bed Printers maintenance expert, power mill programmer, Pai & CNC controller maintenance expert, glass fibrin/forsid polymer expert, mold metal designer, mines/mineral engineers, GRC production engineer, marble fabrication engineer, cutting laser source maintenance expert, metal spring operator, gravity aluminum casting technician, CNC station operator, manual lathe work station operator, cleaving operator, PVC fabric technician, HVAC technician, bulldozer operator, and fork lift operator (Table, 30).

*Estimated number of job creation in marble/grinding industry:* The study explored that an average of three labors are hired to work in a marble/mines grinding factory in Quetta and Hub (Field Survey, 2021). The estimates of available jobs in a functional marble/mines grinding factory are 61 and 62 for vocational/technical and common/specific categories of skills requirements, respectively (Tables, 29 & 30). Since there are approximately 250 marble/mines grinding factories in areas near to SEZs of Bostan and Hub. The average employment created by a functional marble/mines grinding factory is reported 181 (=3x61) in Quetta and Hub industrial zones (Field Survey, 2021). The total number of employment created by 250 marble/mines grinding industry is estimated around 45250 (= 250x181) in the province. The statistics and field survey's observations show that most of the jobs are either vocational or technical in both the common and specific categories of skills required for the labor market needs of marble/mines grinding industry in Balochistan (FGD 1, Field Survey, 2021; I&CD, 2021).

The estimated statistics about potential job creation in marble/mines grinding industry, in future, depends upon the potential number of marble/mines grinding factories to be installed in SEZs/EPZs of Balochistan. The results of the study have acquired an estimation of approximately of 1500 marble/mines grinding factories based on the 300 billion tons of marble reserves in Balochistan and KPK and the export share of 90%

in overall exports of marble from Balochistan to almost 52 countries worldwide (FGDs 1 & 2; Field Survey, 2021; Keerio & Abden, 2017; Malkani & Mahmood, 2017; Mohammad, 2016). Thus the provincial marble/mines grinding industry could create jobs for an approximation of 271,500 (=181x1500) in future, based on average job creation of 181 by a functional marble/mines grinding factory, for unemployed youth of Balochistan. However, the jobs creation potential of this sector depends upon many factors including provision of relevant TVET skills, pertaining to the skills demands of marble/mines grinding industry, to provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for marble/mines grinding industry:* The provincial TVET system provides skills of both the technical and vocational skills but in very limited number for skilling the labor force of marble/minerals grinding industry of Balochistan. The deficiencies in vocational skills and technical skills for this industry are reported 69% and 86%, respectively by the formal TVET sector of Balochistan (Table 31). The case of deficiencies for common and specific skills requirements for marble/minerals industry is reported 56% and 76%, respectively, by the formal TVET institutes in Balochistan (Table 32). The nature of this huge skills deficiency gap identified for marble/minerals industry may likely be one of the causes of unemployment for youth of Balochistan. The raw material exports of marble/mineral ginning industry from the province of Balochistan may also be counted as one of the consequences of low skills development to work for value addition of the raw mines/minerals of Balochistan. The investment and provision of TVET skills for steel industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021). The TVET related policy options may include provision of TVET skills related to technical/vocational skills on extensive levels to fulfill the skills requirements necessary for the development of marble and mineral grinding industries to ensure employment opportunities in the proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 31: Deficiency of Formal TVET Skills for Marble and Mineral Grinding Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	-	-	-	-
Gwadar EPZ	-	-	-	-
Hub SEZ	Marbles and mineral grinding	250	8 out of 26 = 31% (69% Deficiency)	5 out of 35 = 14% (86% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*Table 32: Deficiency of Formal Common/Specific Skills for Marble and Mineral Grinding*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	-	-	-	-

Gwadar EPZ	-	-	-	-
Hub SEZ	Marbles and mineral grinding	250	11 out of 25 = 44% (56% Deficiency)	9 out of 37 = 24% (76% Deficiency)

Source: Field Survey and FGDs conducted by Authors

### *Skills Mapping for Chromite Processing industry*

The details of results and discussion of skills mapping for chromite processing industry, selected from the category of selected three potential industries, are given below in tabular and explanatory form.

*Table 33: Total Number of TVET Skills for Chromite Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	Chromite	7	19	28	47
Gwadar EPZ	-	-	-	-	-
Hub SEZ	Chromite	4	19	28	47

Source: LIEDA, 2021; I&CD, 2021; District Profile Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

*Table 34: Total Number of Common/Specific Skills for Chromite Industries*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	Chromite	7	64	66	130
Gwadar EPZ	-	-	-	-	-
Hub SEZ	Chromite	4	64	66	130

Source: LIEDA, 2021; I&CD, 2021; District Profile Qila Saifullah, 2021; Field Survey and FGDs conducted by Authors

*List of TVET Skills for Chromite industry:* The TVET skills necessary for the production in Chromite industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way.

The list of vocational skills: stone cutter, polisher, gangsaw operator, helper/assistant, shotfirer, heavy diesel mechanics, mechanical fitters, excavator operators, HSE advisors, stockpile and ship loading, welder fitter, industrial mechanic, construction site, chromite loaded rail cars operators, trailers, mine safety workers, mine safety equipment security, transporter and chromite business entrepreneurs (Table 33).

*The list of technical skills:* geologist, geochemist, geophysics surveyor, geophysics mine sampler, mechanical geospatial technician, geophysicist, drilling engineer,

mechanical mine driller (exploration), mechanical mineral estimation resource geologist, GIS expert, GIS & modelling technician, mine planning engineer, mine surveying surveyor, geotechnical engineer, mining engineer, mining drilling & cutting manager (mines), mining supervisor, environmental engineer, reclamation supervisor, electrical engineer, colliery engineer(e & m), mechanical engineer, mechatronics engineer, telecom engineer, it engineer, mineral processing engineer, supervisor (plant & operations) and geotechnical engineer (Table 33).

*The list of common skills:* mining mate / mining sirdar, overman, mine foreman, DGMS shot firing/blasting loading & hauling, opencast loading & hauling, safety officer, emergency response & rescue specialist, occupation health specialist, safety specialist, doctor, crane operator-cum-rigger, hydraulic technician, mechanical fitter-cum rigger, electrician and welder-cum-gas cutter, machinist, fitter, instrument mechanic, mineral resource manager, accountant, mine closure specialist, bomber/relief operator, water engineers and contaminated land specialists, reclamation supervisor, security guards, driver, cleaner/helper, dumper/tipper operator, data entry operator, paste fill coordinator, helper, executives/ individual sales professional, plumber, water tanker operator, explosives handler & carrier, driver special vehicle (explosive & sprinkler), fabricator, gardener, attendant (silo, crusher, mill), mason, loaders, crane operators, industrial vehicles drivers, welders, hands tool experts, general metallurgy experts, warehouse maintainers, packaging/finishing labor, rolling machine setters, rolling operators, chromite tenders, chemists, metallurgist, equipment maintainers, chromite janitorial staff, warehouse keepers, office management HR, financiers, audit staff, cash accountants, electricians, and plumbers, welfare officer, and corporate manager (Table 34).

*The list of specific skills:* heavy equipment technician, mobile cranes supervisor, rock mechanic engineer, maintainer/operator carpenter, material handler, geological technician, mine technician, soils technician, mine maintenance scheduler, assay technologist, ventilation technician, environment operations lead, maintenance engineer, rotating equipment maintenance superintendent, geoscientific system & data specialist, metallurgist, grade control geologist, production dozer operator, heavy diesel fitter, , underground mine supervisor, mill training coordinator, geospatial surveyor, drilling assistant (operation), explosives handler & carrier, mine electrician, fitter, self-picker, mine sampler geospatial technician, geospatial surveyor, jumbo operator, mine draft man, universal drill machine operator, blaster, rig mounted drill operator, wire saw operator, excavator operator, loader operator, dumper/tipper operator, mine machinist, HEMM mechanic, timber man, bucket wheel excavator operator, winding engine operator, rescue supervisor, reclamation supervisor, mechatronics supervisor, manager (mines), mine foreman/overman, manager (electrical, mechanical, electronics), colliery engineer( excavation), weight & scale technician, tape measure experts, fabricating machines including rolls/shears experts, grinders and drill presses technicians, forklifts and tow motors operators, drivers/helpers. boom lifts operators, mine safety practitioners, blueprint reading surveyors, operators for machinery to cut/bend/rebar/tag, chemical analysts, material identification experts, mechanical testing technicians, non-destructive testing (NDT) experts and quality control experts (Table 34).

*Estimated number of job creation in chromite industry:* The study has explored that an average of two to three skilled labors is hired to work in a functional chromite processing unit Muslimbagh and Wadh (Khuzdar) areas of Balochistan. There are a total of 11 chromite processing units working areas near to SEZs of Bostan and Hub (Tables, 33 & 34; Field Survey, 2021; I&CD, 2021; Personal Communication, 2021). The estimates of available jobs in a functional chromite processing unit are 47 and 130 for vocational/technical and common/specific categories of skills trades requirements, respectively. Since there are approximately 11 chromite processing units in Hub and Bostan industrial areas. The average employment created by a functional small chromite processing unit is reported 22 (=11x2) in both Bostan and Hub (Field Survey, 2021). The total number of employment created by 11 chromite processing units is estimated around 242 (= 11x22) in the province. The statistics and field survey's observations show that most of the jobs are highly advanced in vocational or technical terms of job responsibilities for the chromite processing units' workers. However, more jobs will be created if the chromite processing techniques via TVET skills provisions are given in specific categories of skills required for this industry in Balochistan (FGD 1, Field Survey, 2021; I&CD, 2021).

The estimated statistics about potential job creation in chromite industry, in future, depends upon the potential number of chromite processing units to be installed in SEZs/EPZs of Balochistan. The results of the study have acquired an estimation of approximately of 100 to 120 chromite processing units (FGDs 1 & 2; Field Survey, 2021). Thus the provincial chromite industry may likely create jobs for an approximation of 242,00 (=242x100) in future, based on average job creation of 242 by a functional chromite processing unit, for unemployed youth of Balochistan. However, the jobs creation potential of this sector depends upon many reasons including provision of relevant TVET skills, pertaining to the skills demands of chromite processing industry, to provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Chromite industry:* The provincial TVET system provides skills of both the technical and vocational skills but in very limited number for skilling the labor force of chromite industry in Balochistan. The deficiencies in vocational and technical skills for this industry are reported 74% and 82.5%, respectively by the formal TVET sector of Balochistan (Table 35). The case of deficiencies for common and specific skills requirements for chromite industry is reported 83% and 92.5%, respectively, by the formal TVET institutes in Balochistan (Table 36). The nature this huge skills deficiency gap identified for chromite processing industry may likely be one of the causes of unemployment for youth of Balochistan. The existing exports of raw chromite and its ores from the province of Balochistan to China may likely be one of the factors and not establishing the chromite processing industry for processed chromite materials are likely due to deficiency of TVET skills that are required for establishing this industry in Balochistan. The investment and provision of TVET skills for the skills provision pertaining to chromite industry may likely ensure employment for unemployed youth of Balochistan (FGD 1 & 3, 2021; Personal Communication, 2021). The TVET related policy options may include provision of TVET skills as per skills demands of the chromite processing industry on extensive levels

may create jobs for unemployed youth in the context of proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 35: Deficiency of Formal TVET Skills for Chromite Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	Chromite	7	5 out of 19 = 26% (74% Deficiency)	5 out of 28 = 17.5% (82.5% Deficiency)
Gwadar EPZ	-	-	-	-
Hub SEZ	Chromite	4	5 out of 19 = 26% (74% Deficiency)	5 out of 28 = 17.5% (82.5% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*Table 36: Deficiency of Formal Common/Specific Skills for Chromite Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	Chromite	7	11 out of 64 = 17% (83% Deficiency)	5 out of 66 = 7.5% (92.5% Deficiency)
Gwadar EPZ	-	-	-	-
Hub SEZ	Chromite	4	11 out of 64 = 17% (83% Deficiency)	5 out of 66 = 7.5% (92.5% Deficiency)

Source: Field Survey and FGDs conducted by Authors

*Skills Mapping for small boat making industry:*

The details of results and discussion of skills mapping for small boat making, selected from the category of selected three potential industries, are given below in tabular and explanatory form.



Table 37: Total Number of TVET Skills for Boat Making Industry

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	Small boat making	22	15	20	35
Hub SEZ	-	-	-	-	-

Source: GIEDA, 2021; I&CD, 2021; District Profile Gwadar, 2021; Field Survey and FGDs conducted by Authors

Table 38: Total Number of Common/Specific Skills for Boat Making Industries

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	Small boat making	22	23	35	58
Hub SEZ	-	-	-	-	-

Source: GIEDA, 2021; I&CD, 2021; District Profile Gwadar, 2021; Field Survey and FGDs conducted by Authors

*List of TVET Skills for small boat making industry:* The TVET skills relevant to small boat making industry are given in form of the four categories of vocational skills, technical skills, common skills and specific skills below.

*The list of vocational skills:* boat making breaking diploma, boat repairing diploma, fiber boat making, wooden boat making, fisheries management diploma, motorboat repair, netmaking diploma, boat decoration diploma, boatyard operators, boat safety diploma, diploma in offshore operation, yacht making, office management, swimming skills, and aluminum fixing (Table, 37).

*The list of technical skills:* fishing rowboat making, recreational rowboat making, boat making technicians, net making technicians, yacht making technicians, outboard boat making, inboard boat making, sailboat building, personal watercraft, dinghy boat making, rowing boat manufacturing skills, boat designing skills, motorboat mechanics, boat steel and iron welders, boat wood parts fabricator, boat making motors operators, boat making safety practitioners, boat/yacht machinery experts, wood and fiber parts experts, and boat making tools repair mechanics (Table, 37).

*The list of common skills:* boat carpenters, electricians, mechanics, safety experts, sea tourism skills, sea racing managers, boat fabricators, welding labor, manual labor, fishermen, wood fabricators, rubber fabricators, boat warehouse keepers, cashiers, bookkeepers, audit and cash staff, sea sports managers, manual workers, fish/sea-food vendors, office management, boat plumbers, watchman, and boat raw material sellers (Table, 38).

*The list of specific skills:* boatmakingbreakingdiploma,boatrepairingdiploma,fiberboat making, wooden boat making, fisheries management diploma, motorboat repair, netmaking diploma, boat decoration diploma, boatyard operators, boat safety diploma, diploma in offshore operation, yacht making, office management, swimming skills, aluminum fixing for boat, fishing rowboat making, recreational rowboat making, boat making technicians, net making technicians, yacht making technicians, outboard boat making, inboard boat making, sailboat building, personal watercraft, dinghy boat making, rowingboatmanufacturingskills,boatdesigningskills,motorboat mechanics,boatsteel andironwelders,boatwoodpartsfabricator,boatmakingmotorsoperators, boat making safety practitioners, boat/yacht machinery experts, wood and fiber parts experts, boat making tools repair mechanics (Table, 38).

*Estimated number of job creation in boat making industry:* The field survey observations show that an average of two skilled labor in boat making industry are required for functioning a small boat making manufacturing unit in Gwadar and Hub areas of Balochistan. There are a total of 22 boat making manufacturing units are observed in Gwadar and Hub areas during the field work of this study (Tables, 37 & 38; Field Survey, 2021; GIEDA, 2021; Personal Communication, 2021). The estimates of available jobs in a functional boat making unit are 35 and 58 for vocational/technical and common/specific categories of skills, respectively. Since there are approximately 22 small boat making units in Gwadar and Hub industrial areas. The average employment created by a functional small boat making unit is reported around 116 ( $=58 \times 2$ ) in Gwadar and Hub areas of Balochistan (Field Survey, 2021). Since, there are 22 small boat making units functional, so an approximated number of total employment created by these units is around 2552 ( $= 22 \times 116$ ) based on TVET skills relevant to small boat making industry in the province. The field observations and personal interviews with the key informants and skilled labors of this industry reveal that non-availability of the skilled labor force in all the four categories of TVET skills mentioned above. However, more jobs will be created if relevant TVET skills are provided on extensive levels and due investment in provision of boat making skills to ensure decent job opportunities for unemployed and unskilled labor force of coastal areas of Balochistan (FGD 1, 2 & 3, 2021; Field Survey, 2021; I&CD, 2021).

The estimated statistics about potential job creation in small boat making industry, in future, depends upon the potential number of boat manufacturing units to be installed in SEZs/EPZs of Balochistan. The results of the study have acquired an estimation of approximately of 100 small boat making manufacturing units (FGDs 1 & 2; Field Survey, 2021). Thus the provincial small boat making industry could create jobs for an approximation of 11,600 ( $=116 \times 100$ ) in future, based on average job creation of two per relevant TVET skills by a functional small boat making manufacturing units for unemployed youth of Balochistan. However, the jobs creation potential of this sector depends upon many reasons including provision of relevant TVET skills, pertaining to the skills demands of small boat making and its relevant trades for this industry to ensure job opportunities and create employment for provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Boat Making Industry:* The provincial TVET system provides skills of both the technical and vocational skills but not up-to the labor market requirements of skills for small boat making industry in Balochistan. The deficiencies in vocational skills and technical skills for this industry are reported 60% and 65%, respectively by the formal TVET sector of Balochistan (Table 39). The case of deficiencies for common and specific skills requirements for small boat making industry is reported 52% and 65%, respectively, in Balochistan (Table 40). Here too like for skills requirement of other industries, the unavailability of relevant skills provision are likely causes of unemployment of youth in Balochistan. It is revealed from site observation and interviews of the field work that modern TVET skills for manufacturing of different versions/types of small boat making and related industries are not present in TVET framework by either provincial TVET departments or national TVET under the NVQF that could fulfill skills needs of this industry. The investment and provision of TVET skills for the skills provision pertaining to small boat making industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021). There are strong needs of small boat making TVET skills in vocational, technical and specific categories of skills to be inclusive part of human resource development and its policies to ensure job creation and employment opportunities in small boat making industrial set-ups of SEZs/EPZs of Balochistan.

*Table 39: Deficiency of Formal TVET Skills for Boat Making Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	-	-	-	-
Gwadar EPZ	Small boat making	22	6 out of 15 = 40% (60% Deficiency)	7 out of 20 = 35% (65% Deficiency)
Hub SEZ	-	-	-	-

Source: Field Survey and FGDs conducted by Authors

*Table 40: Deficiency of Formal Common/Specific Skills for Boat Making Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	-	-	-	-
Gwadar EPZ	Small boat making	22	11 out of 23 = 48% (52% Deficiency)	13 out of 58 = 35% (65% Deficiency)
Hub SEZ	-	-	-	-

Source: Field Survey and FGDs conducted by Authors

*Skills Mapping for Fisheries/Olive-oil industry:*

The details of results and discussion of skills mapping for Fisheries/Olive-oil industry, selected from the category of selected three proposed industries, are given below in tabular and explanatory form.

*Table 41: Total Number of TVET Skills for Fisheries/Olive-oil Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills	Total No. of Skills
Bostan SEZ	-	-	-	-	-
Gwadar EPZ	Fisheries/Olive-oil	5+0 = 5	15	30	45
Hub SEZ	Fisheries/Olive-oil	7+2 = 9	15	30	45

Source: LIEDA, 2021; I&CD, 2021; District Profiles Lasbela/Gwadar, 2021; Field Survey and FGDs conducted by Authors

*Table 42: Total Number of Common/Specific Skills for Fisheries/Olive-oil Industries*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills	Total No. of Skills
Bostan SEZ		-	-	-	-
Gwadar EPZ	Fisheries/Olive-oil	5	18	39	57
Hub SEZ	Fisheries/Olive-oil	9	18	39	57

Source: LIEDA, 2021; I&CD, 2021; District Profiles Lasbela/Gwadar, 2021; Field Survey and FGDs conducted by Authors

*List of TVET Skills for Fisheries/Olive-oil industry:* The TVET skills necessary for the production in Fisheries/Olive-oil industry are given in the form of four categories. That are vocational skills, technical skills, common skills and specific skill in the following way.

*The list of vocational skills:* fishing position experts, fish feeds experts, fishing record keepers, distant water surveyors, geographic coordinator, fishing estimate data entry operators, fishing data enumerators, Monitoring/control/surveillance, fishing logbook coverage, e-logbook experts, vessel information system analysts, olive technical assistance, olive tree cultivators, olive tree irrigation experts, and olive oil storage managers (Table 41).

*The list of technical skills:* cultured fish experts, fish taxonomy expert, fish ecologists, fish breeding skills, fish diseases laboratory experts, lakes and reservoirs engineers, waster waste managers, fisheries technicians, harbor managers, harbor warehouse keepers, harbor/fish preservers, fish distributors, ichthyology, freshwater biology, fish physiology, fish culture, fish breeding, fish diseases, freshwater culture engineering, vessel monitoring systems, satellite-based vessel monitoring system

(VMS), olive tree pesticide experts, olive oil extract mechanists, olive oil chemists, olive oil centrifuge experts, olive oil business managers, olive oil botanists, traditional malaxation experts, olive oil crushing personnel, and olive oil filtration mechanics (Table 41).

*The list of common skills:* Financiers, managers, business dealers, cultivators, common labors, olive field workers, packages and store keepers, Olive oil industry managers, computer operators, harbor managers, harbor warehouse keepers, harbor/fish preservers, fish distributors, fisheries entrepreneurial skills, fish diseases, freshwater fish capture, fishing data enumerators, and aquatic products value chain experts (Table 42).

*The list of specific skills:* cultured fish experts, fish taxonomy expert, fish ecologists, fish breeding skills, fish diseases laboratory experts, lakes and reservoirs engineers, waste waste managers, fisheries technicians, aquatic products value chain experts, ichthyology, freshwater biology, fish physiology, fish culture in ponds and in large water bodies, fish breeding, fish culture engineering, vessel monitoring systems, satellite-based vessel monitoring system (VMS), Monitoring/control/surveillance, fishing logbook coverage, e-logbook experts, vessel information system analysts, fishing position experts, fishing record keepers, distant water surveyors, geographic coordinator, fishing estimate data entry operators, olive technical assistance, olive tree cultivators, olive tree irrigation experts, olive tree pesticide experts, olive oil extract mechanists, olive oil chemists, olive oil centrifuge experts, olive oil business managers, olive oil botanists, traditional malaxation experts, olive oil crushing personnel, olive oil storage managers, and olive oil filtration mechanics (Table 42).

*Estimated number of job creation in fisheries/olive-oil extraction industry:* The study has explored that an average of two to three skilled labors is hired to work in a functional fisheries/olive-oil extraction unit Gwadar and Winder and Hub areas of Balochistan. There are a total of 14 (5+9) fisheries/olive-oil extraction units working areas near to SEZs of Gwadar and Hub (Tables, 41 & 42; Field Survey, 2021; I&CD, 2021; Fisheries Department, 2021; Agriculture Department, 2021; Personal Communication, 2021). The estimates of available jobs in a functional fisheries/olive-oil extraction unit are 15 and 30 for vocational/technical and common/specific categories of skills trades requirements, respectively. Since there are approximately 14 fisheries/olive-oil extraction units in Hub and Gwadar industrial areas. The average employment created by a functional small fisheries/olive-oil extraction unit is reported 28 (=14x2) in both Gwadar and Hub (Field Survey, 2021). The total number of employment created by 14 fisheries/olive-oil extraction units is estimated around 392 (= 14x28) in the province. The field survey's observations and description of FGDs show that most of the jobs are advanced in vocational, technical and specific trades of skills and based on industry related TVET skills for the workers of fisheries/olive-oil extraction units in Balochistan. However, more jobs will be created if the fisheries/olive-oil extraction techniques via TVET skills provisions are given in specific categories of skills required for this industry in Balochistan (FGD 1 & 2, 2021; Field Survey, 2021; I&CD, 2021; GIEDA, 2021).

The estimated statistics about potential job creation in fisheries/olive-oil extraction industry, in future, depends upon the potential number of fisheries/olive-oil extraction units to be installed around the sea areas and olive-oil extraction fields pertaining to SEZs/EPZs of Balochistan. The results of the study have acquired an estimation of approximately of 150 for fisheries industry and 100 for olive-oil extraction units (FGDs 1 & 2; Field Survey, 2021). Thus the total sum of fisheries and olive-oil extraction may likely create jobs of approximately 7000 (=28x250) in future, based on average job creation of 28 by a functional fisheries/olive-oil extraction unit, for unemployed youth of Balochistan. However, the jobs creation potential of this sector depends upon many reasons including provision of relevant TVET skills, laws on the development of fisheries/olive-oil extraction industries, opportunities for local industrialists by the concessions from Board of Investment and fisheries access facilities to the local fishermen pertaining to the skills demands of fisheries/olive-oil extraction industry, to provincial labor force of Balochistan (Authors' Calculations, 2021).

*Mapping Deficiency of Formal TVET Skills for Fisheries/Olive-oil industry:* The provincial TVET system provides skills of both the technical and vocational skills but in very limited number for skilling the labor force of fisheries/olive-oil extraction industry in Balochistan. The deficiencies in vocational and technical skills for this industry are reported 60% and 63%, respectively by the formal TVET sector of Balochistan (Table 43). The case of deficiencies for common and specific skills requirements for fisheries/olive-oil extraction industry is reported 44.5 and 72%, respectively, by the formal TVET institutes in Balochistan (Table 44). The investment and provision of TVET skills for the skills provision pertaining to fisheries/olive-oil extraction industry may likely ensure employment for unemployed youth of Balochistan (FGD 1, 2021; Personal Communication, 2021). The TVET related policy options may include provision of TVET skills as per skills demands of the fisheries/olive-oil extraction industry on extensive levels that may create jobs for unemployed youth in the context of proposed industrial set-ups of SEZs/EPZs of Balochistan.

*Table 43: Deficiency of Formal TVET Skills for Fisheries/Olive-oil Industry*

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Vocational Skills	No. of Technical Skills
Bostan SEZ	Chromite	-	--	-
Gwadar EPZ	fisheries/olive-oil	14	6 out of 15 = 40% (60% Deficiency)	11 out of 30 = 37% (63% Deficiency)
Hub SEZ	fisheries/olive-oil	14	6 out of 15 = 40% (60% Deficiency)	11 out of 30 = 37% (63% Deficiency)

Source: Field Survey and FGDs conducted by Authors

Table 44: Deficiency of Formal Common/Specific Skills for Fisheries/Olive-oil Industry

SEZ/EPZ	Proposed Industry	Units of Factory	No. of Common Skills	No. of Specific Skills
Bostan SEZ	-	-	-	-
Gwadar EPZ	Fisheries/olive-oil	14	10 out of 18 = 55.5% (44.5% Deficiency)	11 out of 39 = 28% (72% Deficiency)
Hub SEZ	Fisheries/olive-oil	14	10 out of 18 = 55.5% (44.5% Deficiency)	11 out of 39 = 28% (72% Deficiency)

Source: Field Survey and FGDs conducted by Authors

### **National Vocational Qualification Framework and TVET Skills for SEZs/EPZs**

The document of National Vocational Qualification Framework (NVQF) has framed a total of eight levels of TVET skills qualifications and expertise by a consensus of relevant TVET stakeholders for Pakistan. These levels are segmented into three broader categories, that are level 1 to level 4, level 5, and level 6 to level 8. The first two levels (i.e. level 1 to level 5) are termed as National Vocation Certificates and National Vocational Diplomas and these levels 1 to 5 are considered as TVET sector for industries and other economic sectors to give skilled based employment for the qualified holders labor force. The last category of level 6 to level 8 are considered as higher education sector of TVET in Pakistan. The levels 1 to 5 will be the mandate of TVET institutes and the levels 6 to 8 will be mandate of universities across Pakistan (NAVTTTC, 2017; NVQF, 2020; Khan & Ahmed, 2019).

The TVET skills mapping for selected nine industries in three selected SEZs/EPZs consist upon all the skills/trades levels of NVQF and further segregation specific to each levels are not mapped in this study. The mentioned limitation of level-wise TVET mapping according to the four lists of vocational, technical, common and specific skills pertaining to each of the nine industries of this study for SEZs/EPZs of Balochistan may likely give further insights of TVET skills mapping for human resource development and it is beyond the scope of this study. The authors have identified this sort of limitation suggest further studies to be conducted on the limitations of this study to fill the relevant and very necessary gap of TVET level-wise segregations for TVET based human resource development.

Similarly, there are 122 TVET skills that are designed under the standards of NVQF and most the skills trades are related to common skills lists identified the above nine industries of SEZs/EPZs of Balochistan. There are less attentions identified in NVQF skills lists that could fulfill the three remaining categories of skills lists mapped for existing, proposed and potential industries that have the likelihood to be installed on SEZs/EPZs of Bostan, Hub and Gwadar under the broader CPEC projects in Balochistan (NSIS, 2018, NVQF, 2020; GIZ, 2021; Ahmed et al, 2018).

One of the studies of Ahmed and Khan (2019) has analyzed SWOT analysis of associate engineering diplomas of Balochistan and indicated lots of skills deficiencies in the context of standards of NVQF (2020) and emphasized for skills mapping and identification of relevant skills trades for fulfilling the labor market demands of ever generating industrial set-ups in Balochistan. Similarly, skills related

studies by Khilji (2016), Ahmed (2020) and Ahmed, Shakeel and Khan (2021) also identify TVET areas of interventions for investment in providing relevant skills that are covered under the NVQF (2020) and its list of standardized skills of different levels in the context of demand-driven

### ***Traces of TVET based Job Creation in Labor Force Survey***

The Labor Force Survey (2018-19) indicates that bulge of youth with population of 180 million plus (below 30 years of age group) are at verge of entering into labor force by the end of 2030 and a bare minimum of only 3% are professionally trained to work in different sectors of Pakistan's economy. The estimates of vocational and technical skilled labor force are not likely to meet the emerging demands of industry and manufacturing with the right and relevant kinds of skills in Pakistan (LFS, 2018-19; Afza et al, 2020; Andlib & Khan, 2018).

The Labor Force Survey 2018-19 contains data collected from 43,361 families spread over all the four provinces. Among the employed, in this round, 31,799 are paid employees, 28,075 are self-employed, 1,120 are employers and 17,409 are contributing family helpers. For the analysis, in case of Balochistan province, we get a sample of 6,494 employed youth, out of which 3,326 are paid employees and 3,164 are self-employed workers, respectively. Irony is that only 187 are employed by their TVET skills levels in different industrial set-ups confined to Quetta and Hub industrial zones of the province. The TVET skilled employment level is limited to 2.88% at provincial level of employment accounts in Balochistan (LFS, 2018-19; Afza et al, 2020; Andlib et al, 2020; Table 45; Andlib & Khan, 2018).

The LFS (2018-19) also indicates that 8 out of 1000 are reported in self-employees and 79 out of 1000, from a sample of 6,494 employed youth, are reported in paid employment in industrial and manufacturing sector of the province. The situation of TVET based employment implies for very low levels of industrial existence in the province.

*Table 45: Comparison of Employment Status by Pakistan & Balochistan*

Employment Status	Pakistan		Balochistan	
	Million	Percentage	Million	Percentage
Paid employed	26.17	42.41	0.99	39.62
Self-employed	21.47	34.80	0.98	39.17
Employers	0.84	1.37	0.05	1.96
Unpaid family workers	13.22	21.43	0.48	19.25
Total	61.71	100	2.5	100
TVET based employment	-	-	-	2.88

Source: Authors' calculations from LFS (2018-19)



## CONCLUSION AND POLICY RECOMMENDATIONS

The concluding remarks and policy recommendations are given here to answer the last objective of this study.

### 5.1 Conclusion

The TVET system of Balochistan is highlighted to give starting point mapping of TVET skills for human resource planning in this study. The study reveals that human resource planning through TVET composed of B-TEVTA, skills allied provincial departments, NAVTTC skills sets, the provision of skills by national and international NGOs, and private sector skills provision including apprenticeships in existing industrial set-ups for SEZs/EPZs that ensure job creations for provincial labor force. The strength of skills mapping for human resource planning are based on these institutional frameworks of TVET system in Balochistan. The skills dissemination through public and private sectors institutions rely upon TVET policies, laws, protocols and standards of provincial and national qualification frameworks to ensure quality skills provision for skilling the provincial labor force. The guidelines given by NAVTTC, ILO and UNESCO documents for skills provisions in the province recognize the testing and relevancy of TVET skills mostly concerned with fulfilling the common sets of demand-driven TVET skills for the requirements of industrial labor market needs in the province. The study also reveals deficiencies in the categories of mapped lists of skills for vocational, technical and specific skills sets required for the existing, proposed and potential industries focused in this study. There are traces of legal, administrative, coordination, cascading, not specific to industrial needs, highly imbalanced skills sets provision among vocational and technical skills, gender-biased, quality compromises, non-alliance of provincial TVET provisions, and deficiencies in specific technical and vocational skills are issues that are identified for skills mapping and human resource planning to effectively ensure job creation for unemployed labor force to be employed in SEZs/EPZs of Balochistan. Low skills formations and shortages of technical and vocational skills are deficient areas mapped in this study. To cope with the problem of skills deficiency in technical and vocational skills for the needs of SEZs/EPZs and their industrial labor demands justify the case for devising human resource planning to ensure employment and job creation for unemployed youth of Balochistan. The policy options are given below for human resource planning pertaining to skills development that could justify the following policy recommendation in the context of the findings and discussions of this study.

### 5.2 Expected Policy Implications: Objective # 5

This research project has strong policy implications in relevance with skilled labor needs of the existing, proposed and potential industries of SEZs/EPZs under CPEC project for Balochistan. The following policy options are recommended for skills mapping and HR planning in the light of this study to ensure job creation for unemployed youth of Balochistan.

- i. The government of Balochistan must seriously work on emergency basis for human resource development relevant to industrial HR needs of SEZs and EPZs, so that the levels of living and per capita income of unemployed youth would be raised to eliminate poverty and enhance socio-economic status of provincial youth.
- ii. The policy recommendations should imply for introduction of relevant and demand-driven TVET skills that could fulfill provincial TVET skills requirements of

all types of industries of SEZs/EPZs of Balochistan.

- iii. There must be capacity building approaches being part of most of the industry-specific policies and skills development programs should focus on human capital formation in the same context for skilling unskilled labor force of the province.
- iv. The recognition and functionality of B-TEVTA as per the B-TEVTA Act of 2011 should be made integral part of skilling Balochistan strategies for regulation, execution and skills development in the province.
- v. There is a strong need of coordination and alignment of B-TEVTA with provincial allied TVET departments that should work collectively for ensuring skilled based human resource planning for ensuring job creations in industrial set-ups of SEZs/EPZs.
- vi. The recommendations of National Skill Strategy (2015) should be implemented as per its true spirits to enhance capacity building of the provincial TVET system that could further ensure job creations for unemployed youth of Balochistan.
- vii. TVET skills deficiency is serious a problem for unemployment in the province, the government is recommended to invest in enlarging the supply of TVET skills that are relevant to the existing, proposed and potential industries of SEZs/EPZs of Balochistan.
- viii. The linkages between TVET institutes and industries are strongly recommended to fill the skills gaps for ensuring employment and livelihood earnings to provincial labor force.
- ix. A well-coordinated and comprehensive TVET framework should be devised to include all the supply side and demand-driven aspects of skills formation to balanced levels of labor market equilibriums for industrial development in SEZs/EPZs of Balochistan.
- x. The recommendations of B-TEVTA, NAVTTC, ILO, UNESCO and other stakeholders must be sorted/coordinated in way to devise a comprehensive TVET policy for the province of Balochistan.
- xi. Industry specific skills trades models for each industry must be devised and started for skills formation of youth via establishments of industry-specific skills centers of excellences in the physical premises of SEZs/EPZs in Bostan, Hub and Gwadar areas of Balochistan.
- xii. The provision of industry specific skills in vocational/technical trades should be encourages with private sector, NGOs, skills institutes-industry linkages, and public-private partnership, not confined to provincial/national but to international TVET organizations as well, should be encouraged through conducive TVET policies, funding opportunities, inclusion of relevant skills in Prime Minister Skilling Pakistan Program, due subsidies, loans for TVET investments and other

ways of collaboration and all these steps are recommended for any human resource planning endeavors to ensure job creation of decent work and livelihood earnings for unemployed youth in the industrial set-ups of SEZs/EPZs of Balochistan.

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## Appendix-A:

### Details of Mixed Research Methodology

It constitutes two surveys of Desktop and Field surveys with different phases and skills mapping exercises for collection of data and information necessary for accomplishing the objectives of this study. The details are given below.

**Desktop Survey:** It contains upon systematic review of literature relevant to TVET systems, skills mapping, SEZs/EPZs, industrial set-ups of Balochistan, human resource development and job creation in this study. The systematic review covers selected research articles, official reports, periodicals, online SEZs related materials, books reading about human resource development and job creation, research methodology for giving context and proper insight to conduct the second component of research methodology (Field Visits) of this study. The systematic literature review for this study covers the following set of available literature in this study.

1. Selected literature review of TVET skills, industrial set-ups, SEZs/EPZs
2. TVET Policy Documents
3. National Vocational Qualification Framework
4. Skilling Pakistan Literature and Data
5. Balochistan-TEVTA
6. NAVTTC Reports/studies
7. GIZ TVET Sector Support Program for Pakistan
8. Balochistan Economic Report (Asian Development Bank, 2005)
9. Pakistan Vision-2025
10. National Vocational Qualifications Framework (NVQF)

**Field Survey Components:** Field survey components is divided into three phases and its sub-phases for remaining parts of skills mapping and explained as under;

**Phase-1:** Phase-1 of field survey contains meeting with TVET authorities, TVET and SEZs/EPZs stakeholders, field visits and results of field visits to meet TVET and relevant KIs for exercising skills mapping of this study. The details are given below.

**Meetings with Authorities of Related TVET Departments:** In the first phase multiple visits will be paid to related TVET departments where meetings will be held with the authorities for discussions on the subject matter, scope of work and obtain their consent to continue the study further. This phase has updated the researchers of the study about existing human resource development and planning in the context of SEZs/EPZs and their overall industry in Balochistan. Identifying HODs, key informants (KIs) & subject matter experts related to job creation and skill formation policy for different industries proposed for SEZs/EPZs are research output in this phase of the field survey. Official meetings are sought out with authorities/members of Chairman Gwadar Port Authority, Chinese

Facilitator of Gwadar Free Trade Zone, members Chambers of Commerce, officials of LIEDA, GIEDA, BSEZ, HSEZ, authorities of TVET allied departments of GoB, GIZ provincial coordinators, members Board of Investment, B-TEVTA working for human resource development, NAVTTC, Commerce & Industries Departments, Provincial based Chamber of Commerce and Industry, Labor and Manpower department at provincial level, and including some other institutions as well. Meetings will be arranged for getting TVET informations and data collection via brainstorming interviews, official meetings, informal discussions and getting their permission letters for next phases of FGDs, field surveys/visits and feedback responses till the completion of this research oriented nature of study financed by RASTA, PIDE.

*Phase # 2: Visits to Three SEZs/EPZs in Bostan, Gawadar and Hub:* Multiple visits to the sites of industries located in three SEZs/EPZs are undertaken to know the development statuses of these zones for industrial development with the consent letters obtained in phase one of the field survey. Visits also included meetings with HoDs of these authorities and identification of potential employers to install proposed industries on these SEZs/EPZs in Balochistan.

*Sector-wise Identification of Relevant TVET Skills:* Designing and identifying industries for proposed SEZs in Pakistan. Identifying skills and human capital requirements also undertaken for the identified industries to be installed in selected SEZs/EPZs. The outcome of this TVET identification for industry-wise human resource planning for job creation of unemployed youth of Balchistan (See Appendix-A).

*Highlighting Industrial Sector-wise Job Opportunities:* Job creation prospects and job opportunities in proposed and potential industries of SEZs and EPZs of Balochistan in four FGDs and field visits will be highlighted in skills mapping exercise 3. The outcome of this exercise-3 will be bringing for the set of industry-wise economic and employment opportunities that are expected to be started for job creations in selected SEZs and EPZs of the province.

It is future work for the completion of this study.

*Human Resource Planning & Recommendation thereof in Perspective of Proposed Industries Selected SEZs/EPZs (Skills Mapping Exercise-Final):* Complete documentations will be undertaken in this part of research design for job creation and human resource planning for the proposed industrial projects of SEZs/EPZs. Human resource planning and addressing the job creation potential issue in line with both the macro objectives set for Vision-2025 and CPEC projects for the socio-economic development of Balochistan will be undertaken in this phase. Recommendations for human resources planning for job creation to unemployed youth will be documented as a planning policy in the context of the above-mentioned phases of data collection for skill mapping and human resource planning the select SEZs and EPZs of the province. It is also future work for the completion of this study.

*Data Collection & Its Tools:* As suggested for the studies of mixed methods in nature by Ercikan and Roth (2006), Sandelowski, (2017) and following the research methods identified by Gonzalez-Velosa and Rucci (2016) for a combination of qualitative and quantitative data nature about discussing methods of anticipating skills demand, the

data collection sources for this study will be multiple and that will comprise of desktop survey, field survey and its phases, three FGDs, multiple visits to industrial sites of SEZs and EPZs, informal interviews and discussion with key informants including employers, field survey/visits to TVET ministries/departments/commissions/authorities.

*Two set of questionnaires:* One set of questionnaires will be designed/opted for employers and other key informants to get data about TVET skills demand for proposed industries and their occupations for all the three SEZs and EPZs selected for this study. Questionnaire is designed from the contents of five research objectives and questions of this study and all the queries of FGDs are made in line with NAVTTC research studies and NVQF (2020) (Feldstein, 2015; NAVTTC, 2017 & 2020; Ahmed, 2019). The other set of questionnaire was designed to get relevant TVET skills for skills mapping in the four categories of vocational, technical, common and specific skills. It contains self-assessment of demanded TVET skills in these categories and identified by the industrial human resource office, record keepers, and employed key informants in selected nine industries each one from existing, proposed and potential industries of this study. The research ethics of mixed research methodologies for getting NOCs from the respective respondents to the last stages of demonstrations of questionnaire and fulfilling the research protocols of FGDs, field surveys, contacting HR and key informants and other ethical codes of research design for this study. The enumerators are well trained for the research ethics and conduct of this study and allowed to get relevant data after the consent of all the TVET stakeholders and relevant respondents of this study. The ethical guidelines mentioned by Williams (2007) and Wilson (2008) are incorporated in this study. **Technique/Approach for Policy Formulation:** Both the qualitative and quantitative components of analyses (Mixed Method Method) and assessment (based on acquired data, facts and information) are used for the topic concerned of this study. Qualitative analysis or assessment are accomplished through descriptive analysis to document human resource planning for TVET skills mapping to fulfill the required human resource for proposed industries of SEZs and EPZs selected for this study. Quantitative analysis dealt via suitable statistical analysis to complement the descriptive analysis of qualitative data are recommended for future work and further research agenda to this study (Ercikan and Roth, 2006; CEDEFOP, 2008; Sandelowski, 2017; Wolf, 2011).

## Appendix-B

### Detailed Description of Field Visits

The details of this comprehensive sort of field visits are given below.

#### Field Visits Routes to Interior Balochistan

The PI, one of Co-PIs and a trained team of field enumerators have managed to conduct a detailed field visit to the interior Balochistan starting from district Quetta (Bostan SEZ) to Kalat, Surab, Khuzdar, Uthal and Hub Industrial estate (Hub economic Zone) and then moved on towards Gwadar (Gwadar Economic Zone) via Ormara, Pasni and then towards Tubat and Panjgure region to return back to Quetta while covering a distance of almost 2500 km indicated by blue line in the following Gppgle Map (Figure-1)



Google Maps Balochistan, Pakistan Drive 2,189 km



Figure-1: Imagery ©2021 Data SIO, NOAA, U.S. Navy, NGA, GEBCO, Landsat / Copernicus, Map data ©2021 Google 100 km

#### Meetings with TVET authorities, Academia & KIs for Brainstorming Interviews, Informal Discussions and TVET data acquisitions

The research team has made field visits to the various points/locations of research interests in Kalat and Surab regions and identified potential industries for olive oil, livestock and agricultural farming to be launched on SEZs/EPZs of Balochistan. While at Khuzdar region, the team happened to get insight from the academia and research scholars, team met with the faculty deans and chairpersons of the different technologies to highlight and give feedbacks on the objectives of their study. The team had telephonic conversation with the worthy Vice Chancellor Dr. Ehsan Kakar of UET, Khuzdar and Director ORIC Dr. Khair Muhammad Kakar for getting permissions of future data inputs and

requested Dr. Khair Muhammad Kakar, resource person for olive oil plantations and industrial development, for his collaborations in identification of the potential industrial sector of this region in prospects of including in the proposed industrial clusters of SEZs/EPZs of Balochistan. For getting practical insights about potential industries of the region and its TVET skills requirements, the research team has also visited the agriculture farming, mining and livestock in region. The research team then moved on meeting and visits to the institutes and public sector regulatory bodies at district Lasbela.

### **Lasbela Chamber of commerce and Industries**

Meeting with Mr. Anjum Rafatullah Khan (Secretary General) Lasbela Chamber of Commerce & Industry Hub, Balochistan took place in his office located in Lasbela Industrial Estate Authority building, at district Lasbela. Lasbela district of the province of Balochistan serves as the principal gateway to the upcoming free port of Gwadar and the mega industrial and TVET hub for the entire province of Balochistan.



With more than 150 industrial units and more industries to coming up, it has emerged as the industrially and commercially most active region of the province, having great potential for industrial and commercial investment and thus has most of technically and vocationally trained human resource in the province. Chamber of Commerce and Industries assured all time availability and support where it is solicited for this important study.

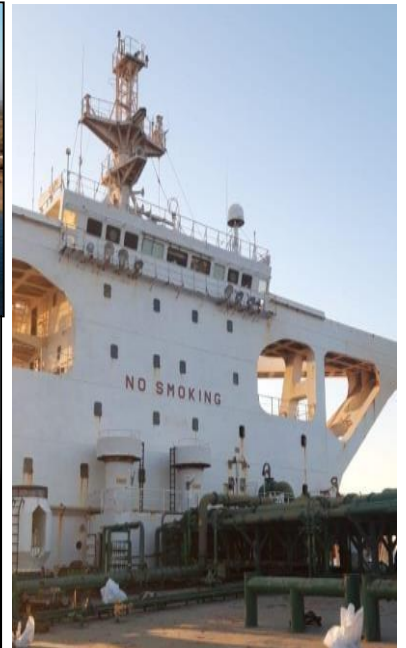
### **Lasbela Industrial Estate Development Authority**

Meeting with Mr. Shafiq Qasmi, Director Finance Lasbela Industrial estate development authority and other LIEDA management team members. LIEDA management arranged a special visit to the proposed site of Hub Special Economic Zone and other parts of Industries working under LIEDA at district Lasbela of Balochistan.



## Visit to Giddani Ship Breaking Yard

After having three days of field visits with LIEDA at Hub, the research team then planned to visit Giddani Ship Breaking Yard, Lasbela, Balochistan and meet up with Mr. Naik Muhammad (Manager of Ship Breaking Yard) and also met and interviewed with qualified TVET individuals working in Giddani Ship Breaking Yard. The did a two days detailed visit to see in actual practice and some direct interactions with labor force working on this potential industrial sector of Balochistan province. The team has identified that TVET skills needed for Ship Breaking industry of Balochistan is more than the provision of TVET skills designed for this important industry.



The team had practically took part in some of the technical/vocational job activities helped by the TVET operators of heavy Ship Breaking experts at Giddani, Lasbela. The research got insights for heavy ship breaking TVET skills that may competitive advantages to the same industry existed in the regions of Asia.

## Academic Insights from Technical Universities and TVET Institutes

In order to get academic insights, knowing university-industry linkages for TVET skills mapping, the research team managed to visits Worthy Vice Chancellor, Dr. Jan Muhammad, VC University of Turbat, ORIC directors of UET Khuzdar, and Faculty Deans of Uthal University, Lasbela. The team also had meetings with technical and brain storm the initiative, team called on meetings and brainstorming interviews, academic discussions and informal gatherings with Dean, HoDs and Campus heads of all the universities of Balochistan except SBK Women University and Bolan Medical College.



The team had research oriented meetings with Director ORIC, Mr. Muhammad Aslam Buzdar and Dr. Masood Ahmed from Lasbela University of Agriculture, Water and Marine Sciences (LUAWMS), Dr. Jan Muhammad Vice Chancellor University of Turbat and his scholars, team has detailed meeting with Dr. Jalal Shah (registrar), Dr. Syed Ali Raza (Dean Engineering) and Dr. Syed Jahangir (Head of Computer/IT sciences) from Balochistan University of Engineering and Technology Khuzdar. Team also visited the sub campuses of University of Turbat and LUAWMS located at Gwadar and Panjur and Wadh, respectively. The team also had meetings with BUIEMS faculty of engineering and ICT sciences for knowing the TVET skills mapping and HR planning that could work for job creation to unemployed youth in proposed and potential industries to be launched in SEZs/EPZs of Balochistan.



### **Chairman Gwadar Port Development Authority**

Team met with Mr. Naseer Khan Kashani, Chairman Gwadar Port Development Authority (GPA) and discussed on the current and future need of technical and soft skills requirement for the CPEC projects of Gwadar, GPA and its economic activities, industrial development at different SEZs/EPZs proposed in Gwadar. The Chairman was pleased to support and facilitate the research team for all possible and viable kinds of support for this noble cause of TVET skills mapping and investigations to put for the HR planning for job creation to unemployed youth of Balochistan.



### **Meeting & Brainstorming Interview with Chairman Gwadar Free Trade Zone:**

The chairman Gwadar Port Development Authority chairman, Mr. Naseer Khan Kashani, has helped the research team to also arranged a special meeting of three (3) hours with his highness, Mr. Zhong Bao (Chairman China Overseas Port Holding Company) that has mandated to make functional Gwadar Deep-sea Port Free Trade on international shipment and cargo SoPs. The meeting with highest ranks of Chinese Free Trade facilitator gave insights for skills mapping and HR planning for the purpose of this study in a detailed and very informed version during our discussion and brainstorming interview in the office of the HoD, Gwadar Free Trade Zone, in the premises of Gwadar Port Authority, at Gwadar.

### **Gwadar Industrial Development Authority**

Gwadar Industrial Estate Development Authority (GIEDA) has significant role in development of SEZs in Gwadar. A detailed visit is conducted to DIEDA location and the researcher practically saw the allocated piece of land for SEZs/EPZs of GIEDA few KM away from Gwadar Port city. Before going to SEZ in Gwadar, GIEDA official warmly welcomed our meetings with them at their offices for having insightful discussions on the thematic areas of discussion of this research study.

### **Potential Industries Identified to be Included in Proposed Industrial Clusters of SEZs/EPZs in Balochistan:**

During this detailed and long field visit by the research team, the following industries are identified with the help of the above sort of research activities/components of field visits. These industries are potential industries for industrial development, job creation and sustainable socioeconomic



development of the province.

1. Mines and Minerals
2. Agriculture, Olive Oil Extraction and Horticulture
3. Fisheries and Livestock
4. Tourism and Hospitality
5. Oil & Gas and Natural Resources
6. High-tech Services
7. Light Industries of Manufacturing Sector
8. Construction
9. Date Processing & Food Preservations
10. Small Boat Making & Heavy Ship Breaking Industry

### **Visits to TVET Institutes and TVET Entities of the Province**

The team led by Dr. Aziz Ahmed, next day, visited the TVET sector government, semi government and private sector institutes in Gwadar region. During our field visits to Bostan, Hub and Gwadar, the research team had visited, to know TVET provisions and different TVET trades, different TVET institutes like, WTTC, Quetta, TUSDEC Projects at Quetta and Hub, TTC Hub, IDO, SCSPEB-Quetta, BWBA-Quetta, TTC male and female Gwadar to mention a few.

### **TVET Skills Mapping for the Above Mentioned Potential Industries:**

Most of the KIs, high levels officials of different organization/departments/authorities have clearly mention dire need for the initiations of TVET skills in different trades from general to specific technical/vocational tasks and job requirements for the above mentioned potential industries that have strong probability to be proposed and launched at industrial sites of the target SEZs/EPZs of this study in Balochistan.

## Appendix-C

### Focus Groups Discussions

Two focus group discussions are held. The detailed results and discussions of FGDs are given below. The details include exact responses of the focus group discussants to answer the five research questions asked by PI of this research study. The following five Qs are asked during two exercises of FGDs for this study.

1. What is TVET institutional set-up for skills development pertaining to SEZs/EPZs in Balochistan?
2. What kind of technical, vocational, common and specific TVET skills are required for selected industries in existing, proposed and potential categories of Balochistan?
3. How are the estimates of job creation by these selected existing, proposed and potential industries for TVET skilled labor force in Balochistan?
4. What are the estimates of TVET skills deficiency for selected existing, proposed and potential industries in Balochistan?
5. What are policy implications for skills mapping and human resource planning for SEZs/EPZs to ensure job creation for unemployed youth of Balochistan?

In the following, some of the responses to all these five Qs are given

#### Q. No. 1.

**Answer:** The institutional framework for the provision of skills to the people of Baluchistan is comprised of the Public and Private sectors.

**Public Sector Provision of TVET in Baluchistan:** Mainly BTEVTA heads the skill provision authority, but other departments perform the duties to provide technical skills to youth, they are the Department of Higher and Technical Education, Department of Labor and Manpower, Department of Industries and Commerce, and Social Welfare Department. (Skill Development Program | Baluchistan Technical Education & Vocational Training Authority, n.d.)

**Private Sector Skill Development and Provision department:** There are several NGOs, NPOs, and other private institutions responsible for the provision of TVET in the province.

#### Q. No. 2.

**Answer.** Baluchistan offers unique features that give other complimentary conditions for investment in Baluchistan. There are number of sectors identified which are expected to be particularly attractive for foreign and local investment. Up till now there are three Special Economic Zones are approved by the federal government to fulfill the gigantic needs of CPEC. They are, Gawadar Special Economic Zone, Bostan Economic Zone and Hub Special Economic Zones and the approved projects. In this context, Baluchistan offers some of the potential industries in following fields; Non-Staple/high value products in coal, minerals and fruit hub in the districts of Zhob, Killa Saifullah, Loralai, Sibbi and Musa Khel Ziarat District Dera Bugti, Nasirabad, Jaffarabad, and Jhal Magsi

provide vast opportunities in Gas production and crop yields in irrigated areas.

Karachi-Khuzdar-Quetta and Chamman Corridor provide Trade hub way for Lasbela, Khuzdar, Kalat, Quetta and Pishin. Gwadar-Mustung Corridor for Gwadar, Panjgur, Washuk, and Kharan. Port-Mineral Corridor, Fruit, Trade and Minerals for Chagai, Washuk, Panjgur, Kech, Gwadar Fisheries, Port & Shipping, & International Trade for Gwadar and Lasbela district. Source: ([https://smeda.org/index.php?option=com\\_content&view=article&id=91&Itemid=189](https://smeda.org/index.php?option=com_content&view=article&id=91&Itemid=189)).

### Q. No. 3.

**Answer.** There are 300 plus institutions registered with the labor and manpower department but most of them are non-functional. There is a shortage of TVET programs and the skills are few to handle the vast capacity of CPEC and its SEZs and EPZs. According to a report published by NAVTIC in 2018, enrollments, TVET pass-outs, several skilled trades, TVET institutions, and overall skill development programs are in the lowest categories in Baluchistan. CPEC requires skills that are not provided in the province besides providing specific skills unconventional skills are given in the province.

### Q. No. 4.

**Answer.** For any economic zone required skills act as a backbone. With the inception of CPEC, federal government has proposed 3 Special Economic Zones in Baluchistan. They are, Gawadar Special Economic Zones, Hub Special Economic Zone and Bostan Economic Zone. These economic zones will enhance trade opportunities in all economic sectors of Baluchistan. Some of the skills required in different fields are as under:

**Mines & Minerals:** It includes skills in Quarrying, Mining Diplomas, Draftsman & surveyors, Low Skills for Mining, Resource Identifiers & Specialists, Petrol-chemists, Stone identifications diplomas, Gems & Jewelry Specialist, Miners, Clerical staff, Resource Managers, and entrepreneurship for Mines & Minerals.

**Agriculture:** The skill trades in Veterinary, Poultry & Dairy Assistants, Fruit Processing, Preservation, Packaging & Logistics, Gardening & Horticulture, Tunnel Farming, Bidding and Seed Sewing Experts, Water management courses, Orchard specialists and care takers, Fruit preservation techniques, and Fruit value chain diplomas.

**Construction:** The skills of Shuttering, Carpenter, Aluminum Fabricator & Steel Fixer Carpenter, Woodwork & Handicraft, Civil Drafting, Auto CAD, Civil Surveyor, Quantity Surveyor, Hi-Tech Fitter, Pipe fitter & Fabrication, Mason & Tile fixer, Plaster, Plumber / Pipe Fitter, Scaffolder, Welder, Concrete Plant Operator, and many more are identified for this sector in the province.

**Hospitality & Tourism:** It includes skills in the areas of Tourist guides, Local food experts, Archive Specialists, Archive Short Courses for provincial heritage, House Keeping, Hotel & Management, Rest House Personnel, Cooking / Chef, Cultural Experts

and Guides, Social Mobilisers, and Social entrepreneurs.

**Q. No. 5.**

**Answer.** Baluchistan is the most neglected province since independence but Baluchistan is a hub of several economic and trade opportunities. Therefore, the backbone of CPEC, Gawadar, is situated in Baluchistan. In this context, certain components require skills for smooth operation. Some of the components are as under:

Agriculture and Horticulture: Farming, harvest, processing and export. Tourism: hotel industry, transportation Mining: digging, loading and processing Port and shipping industry: port management, warehouses, ship breaking and making Fisheries and Marine life: research, catching skills, preservation and packing Livestock: rearing, breeding, processing and export. Local craft industry Textile industries Human resource development industry Heavy industry Information technology units Assembling units for vehicles and motorbikes Food industry: preservation, packing and storage.

**Focus Groups Discussion (Skills Mapping Exercise-2):** Four FGDs are scheduled for directly answering and discussing the five research questions of this research study (see Introduction). Two FGDs are conducted. One from all the TVET stakeholders, designers, and implementers including 22 officials/authorities/KIs from TVET allied departments, TVET principals/head-masters, TVET NGOs/INGOs, TVET/HRD academicians, GIZ, NAVTTC and B-TEVTA. The second FGD was conducted with research officers and research associates of Balochistan Think Tank Network, working at BUIITEMS. The research questions of the research proposals are asked to respond accordingly in keeping the purpose of the research theme of investigation.

The generic results/findings/outcomes of these FGDs are highlighted in the following points. Details will be provided in the final report in complement with getting the responses from the remaining two FGDs of this study.

**The responses of Discussants of FGD to Qs 1/2 are highlighted in points below:**

- Skills mapping and HRD are both needed for industries of SEZs/EPZs in Balochistan
- TVET institutional framework constitute on TVET departments, B-TEVTA, NAVTTC, GIZ support TVET in Balochistan, NGOs/INGOs for TVET, TVET labor markets, TVET applications in SEZs/EPZs
- Provide easy and tax free environment for foreign as well as for domestic investors in SEZs/EPZs
- TVET skills are not defined for the industries of SEZs/EPZs
- Need to specify TVET skills for industries, yet general TVET skills are given that do not fulfill the upcoming industrial labor market demands in CPEC industries in Balochistan
- Provision of informed and research based policy inputs for implementers of TVET sector of the province—it indicates that official higher bureaucracy are big obstacles for TVET reforms according to the needs of labor markets in industrial set-ups of CPEC
- Analyze actual demand of TVET at Gawadar port and industrial needs of SEZs/EPZs

- Proposed industries for producing products made of plastics and ceramics to export to Afghanistan
- Policy makers support and coordination is required for TVET sectors across the TVET institutes
- Linkages between TVET institutions, departments and organizations
- TVET problems should be solved through proper research at universities
- The responses of respondents to Question 3 & 4 by the participants
- Industries such as; electric appliances, pharmaceutical, motorbike assembling, food processing, agriculture machinery, halal food and fisheries and ship breaking industries must be proposed at Gwadar and other SEZs/EPZs.
- There is need to balance TVET supply and demand for industries of special economic zones
- Manufacturing sector has higher demand of technical skills as compared to lower supply of skills
- TVET provisions must be programmed by TVET supply mechanism according to specific industry TVET demands for skills
- Need to enhance private sector for TVET provision as TVET demands are not fulfilled by existing TVET set of provisions by the public sector
- Need to identify major issues about unemployment, causes of unemployment and treating skills deficiencies and skills mechanism must follow this type of TVET system for industries of SEZs/EPZs in Balochistan
- TVET skills of outdated technologies, curriculum and methodology must be replaced by TVET skills provisions according to the NVQF of Pakistan to provide competitive skills in different trades for human resource development to ensure employment opportunities for unemployed youth of the province
- Identifying right person for the right job is the base of TVET system and industries in SEZs/EPZs of Balochistan
- Security issues in special economic zones, so security related skills must also be started for youth to get secured jobs in industries
- Reduction of oversupply of unskilled labor and provide efficient skilled labor to the proposed industries of SEZs
- Following industries will be established in Bostan economic zone: Livestock, pharmaceutical, chromite, cold storage, frozen meat, engineering machinery and textile. For these industries, the Small Industry Wing of I&CD has no training centers to provide relevant skills for human capital formation of provincial labor force. There is lack of coordination among proposed industries of SEZs/EPZs, technical universities and colleges, vocational training centers, industry, chamber of commerce of respective districts and labor and manpower stakeholder to ensure comprehensive and coordinated TVET system to meet the existing and future HR needs of industrial development in Balochistan. Raw material needed in all these

industries is available within and in the vicinity of SEZs/EPZs and their availability be made secured by BoI rules and regulations. TVET in computer and IT technologies, trade and commerce, input and out management courses, packaging/categorization and supply chain management, soft skills for warehouses and store keeping management and many more must be included in NVQF to effective HR policy making for SEZs/EPZs to ensure employability for the youth of Balochistan.

- Donor issues for skill development and trainings like, GIZ and INGOs
- The 18<sup>th</sup> Amendment created problems for coordinating TVET skills mechanism as per NAVTTC domains and mandates of skilling Pakistan uniformly. 18<sup>th</sup> Amendments also made confusion in TVET skills education whether it is formal or informal, between provincial domains and federal domains of skills provision as per national levels skills demands, the problems of general governance and skilling Pakistan governance in particular are other issues for NAVTTC to work upon implementing comprehensive TVET system as effective as higher education through HEC, Paksiatn.
- Skills and trainings must be based on future needs of the proposed and potential industries of Balochistan
- TVET framework, TVET policy, Provincial TEVTAs Acts and other necessary legislations are present for defining institutional TVET framework in Pakistan. But the real issues for not implementing the national framework of TVET are due to many reasons. The reasons are bad governance, ineffective position of B-TEVTA, non-coordination among allied TVET departments, bureaucracy red-tapes behavior of official correspondence, zero coordination mechanism among SEZs/EPZs, BoI, provincial chamber of commerce and TVET institutes, and more issues of governance prevalent in the province.
- Focus and specific skills in different TVET trades not generic TVET trades can solve the problems of skills needs of the proposed industries of SEZs/EPZs in Balochistan. There are general TVET provided by TVET and industries require specific TVET skills from labor force in the province.
- Mineral refining, meat processing, fisheries are industries proposed for CPEC and other economic zones and there are no specific trainings, trainings and skills are generally provided.

QNO: 1

There is institutional framework of TVET given by TVET institutes, TVET departments, NAVTTC and B-TEVTA and NVQF in the Balochistan. This TVET framework must also include industries, chamber of commerce, companies for SEZs/EPZs, mechanism for PPP in investment and skills development, CPEC authorities, allied TVET departments, technical universities and colleges, labor market stakeholders, labor union, national skills counsels, TVET system mechanism to cover all skills requirements of the districts distribution of small/cottage industries, collaborations with Chinese

TVET system, regular assessment of TVET requirements from the industries of SEZs/EPZs, TVET alignment with national labor force participation in ILO categories of occupations and good TVET implementing governance in Balochistan. We should adopt this new, better and efficient TVET framework in Balochistan.

QNO: 2

Those industries should be focused for which we have raw material and use our TVET skilled human resource for ensuring job creation for unemployed youth of Balochistan.

QNO.3

We should look into future trends of TVET requirements according to our TVET capacity required by TVET based needs of the industries of SEZs/EPZs in Balochistan.

We have international standards we just want implementation and cooperation by strong and efficient TVET governance in the province through legislation We have big human resource and have to build industries accordingly and issue certificates by BoI for SEZs/EPZs of the province. What we have now we must optimize that then go for future inventions in TVET skilling of our labor force. There is problem of TVET unifications, coordination, implementing and cooperation We should focus on current required skills and requirements of current era for economic zones TVET system and framework is planned in 2017 and still we are stuck in the problems/issues of TVET implementations by provincial TEVTAs and the model of Punjab TVETA works in all the provinces of Pakistan.

We have TVET institutes and TVET supply sides of resources we just have to utilize this mechanism for solving the issues/problems of TVET implementation that can be sorted by cooperation and coordination will and strong political and legislative support at provincial and national levels in the country.

## Appendix-D

### Description of Three Selected SEZs/EPZs of Balochistan

Three SEZs/EPZs of Balochistan are selected for skills mapping and human resource planning to ensure job creation and provide employment opportunities to unemployed youth of the province. The details are given in the following manner.

**1. Bostan Special Economic Zone:** Bostan Special Economic Zone (BSEZ) is a 200 sq KM designated area under the establishment of Industrial Estate Bostan, that constituted on 1000 sq KM of area, executed by Industries and Commerce Department (I&CD), Government of Balochistan. The scope of development works is done for networking of basic physical infrastructure and facilities like, boundary wall construction, road networks of 9.3 KM, street lights installation, sewerage and water distribution network, administrative blocks and prayers place of mosque, telecommunication network and providing security and look after staff to BSEZ. However, basic inputs and infrastructure of provision of gas, electricity, grid-station and construction of warehouses are yet to be developed in BSEZ.

For industrial development, the land and plots distributions of the area of BSEZ reveal a number of 222 plots in total units for industrialization distribution of 209 and 13 for industrial and commercial plots, respectively, under the notification orders issued by Board of Investment (BoI) on 5<sup>th</sup> May, 2020, by Government of Pakistan.

The official key informants (KIs) from I&CD reveal that there is no mechanism yet developed by the Small Industries Wing of the I&CD to provide TVET skills in trades required for the proposed industries of BSEZ in Pishin. The other TVET allied departments of GoB, NAVTTC and B-TEVTA have no coordination to design and suggest TVET skills for prospective jobs created at the start of industries functioning for production of goods and services in proposed industries of BSEZ in Balochistan.

**2. Hub Special Economic Zone, Lasbela:** Hub Special Economic Zone (HSEZ) is located in Lasbela district of Balochistan. It has some total areas of 406 acres bifurcating into 284 acres for industrial set-ups and 284 acres of areas for remaining activities of commercial, electrification, offices, sewerages and water provisions, and other types of physical infrastructure at HSEZ.

The proposed industries are Textile, Pharmaceutical, Cement manufacturing, Food & Confectionary Industries, Chemical Industries, Plastic, Paper Manufacturing, Printing & Packaging, Ceramics, Marble Processing, and Mineral Grinding in HSEZ. This very important and mega project of SEZ for Balochistan is given under the Lasbela Industrial Estates Development Authority (LIEDA) development framework by BoI.

The KIs and officials of both LIEDA and I&CD of Balochistan told during field visits that yet no development program has been started on the proposed and allocated area for HSEZ. It will take another 10 years for industries to get materialized for its physical infrastructural development and producing phases of goods and services by the proposed industries of HSEZ.

Regarding the relevant TVET availability and provision for the proposed industries of HSEZ, the KIs reveal that no such mechanism is developed by provincial or federal TVET supply organizations to make human capital formation in skilling the local youth for creation by the industries in HSEZ.



**3. Gwadar Port Operation and Development of Free Zone:** The Chinese Embassy documents reveal information about Gwadar Port Operation and Development of Free Zone (GPODFZ) as, *“According to the concession agreement signed among China Overseas Ports Holding Company (COPHC), Gwadar Port Authority (GPA) and Singapore Port Authority in 2013, the development and operation of Gwadar free zone was handed over to COPHC. Gwadar free zone is located in the northern part of Gwadar, about 7km away from the existing port. The planned development period is from 2015 to 2030, and is divided into four phases. The free zone includes the northern area (898 hectares) and the initial area (25 hectares), totally 923 hectares”*.

The current developmental progress of GPODFZ include construction of its physical infrastructure of building, structure, water supply and drainage, electrical, control, high-voltage alternating current (HVAC), foundation treatment and traffic engineering have already been completed. The filed leveling and foundation treatments are under development and by 2030 it will be completed. The Business center and Linyani Trade Exhibition Halls of GPODFZ are completed and business and cargo activities are made functional for investors and traders. The fishery processing center is also completed for fisheries industry development in Gwadar. The Hebei Bishu Group stainless steel plant is yet to be developed in near future at GPODFZ. The starting designs for the projects like, MID-TRANS company edible oil squeezing project are under way and many more projects, MoUs among stakeholders, businesses licenses, and much more business ventures related to trades are yet to be started for Game-Changer project Gwadar Deep-sea Port of CPEC for regional development and transnational connectivity.

**4. Gwadar Technical and Vocational Training Centre:** China has also established Gwadar Technical and Vocational Training Centre for provision of TVET skills to the local young of Gwadar and adjacent districts of Balochistan. The Chinese Zhongbao, Chairman China Overseas Port Holding Company, in brainstorming discussion with field visit researcher told that TVET capacity of Pakistan and the provincial TVET set-up cannot viably provide TVET skills in different trades to meet the needs of local skilled labor force all projects proposed for SEZs/EPZs and GPODFZ and other CPEC projects in Balochistan. As per mandate of the Gwadar TVET Centre, the China and GPODFZ authorities are not liable to start and provide to skilling youth of Balochistan. The solutions might range from public-private partnerships, private investment in TVET provision as per Chinese models of skills development, and heavy investment in public sector TVET institutes and prioritizing TVET system of human resource development by both the provincial and federal government of Pakistan.

**5. Infrastructure Development for Free Zone & Export Processing Zones (EPZsG), Gwadar:** In Gwadar, which is central point of CPEC in Pakistan, three very strategic and important, from trade and international businesses point of views, CPEC projects are launched for socioeconomic development of Balochistan. These are aimed at making Gwadar Deep-sea Port the future of economic hub for regional and Central Asian countries for their transnational shipment of energy, goods and services. These projects are earmarked for the purpose of Gwadar port free zone having approximately an allocated area of 2,280 acres, Gwadar Industrial Estate Development Authority (GIEDA) as industrial zone constituting 3,000 acres of land and Export Processing Zone (EPZ) of approximately occupying 1,000 acres of land for industrial development and export processing facilities to the industrial shipments of goods and services via Gwadar Deep-sea Port to the world.

The GIEDA officials and some KIs told that Gwadar is the least developed region in terms of human resource development and TVET skills in responses to field survey interviewers in the first phase

during the field work of this study.

The TVET departments like, I&CD, Education department, SWD, NAVTTC and many local NGOs were found just providing conventional TVET skills that are least relevant to the TVET trades required for proposed industries and services of Gwadar Port Authority, EPZs, GPODFZ, industries of GIEDA and Gwadar Development Authority. The following industries like, Warehouses Small Size Industries, Medium Size Industries, Noise & Pollution Intensive Industries, Cement Industries, Manufacturing Industries, Textile Industries, Food Industries, Petro Chemical Industries are proposed in Gwadar and its SEZs/EPZs.

*“There is dire need of mapping and identifications of TVET skills trades for human resource development for creating jobs to unemployed youth of Gwadar and coastal areas of Balochistan”,* it is narrated by one of the GIEDA officials, Nadeem Khoso, in response to discussion session with the Principal Investigator (PI) of this study.

**Bostan Special Economic Zone:** Bostan Special Economic Zone is developed part of Industrial Estate Bostan, located in Bostan, Tehsil Karezat of district Pishin. Industrial Estate, including Bostan special economic zone (BSEZ), is one of mega CPEC projects that has very significant economic and investment role in overall CPEC projects of Balochistan. It is approved by the relevant stakeholders of federal ministries, Board of Investment, provincial government, relevant provincial department, Chinese stakeholders, and both the provincial and federal Chambers of Commerce. This industrial zone is allocated 1000 acre of area located in sub-tehsil Bostan, Tehsil Karezat Khanozai Kakar, district Pishin. It is located on main Highway-50 and has proximity of connectivity of almost 30 KM from both the Quetta International Airport and Dry-port of Quetta City, the capital city of the province. The developed area is reported around 200 acres plus and the constructor is assigned its work to develop this industrial zone in stipulated time for industrial development. The federal public sector development program (PSDP-2017/18) has allocated around PKR 519.6 million for the Establishment of Bostan Industrial Estate Phase-I and other phases the funds are yet to be allocated. The types of industries which are mentioned, in the first instance, as Fruit Processing, Agriculture machinery, Pharmaceutical, Motor Bikes Assembly, Chromite, Cooking Oil, Ceramic industries, Ice and Cold storage, Electric Appliance, Halal Food Industry in the Bostan Industrial Zone for local and foreign investors (Khan & Ahmed, 2018; Saira & Abbas, 2018; Khan & Anwar, 2016, Planning Commission, 2017).