Exploring the Set of Skills Required for Main Line-1 (ML-1)

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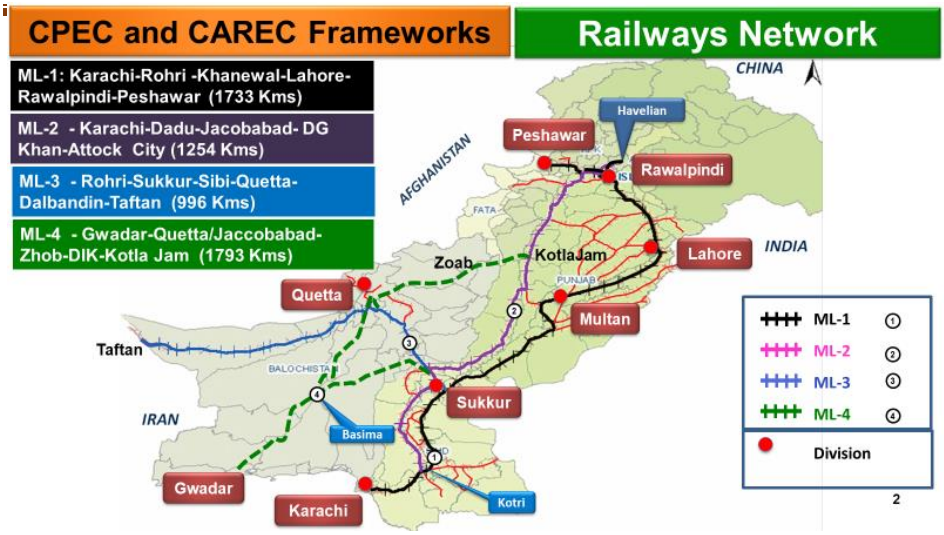
Abstract:

CPEC is an umbrella of multiple projects, under which investment is subjected to economic and social development of local masses and the country at broader level. One of the key realm of CPEC is rail-road infrastructure. In developing nations, investment in transport is closely linked to economic progress same is the case with Pakistan that development of rail-road infrastructure will enhance the connectivity for social and economic uplift of the country and increase the employment opportunities for the domestic labor. In this regard government of Pakistan is going to expand and reconstruct the current line ML-1 project (1733km), which cost around US $6,806 million, under the umbrella of China Pakistan Economic Corridor (CPEC). The key success factors behind any project can be a series of conditions that contributes to the fulfillment of project but trained human resource is the crucial factor. This study has investigated the employment opportunities for domestic labor and requisite skill sets required particularly for ML-1 project via interviewing the relevant authorities and extensive desktop survey. Training and capacity building of labor is considered as important as up gradation of railway infrastructure, so for its practical implementation purposive recommendations given at the end.

Key words: *Human Resource, Infrastructure, CPEC ML-1, Skills, Employment*

1- INTRODUCTION

Transportation system, including railways are treated as crucial characteristic of all modern economic systems. Founded along the concept of Sustainable development of society, transportation have significant importance for the development stability of social and economic arrangements of the state. Transportation is considered for a long time an important factor in regional, social and economic development. Furthermore, transportation plays an important role in increasing production, increasing job opportunities, and accessibility, reduce the travel time, reducing regional differences, facilitating the trade, labor migration and economies of scale. During the past decade the focus has been increasing in the relationship between transportation infrastructure and economic development. In the 19th century, in North America there is no doubt that investment in transportation infrastructure counting roads, railroads and ports accelerated the economic growth. The route net is constructed up of single roads that tie together two or more degrees of motion, set of interconnected roadways. Different transportation modes from prominent landscape features and indeed roads, railroad tracks, electricity, waterways form imposing features on the landscape and in well-populated, urban and industrial areas there is usually a heavy design of transit lines.



CPEC is considered as a portfolio of numerous projects including energy, infrastructure, Gwadar port and industrial cooperation. As chunk of the infrastructure portfolio, railroad is one of the most significant area of development since Pakistan's railway network need significant improvements to make it effective in transporting people and required goods. In 1970, around 70% of the cargo transportation was carried out by railways which is now reduced to 5% only. While the speed of rail services is under 60km/hr. which represents an inefficient transportation infrastructure. Under CPEC, Pakistan railways is undertaking several steps to raise three main railway lines step by step under CPEC including the Main Line (ML) -1 (Karachi-Rohri -Khanewal-Lahore-Rawalpindi-Peshawar, 1733 Kms)[1], ML-2 (Karachi-Dadu-Jacobabad- DG Khan-Attock City, 1254 Kms)[2], ML-3 (Rohri-Sukkur-Sibi-Quetta-Dalbandin-Taftan, 996 Kms) and ML-4 (Gwadar-Quetta/Jaccobabad-Zhob-DIK-Kotla Jam, 1793 Kms).

The scope of ML-1 includes the laying of new track with improved subgrade for 160 km/h speed. The freight train speed will be enhanced from 65km/h to 105 km/h whereas for passenger train the speed will upgrade form 120km/h to 160 km/h. Moreover, the project also include the,

- Rehabilitation and construction of major bridges
- Provision of Modern Signaling & Telecom Systems
- Conversion of Level Crossings into Underpasses/ Fly Overs
- Fencing of Track
- Installation of CBI System with Auto Block, CTC and ATP
- Laying of Optical Fibre

The project further help in raising the carrying capacity of cargo from 5 million tons/yr. to 25 million tons/yr. and the passengers from 5 million to 25 million a year. This study spotlights the importance of CPEC in connection with developing industry of railway in Pakistan through dualization of tracks, modernization of signaling system and rolling stocks. The estimated cost of ML-1 is $6.8 billion which includes a huge bulge of systems and manufacture inputs for which local labour and industry should be made ready.

The purpose of this study is to identify the requisite skill sets and projections of trained future labor for the aforementioned needs. The next section concludes relevant literature review about railway transportation, up gradation and its significant effect on economic development of country. Section 3 exhibits the information regarding exploited data and methodology for our research field, whereas section 4 determines the major results of the exploration. The last section of the study comprises key policy recommendations.

2- LITERATURE REVIEW

[1] https://tribune.com.pk/story/1651831/6-cpec-and-railways/
[2] https://www.dawn.com/news/1227664

In this study, we provide a brief literature on transport infrastructure with respect to theoretical considerations and different aspects of economics that might explain the link between transportation development and the economy, further realize the need of efficient Human Resource (HR) for organizational productivity. In literature transport contribution towards productivity is mostly termed as "Transport-induced agglomeration effects". Agglomeration economies occur when economic agents like firms, workers get benefit from being close to other economic components. Productivity effects are gained from improving the access of firms and workers to economic activity, transport affects the realization of agglomeration externalities (Eberts and McMillen, 1999, Graham, 2007). Chong Zhaohui and Qin Chenglin (2014) examined the impact of high speed railway on urban economy agglomeration and conclude that 1% increase in urban accessibility will increase the index of economy agglomeration by 0.8.

The additional important contribution of transport is reduction in transport costs, improvements in transportation also reduce the firm's input costs which lead to increase in factor productivity. In inclusion, distribution costs and lower production cajoled by transport improvements can also result in advance competition level and scale effects, in result this turn into higher degrees of productivity because of natural selection process in benefit of more productive firms (Nocke, 2006, Melitz & Ottaviano, 2008). Weber's theory of location is based on the role of transportation costs as a determinant of the site of industries (Weber, 1928, Moses, 1958). In the context of Imperfect competition and different degrees of interregional labor mobility, the New Economic Geography (NEG) emphasized the use of transport cost as a factor of location (Fujita et al., 2001, Fujita & Thisse, 2013).

Endogenous growth theory of macroeconomics developed a structure of public infrastructure (along with transport infrastructure) can be specified as a causal agent of economic growth through its contribution to technological change (Munnell, 1992, Hulten & Schwab, 1991). Roden (1943) perspective on economic growth and industrialization, invest on the construction of "basic industries" this will lead to new investment opportunities. "Let us build railways, canals, roads, hydroelectric power stations the rest will succeed automatically."

Many of the studies examined the infrastructure impact on the growth of economy. Investment in infrastructure leads to the economic development and significantly affects the output (Fedderke et al., 2006).During the period of 1970's and 1980's in the US, low degree of capital investment in infrastructure is largely responsible for the decline in private sector's productivity (Aschauer, 1989). Banister and Berechman (2001) examined the direct and collateral effects of infrastructure investment and conclude that there is a positive link between transportation investment and economic development. Burma and Rietveld (1999) tested this relationship and conclude that infrastructure investment affects the economic development. In a cross-country study, for a group of developing countries, there is a bilateral causal relationship between investment in transportation infrastructure and economic growth (Bose and Haque, 2005). In a later study of Indian states examined that transport infrastructure investment is a significant cause of regional growth (Lall, 2007).

The role of Railway's on the growth of economy has always been contentious. Traditional economist highlighted that the railway has a unique maximum capacity and owns a big impact on all facets of the economic system. The impact is to reduce the transportation costs, markets extensions and encouraging the development of innovative industries like coal mining, machinery and cast iron (Rostow and Kennedy, 1992).

Though, Fogel and some other economist believe that the railroad is not significant. In his railway and economic growth in America, he illustrates the economic benefits of transportation by "Social Saving". He also put on the anti-factual measure specificity, he assumes that in America, at that berth is no railroad line and observed that economic benefit can be solely obtained from the river transportation with the comparison of economic benefit brought by railway transportation. He concludes that, in economic growth railways are not indispensable because it can be replaced by water transportation (Fogel, 1965).

Some other scholars are doubtful about Fogel's theory. During the period of 1870-1890 in America, there is greatly increased in agricultural land value because of the railroad and its status was unique (Donaldson and Hornbeck, 2016). In Europe, the high-speed railway construction impact on regional development, the high-speed railroad line can benefit the city because in metropolis all main components will be collected, therefore refining the concentration of the major central cities (VicKerman 1997). Schade (2006) conclude that in Europe, high speed railway build up the connections between the marginal and central areas. High speed railway significantly improves the city's accessibility (Monzon et al., 2013). Wang and Zhigang (2014) by using "with and without comparison method" in his work and examined that Shanghai, Hangzhou high speed railway positively affects the economic development of Zhejiang province. The result will vary with place and time, hence having no universality.

Huge investment in infrastructure over the period of 1980's and 1990s, the Southeast Asian nations and People's Republic of China have made rapid improvement in their macroeconomic situations including investment, exports and employment. In South Asia sustained economic development involves the substantial up-gradation of infrastructure investment and provision of quality of infrastructure facilities (Sahoo and Dash, 2012).

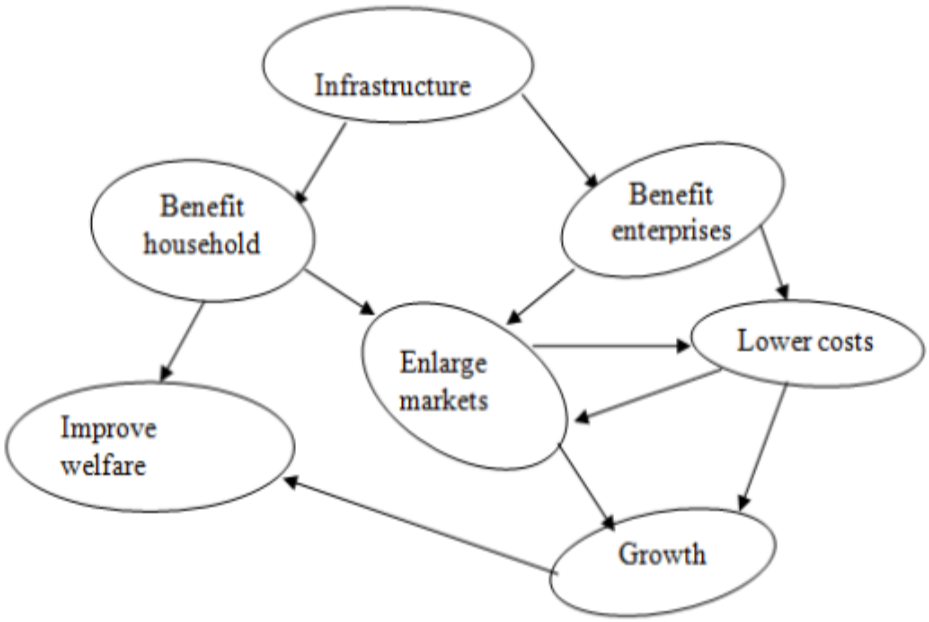


Figure 1: Contribution of Infrastructure in Economic Growth

Source: (Prudhomme, 2005)

2.1- Success Factors in Project.

The survival conditions are becoming heavy-handed where organizations are facing a dynamic environment and their success is dependent to their capacity to adjust their social systems and establish viable relations with their surroundings. In this environment, they are obligated to understand the factors which influence their activities, objectives and effectiveness (Dolan and Schuler, 1994). In recent years, project work environment has become more and more complex and risky. In this context the analysis of factors that limit the failure and success of the projects appeared, accurately because often project results don't meet expectations of stakeholder's (Jugdev and Muller, 2005).

In the projects the key success factors can be viewed as a series of conditions that contributes to the fulfillment of projects (Ika, 2007). Many of the researchers believe that Human resource management is the crucial factor

of an organization's success (Davidson and Fitz, 2002). Now a days Human Resource Management (HRM) is remodeling itself in the organizations (Tsui, 1990).

Nwankwo (2000) believes that an organization's success and failure depend on the quality of workforce, without efficient Human resource (HR) there is no organization, organizations needs money to pay its staff and buy equipment for operation but still they need a capable or productive workforce to put them into effective use.

Todd Barol (2012) analyzed that a poor human resource planning has a countless impact on an organization. Human resource plays an important and invaluable role like administration function within the system. A disorganized and incompetent place of work can be the consequence of failure. The root cause behind Toyota crash is weak HR. In a number of notable cases weak HR is the main reason of failure (Sullivan, 2015). The culture of Uber's company is broken because of inefficient human resource and this is the most constant problem that plagues all companies, no matter what their size[3].

2.2- Human Resource Development (HRD) and Training.

Human resource development is a systematic process of growth and training, by which an individual gain applies knowledgeable vision and attitude to manage the organization and work effectively (Okoye and Raymond, 2013). Adam Smith states that "the capacities of individual depended on their access to education".

To better the individual, group and organizational effectiveness a joint function of training, organization and career development activities are needed, HRD develops the key competencies that enable people in an organization to perform the jobs through planned learning activities. An organization organized the activities in order to develop the performance of an individual. It includes planning and development, organizational growth and career growth (Okoye and Raymond, 2013). In the labor market well-trained labor force is more capable of achieving performance targets and attaining competitive advantage (Pfeffer, 1994). Training is determined as the procedure of enabling employees to finish the task effectively, thus regarded to be a critical element of managing the HR performance strategically (Delaney and Huselid, 1996).

2.3- Relationship between Training and Employee Performance

Guest (1997) mentioned that development and training programs positively affects the workers' productivity and hence results in higher employee performance on the task. Farooq and Aslam (2011) studied that there is a positive correlation between employee performances and training, further they predict that without best utilization of its human resource it is not possible for the firm to generate higher returns, this may be possible only when a firm is able to conform to its employee job related training programs so they can execute efficiently.

Sultana et al., (2012), studied the telecom sector of Pakistan and conclude that variation in performance of an employee is brought by training programs and training is the best predictor of employee performance. Mann et al., (2005), to bridge up the performance gap, implement a relevant training and development programs intervention for developing the particular skills and capabilities of the labor force and enhance the performance of employee.

Wright and Gary (2001), Effective training and development programs change the employee competencies. Training is the crux of better organizational management as it makes labor more productive and effective (Scott et al., 1961). Kulkarni (2013), conclude that well educated labor force is able to establish a fuller use of resources along with a minimal level of wastages.

3- DATA DESCRIPTION AND METHODOLOGY

This is a qualitative study based on descriptive analysis of ML-1 Railways. The data for the descriptive analysis and a comprehensive profiling of ML-1 project will be accumulated from the relevant agencies including the Ministry of Railways, Pakistan Railway academy Walton, Project Implementation Unit and based on purposive sampling technique through structured and semi structured questionnaire. Furthermore, then extensive desktop

[33] Cale Guthrie Weissman, This is what caused uber's Broken company culture: report," Fast company, february,27,2017

survey to research the required skill in railway constructional and functional phases, after examining the current and future state of the railroad industry in Pakistan and overseas. Structuring the collected information according to the codes of labor standards and breaking down the railway related trade levels, further identify the courses which are conducted by Pakistan Railway Academy.

3.1- **Up gradation of Main Line-1(ML-1)**

Main Line-1 of Pakistan Railways is the main corridor for North-South transportation. It is also passenger-freight shared railway line. ML-1 infrastructure has become old and antiquated after being in operation for a long-time. In most of the location the tracks are in delinquent condition and its geometry has deformed in various areas. Pakistan Railway has planned to rehabilitate and upgrading the ML-1 infrastructure under China, Pakistan Economic Corridor with an estimated cost of US$ 6,806 Million. The length of ML-1 extends up to 1,733 km track on ML-1 is broad gauge with 196 small and big stations. ML-1 extends from Kiamari (Karachi) in the south of Pakistan, to Peshawar in the northwest, covering about 1,726km and passing through Hyderabad, Rohri, Rahim-yar-khan, Multan Rawalpindi and Lahore railway stations. ML-1 up-gradation also includes 51km section between Taxila and Havelian and 91km chord line between Lodhran and Khanewal. Speed of passengers to be raised from 110km/h-160km/h and freight trains to operate at 120km/h. To ensure the safety of train operations, it includes grade separation, computer signaling and control system.

Pakistan Railway is responsible for the implementation of this project and work will be caried out by 85% to 90% concessional financing from Chinese Government.

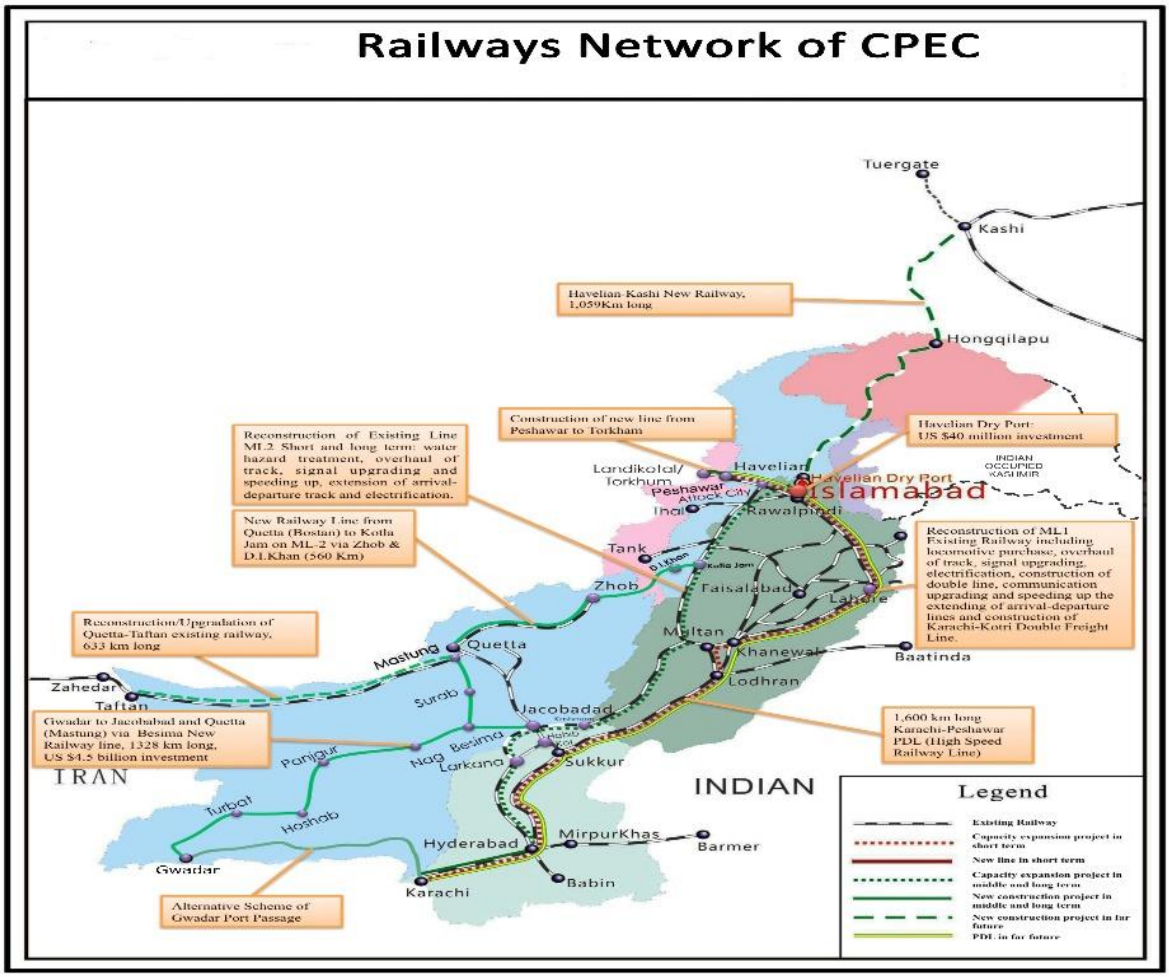


Figure 2 : Railway Segments/Sections falling in ML-1 Source: China Pakistan Economic Corridor

This map shows the railway networks under CPEC. Further show the Existing railway line, Capacity expansion project in short, medium and long term, new line in short-term, New construction project in middle and long term and PDL in far future and also display the railway segments falling in ML-1 under CPEC. Furthermore it shows the major cities from which railway network passes through.

Table 1: Project Area of ML-1

Segments	Length (kms)	Existing Track Parameters
Kiamari-Hyderabad	182	Double track, designed for speed of 110 km/h and axle load of 23.3 tons
Hyderabad-Multan	748	Double track, designed for speed of 110 km/h and axle load of 23.3 tons
Multan-Lahore	334	Double track, designed for speed of 110 km/h and axle load of 23.3 tons
Lahore-Lalamusa	132	Single track, designed for speed of 105 km/h and axle load of 22.86 tons
Lalamusa-Peshawar	330	Single track, designed for speed of 105/80/65 km/h and axle load of 22.86 M-tons
Establishment of Dry port near Havelian		
Upgradation of Walton Academy		
Total	**1726km**	

Source: Project Implementation Unit CPEC

Table 1 display the ML-1 railway sections and their length in kms and also exhibits the existing track parameters of ML-1 which has been divided into seven sections including their speed and loading capacity. Total length of this ML-1 railway line is 1,872 km.

3.2- Time Interval for ML-1 projects under CPEC

The up gradation and reconstruction plan of ML-1 between China and Pakistan under CPEC will be completed in three packages. The following time frames was to be followed for its operations.

Package – 1

Kaluwal – Pindora (52 km)

Multan – Lahore (339 km)

Lahore- Lalamusa (132 km)

Nawabshah – Rohri (183 km)

Walton Academy

Package – 2

Kiamari – Hyderabad (182 km)

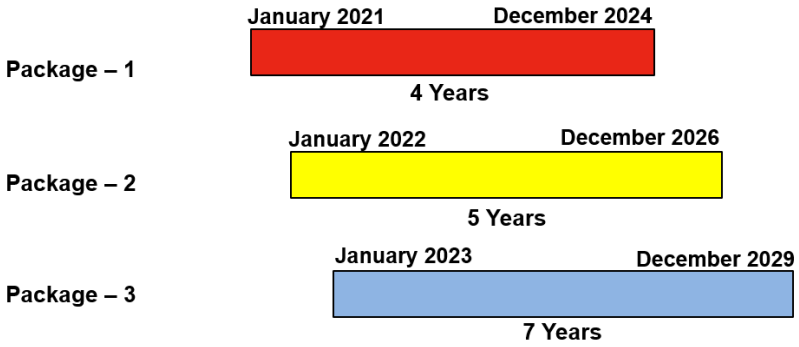
Hyderabad – Multan (566 km)

Package – 3

Peshawar – Rawalpindi including Nowshera- Peshawar Section (174 km)

Lalamusa- Rawalpindi (105 km)

Establishment of Dry port near Havelian



4- RESULTS AND DISCUSSION

The information related to expected number of employments in short and medium term phases of ML-1 and number of trains, projected freight, passengers and traffic is acquired from Project implementation unit (PIU) of CPEC. This project has more than 174,000 job opportunities for local labor and technical experts.

Table 2: Breakup of Job Opportunities

Direct Jobs	*Numbers*	*Indirect Jobs*	*Numbers*
Local Labour/Technical Experts	20,000	Local Labour/Technical Experts	150,000
Chinese Technical Experts	4,000		

Source: Project implementation unit CPEC

This may conclude that in direct job local labor and Chinese Technical experts cover the 5:1 of total employment that is 174,000. On the other side 86% indirect jobs are covered by our local labor.

Table 3: Current and Projected Capacity of ML-1

Increase in Line Capacity from 34-171 Train each way per day
Increase in Freight Volumes from 6 - 35 Million Tons per annum by 2025
Increase in Passenger Trains (ex-Karachi) from 20-40 each way per day
Increase in Railway Share of Freight Transport Volume from Less than 4%-20%

Source: Project implementation unit CPEC

Table 4 shows the current and planned capacity of ML-1 that by doubling the railway tracks the capacity of the line, freight volume, passenger trains and railway share of the cargo transport volume increase. Increase in line capacity means "the number of trains that can be run on section in 24hours".The existing capacity of ML-1 was 34 after its completion, it will be increased to 171 trains each way per day, definitely help out to address the transport demand in a country that is around 208 million. With the increase in line capacity there are three sources of benefits less time per train, more trains per line and more transported freight.

Increase in freight volume requires the development in transport infrastructure. Freight volume is directly associated with transport capacity, as freight transport services cannot be delivered if the infrastructure is undercapitalize, and therefore ineffective. Up-gradation of ML-1 by 2025 will increase the freight volume from 6-35 million tons per anum as its capacity also increases and also facilitate the freight trains at 120km/h.

Robust railways proved the creation of new journeys. If you offer new and improved transport services we can create the demand that wasn't happening before. As the passenger train increases from 20-40 each way per day with design speed of 160km/h. Passenger trains are bringing a profit of Rs. 2 billion. The dual line section from Lalamusa- Peshawar would be projected for speed 120km/h. The minimum radius of curves will be 800m for section to be raised to 120km/h running speed and 1600m for 160km/h running speed of passenger trains. Currently Pakistan railways own 1852 passenger coaches. There are 195 various radii on ML-1 where the speed

to be upgraded at 160km/h, 154 places can meet this requirement of up gradation, speed restrictions on passenger trains will be imposed on the rest of 41 places in the entrance, exit of stations and in the concentrated areas.

The purpose of profit can also be achieved via freight transport. Railway transport is more competitive in high capacity and long distance freight transport. It delivers many advantages such as high-speed, safety, great capacity, long length and less pollution, etc. Presently in railway freight we are standing at embarrassingly lower percentage of 4 and the number of freight fleet are going down over the twelvemonth. Freight fleet owned by Pakistan in 2013-2014 was 16,179. This issue will be addressed after the reconstruction of ML-1 with the increase in railway shares of freight transport volume from less than 4-20%.

Table 4: Railway Job Trades

Major group 1: Managers

Sub major group	Minor group	Unit Group	Description
11			**Chief executives, Senior officials**
	111		**Legislators and senior officials**
		1114	Senior officials of special interest of organizations
		1112	Senior government officials
12			**Administrative and commercial managers**
	121		**Business services and administration managers**
		1211	Finance managers
		1212	Human resource managers
		1213	Policy and planning managers
		1219	Business services and administration managers
	122		**Sales marketing and development managers**
		1222	Public relation managers
13			**Production and specialized services managers**
	132		**Construction and distribution managers**
		1321	Production managers
		1323	Construction managers
	133		**Information and communications technology service managers**
		1330	ICT managers
	134		**Professional service managers**
		1342	Health services managers
		1346	Insurance services managers
		1349	Other managers not elsewhere classified
Major Group 2			***Professionals***
21			**Science and engineering professionals**
	211		**Physical and earth science professionals**
		2114	Geotechnical Engineer
	213		**Life science professionals**
		2133	Environmental protection professionals
	214		**Engineering professionals**
		2141	Industrial engineers
		2142	Civil engineers
		2143	Environmental engineers
		2144	Mechanical engineers
	215		**Electro technology engineers**
		2151	Electrical engineers
		2152	Electronics engineers
		2153	Telecommunications engineers
	216		**Architects, planners, surveyors and designers**
		2164	Town and traffic planners
		2165	Cartographers and surveyors

		2166	Graphic designers
22			**Health Professionals**
	226		**Other health professionals**
		2269	work health professional officers
24			**Business and administration professionals**
	241		**Finance professionals**
		2411	Accountants
		2413	Financial analysts
	242		**Administration professionals**
		2421	Management analysts
		2423	Training and Assessment careers
		2424	Training and staff development professionals
25			**Software developers**
	251		**Software and applications developers and analysts**
		2511	System analysts
		2512	Software developers
		2513	Web designer and developers
		2519	Software and applications developers
	252		**Database and network professionals**
		2522	Systems administrators
		2523	Computer network professionals
		2529	Database and network professionals not elsewhere classified
26			**Legal, social and cultural professionals**
	261		**Legal professionals**
		2611	Lawyers
		2619	Legal analysts
Major group 3		***Technicians and Associate Professionals***	
31			**Science and engineering associate professionals**
	311		**Physical and engineering science technicians**
		3112	Civil engineering technicians
		3113	Electrical engineering technicians
		3114	Electronics engineering technicians
		3115	Mechanical engineering technicians
		3119	Physical and engineering science technicians not elsewhere classified
33			**Business and administration associate professionals**
	334		**Administrative and specialized secretaries**
		3343	Administrative and executive secretaries
35			**Information and communications technicians**
	351		**Information and communications technology operations and user**
		3511	Information & communications technology operations
		3513	Computer network and systems technicians
	352		**Telecommunications and broadcasting technicians**
		3522	Telecommunications engineering technicians
Major group 4		***Clerical Support Workers***	
41			**General and keyboard clerks**
	411		**General office clerks**
		4110	General office clerks
	413		**Keyboard operators**
		4132	Data entry clerks
42			**Customer services clerks**
	422		**Client information workers**
		4221	Travel consultants and clerks
		4227	Survey and market research interviewers
43			**Numerical and material recording clerks**
	431		**Numerical clerks**
		4313	Payroll clerks
	432		**Material-recording and transport clerks**

		4321	Stock clerks
		4323	Transport clerks
Major group 5		***Service and sales workers***	
51			**Personal Services**
	511		**Travel attendants and guides**
		5111	Travel attendants and travel stewards
		5112	Transport conductors
		5113	Travel guides
	516		**Other personal services workers**
		5165	Driving instructors
52			**Sales workers**
	523		**Cashiers and ticket clerks**
		5230	Cashiers and ticket clerks
54			**Protective services workers**
	541		**Protective services workers**
		5411	Fire-fighters
		5414	Security guards
Major group 7		***Craft and related Trades Workers***	
71			**Building and related trades workers, excluding electricians**
	712		**Building finishers and related trades workers**
		7126	Plumbers and pipe fitters
72			**Metal, machinery and related trades workers**
	721		**Sheet and structural metal workers, molders and welders**
		7211	Metal molders and core makers
		7212	Welders and flame cutters
		7213	Sheet-metal workers
		7215	Cable Splices
	722		**Blacksmiths, toolmakers and related trades workers**
		7221	Blacksmiths, hammer smiths and forging press workers
		7222	Toolmakers and related workers
74			**Electrical and electronic trades workers**
	741		**Electrical equipment installers and repairers**
		7412	Electrical mechanics and fitters
		7413	Electrical line installers and repairers
	742		**Electronics and telecommunications installers and repairers**
		7421	Electronics mechanics and servicers
		7422	Information and communications technology installers and servicers
Major group 8		***Plant and Machine operators, and assemblers***	
81			**Stationary plant and machine operators**
	818		**Other stationary plant and machine operators**
		8182	Steam engine and boiler operators
83			**Drivers and mobile plant operators**
	831		**Locomotive engine drivers and related workers**
		8311	Locomotive engine drivers
		8312	Railway brake, signal and switch operators
	833		**Heavy truck and bus drivers**
		8331	Bus and tram driver
Major group 9		***Elementary Occupation***	
91			**Cleaners and helpers**
	912		**Vehicle, window, laundry and other hand cleaning workers**
		9122	Vehicle cleaners
93			**Laborers in mining, construction, manufacturing and transport**
	931		**Mining and construction laborer's**
		9312	Civil engineering laborer's
	933		**Transport and storage laborer's**
		9333	Freight handlers
94			**Food preparation assistants**

	941		**Food preparation assistants**
		9412	Kitchen helpers
96			**Refuse workers and other elementary workers**
	961		**Refuse workers**
		9613	Sweepers and related laborers
		9629	Elementary workers not elsewhere classified

Source: Pakistan Bureau of Statistics and A-Z Rail Career Pathways.

The Constructional and operational unit in railway is mainly divided into three main departments. Infrastructure, Mechanical, Electrical, Civil, Telecom, Signal Engineering Department and Traffic department. Table 5 indicates the required skill sets for a Railway industry according to the codes of labor standards which is divided in to four groups the major, sub major, minor and unit group. From our research, it is identified that Pakistan Railway Academy Walton is responsible for providing basic/required education for the relevant skill sets. The education courses related to railway are mentioned below in table 6 which are conducted by the Pakistan Railway Academy. This information would be beneficial for the local masses to acquire learning/job opportunities in the field of railway industry.

Table 5: Courses under Pakistan Railway Academy

Telecom Engineering	Signal Engineering	Electrical Engineering	Civil Engineering	Mechanical Engineering	Traffic & Commercial	Personnel & Administration
Muawan Telecom	Signal Muawan	Proby Asstt: Electrical Engr	App: Sub Engineer/Way	Apprentice Asst Drivers	Proby ATOs/ACOs	Directly recruited L.D.Cs & U.D.Cs
Muawan (Power supply)	Signal Maintainers	App. Sub. Engr/Electrical	Proby. A.ENs	Apprentice Asst Drivers T-4 NLC	Proby ATOs/ACOs	UDCs for Head Clerks
Asst: Tech/Telecom	App: Sub Engineer signals	Mistry to Jr. Chargemen	App: Sub Engr works	Asst Mechanical Engr	S.M.Group students	Head clerks for office superintendents
Technician (Power supply)	ASEs/ATEs (Proby)	Jr. Chargemen to AEFO/Sr. Chargemen	For Track Machine operators	App: sub: Engineer (C& W)	Guards	Sr. Subordinates for A.P.Os
Sub Engineer Telecom	Signal Maintainer to sub. Engr. Signal	AEFO/Gr-1 to EFO/Gr-II	For work Mistry	Sr. Shed men Tech Drivers/ AFOs for LIOs/LFOs	Train Clerks	**Stores & Purchase**
Sub Engineer Power supply	Signal Muawans to Sig: Maintainer	EFO/Gr-II to AEEs	App: Sub Engineer bridges	For F.Os/workshops	Ticket collectors	ACOs/ACPs
Muawan to Asst: Tech	Sub: Engr. signal to signal inspector	Power Van/T.L Van Operators	AWs for PWIs/Gr-I	Asst Drivers for deputy drivers(literate)-I	Lady reservation clerks	Depot clerk to Ledger Keeper
Muawan (PS) to SS-Fitter(Power supply)	For Asst: sig. Engineer	A.C Attendant	P-way Masteries for AWIs	Asst Drivers for deputy drivers(literate)-II	Section controllers	Ledger keeper to Ward Keeper
SS.Fitter (PS) to Filter (power supply)	For F.O Sig: Shops to AWMs	Ref. Mechanic For A.C Equipment	Work Mistries for AIOWs	Deputy Drivers for drivers(literate)-I	ASMs to SMs	Ward keeper to sub store keeper
Asst: Tech/Technician	Signal Maintainers (Track check, basic electricity)	Muawans /AEEX/EEXR for A.C Coaches	AIOWs for IOWs	Deputy Drivers for drivers (literate)-II	SSM & SSs	Sub store keeper to depot store
Fitter/Asst: Tech(PS) to Technician(Power supply)	Signal maintainer (Token system)	Muawans/AEEXR/EEXR for T.L Equipment	PWs Gr-I for Gr-II	TXRs/Gr-II for Gr-III	Yard Masters(literate)	Sr. subordinates for ACOS/ACPs
Technician Telecom to sub Engineer Telecom	Signal Maintainer (A measuring Tech)		IOWs/Gr-I for GR-II		C.M & S.R.S	
Tech power supply to sub Engineer/Tele(P/supply)	SES/S I Signal (T.C SIEMENS. Arl Auto Block)		Bridge Mistries for AIFXs		Rates inspectors	
Sub Engr. Telecom to F	SES/S Inspector (LM		AIFXs for IFXs for Gr-I		Commercial	

O/Telecom	Ericson)				Superintendent	
Sub Engr. (Power supply) to foreman(P/Supply)	SES/S Inspector (Westing House Sys)		IFXs/Gr-1 for Gr-II		TCR/Gr-II	
F.O/Telecom to Asst. Telecom Engr	SES/S Inspector (Sig Installation)		Boring Mistries for Asstt: Chargemen		TCR/Gr-III	
F.O/Tele PS to Asst. Telecom Engr			Asst: Chargemen for F.O/Driving		Head ticket Inspectors	
Tech: Telecom			Sr. subordinators for A.ENs		STE	
Sub Engineer & F.O Tele (Power supply system)					GISTE	
Sub Engineer & F.O Tele (VHF Radio)					DISTE	
Sub Engineer & F.O Tele (Digital measuring Tech)					Sr. subordinates for ATO/ACOs	
Sub Engineer & F.O Tele (M/W radio)					Guards II	
Sub Engineer & F.O Tele (UHF Radio),(Telecom system network)						

Table 6 indicates the complete course list of Pakistan Railway Academy. Different Engineering fields, stores and purchase, Traffic & commercial, personal and administration related courses are enclosed in this table to better prepare the domestic labor.

CONCLUSION & RECOMMENDATIONS:

It is concluded that, during the period of ML-1 completion from (2016-2026) this project will create 174,000 direct and indirect job opportunities for the unemployed youth of Pakistan. Further identify that Human Resource Development (HRD) is one of the significant features for socioeconomic development and it depends heavily upon human capital formation, through investing in people and uplifting the capacity building of domestic labor via Pakistan Railway academy, specifically according to the needs of ML-1 project under CPEC. Training and capacity building of labor is considered as important as up gradation of railway infrastructure, so for its practical implementation, following are the recommendations for human resource development and job growth.

- The vigorous railway system has a significant impact on the economic growth by country, as developing nations are facing an increasing demand for more carrying capacity to meet the growth in transport needs, so they designed the improved railroad system to address the transport demand. A better railway infrastructure enabled a substantial reduction in cost of transport, leading to lower prices of goods will encourage the investment and spending, improving living standards, and creation of new industries like tourism. The new stream railway (ML-1) technology quite possibly had a bigger impact on economic growth of Pakistan.
- Job growth under CPEC projects across Pakistan may mitigate the unemployment rate by offering work opportunities to local labor while fulfilling labor demands of international employers venturing in CPEC projects. For this purpose specifically for a ML-1 project under CPEC "Pakistan Railway Academy Walton" needs to be raised with additional installations/facilities, technological advancement, hostels and robust infrastructure for the sake of capacity building of the domestic labor because no sustainable development can be accomplished if the Human Resource (HR) is not prepared to handle the modifications.
- The existing rate of unemployment is (5.90%) that can be managed by providing employment opportunities through ML-1 project that is 174,000 linking this unemployed local mass with the project would help to resolve the issue of unemployment.
- Pakistan railway Academy need to be up-graded as university and technical collaboration with Rail road research institutions, so it can commission the modern technologies for skill transfer to its local labor and need to stay informed of market change through updated curriculum, quality training, and skill levels especially for low and semi-skilled labor force.
- In China, Europe and Philippines, labors have certifications, qualifying them for a particular job. A labor cannot be deployed on the working floor without training. Pakistani employers are too short sighted to invest in the productivity of their labor force. So we need to seek the help of Chinese technical experts for raising the domestic labor skills to better secure the job and get more productive.

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