THE FUTURE OF POSSIBILITIES

It is rather difficult to predict the future, so what we offer are the alternatives – but what good are the alternatives when we are not aware of the questions that are needed to be answered. And by the time we even begin to dream of the possibilities, the realities we confront hold us firmly locked in the present, almost forcing us to turn our back towards our destinies facing the long-gone forgotten past. It takes courage to imagine. The science of it all tells us one thing, and peoples belief motivates them otherwise, this is a tricky balance. The paradigm can shift if the intensity for change is a desire systematically intertwined with the not so forgotten past, the concreteness of now, and the longing for a better tomorrow. The human societies developed concepts, invented time, created technology; the vastness of this civilization tends to pass on the burden of responsibility from one generation to the next. The 2029 Edition of Pakistan State of Future Index offers a continuum of ideas, thoughts and perspectives. And as you go through them, newer questions should arise; ones that would almost make you believe and doubt both at the same time – 'What if' and then maybe 'So, what'.

Puruesh Chaudhary
Founder, Foresight Lab

PAKISTAN STATE OF FUTURE INDEX

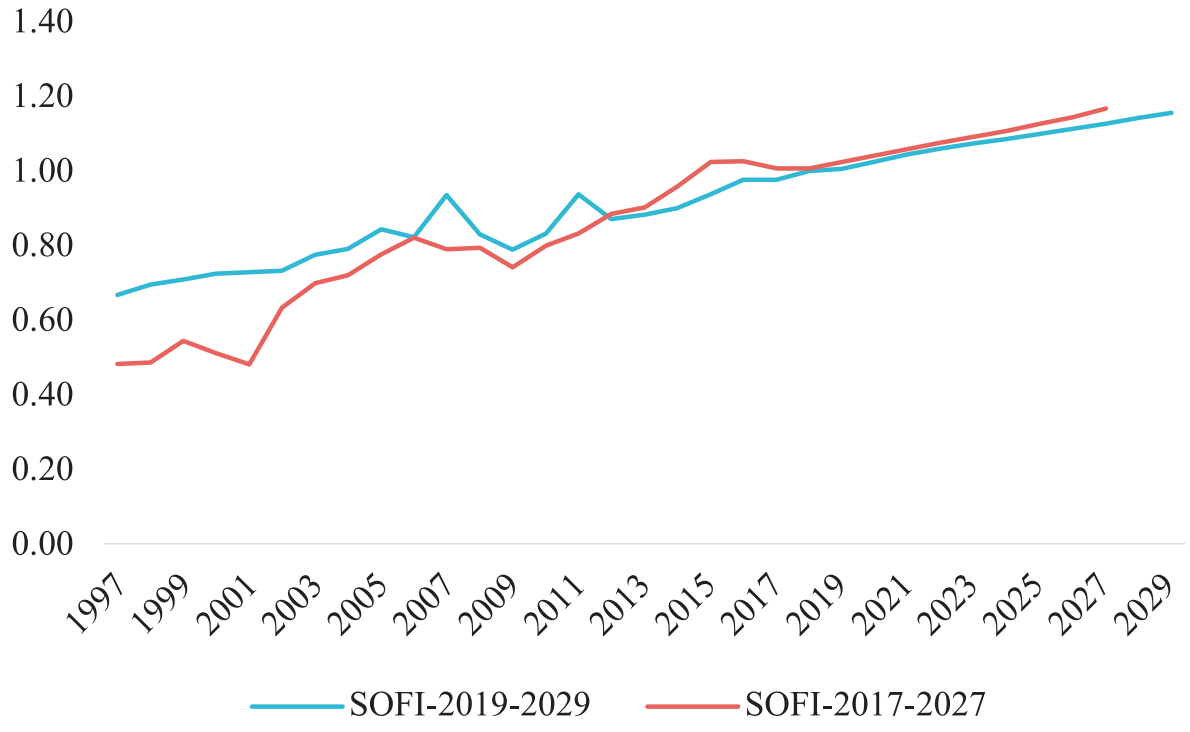
Overview

In 2017, AGAHI launched Pakistan State of the Future Index (PK-SOFI), an inaugural study based on pre-selected variables, to show whether the future outlook is improving or not. The PK-SOFI is a measure of the 10-year outlook of the future based on twenty (20) years or more worth of historical data. It is constructed using key variables and forecasts that, in the aggregate, depict whether the future promises to be better or worse. The index is intended to show the directions and intensity of change and to identify the factors responsible for that change. It also provides a mechanism for studying the relationships among the variables and developments analyzed. PK-SOFI was constructed using the results of the Realtime Delphi (RTD) study in 2017 followed by one in 2019 on the inclusion of two new variables.

The Realtime Delphi approach is an online group facilitation technique, which is an iterative multistage process, designed to transform opinion into group consensus. Earlier this year AGAHI trained more than 200 academics on Realtime Delphi (RTD). The RTD approach in an online group facilitation technique, which is an iterative multistage process, designed to transform opinion into group consensus. AGAHI with a team of local experts developed the platform for the knowledge community in Pakistan.

The 32 variables in the 2029 edition covers: population, CO2 emissions (kt), alternative and nuclear energy (% of total energy use), food production index, forest area (% of land area), freedom level, GDP per capita (constant 2010 US$), GDP per unit of energy use (constant 2011 PPP $

SOFI comparison



per kg of oil eq), intentional homicides (per 100,000 people), mortality rate (infant; per 1000 live births), individuals using the internet (% of population), CPIA (transparency, accountability, and corruption 1=low to 6=high), life expectancy at birth (total; years), youth literacy rate (population; 15-24 years, both sexes %), refugee population by country or territory of origin, people killed or injured in terrorist attacks, physicians (per 1000 people), population growth (annual %), improved water source (% of population with access), poverty headcount ratio at $1.90 a day (2011 PPP; % of population), malaria (confirmed with microscopy), research and development expenditure (% of GDP), tertiary education (universities), proportion of seats held by women in national parliaments (%), total debt service (% of GNI), unemployment, (total % of total labor force - national estimate), imports (millions US $), exports (millions US $), federal taxes (total; millions PKR), inflation (consumer prices; annual %), internal debt (million US $), external debt (million US $).

In July 2019, AGAHI in collaboration with Strategic Vision Institute held a brainstorming session to map out possible developments that would have an impact on the country's future condition. The session was attended by gathering of academics, policy analysts, security strategists, media professionals, political representatives. The participants explored the TIA approach. TIA is a method analyzing the consequences of future developments on a future trend by systematically examining effects of possible future events that are believed to be important. The participations from the session highlighted more than 150 developments that could have an impact on the country's future condition; this session was followed-up in interactions with multiple stakeholders, which included the academia, civil bureaucracy, national security analysts, intelligence community, economists, scientists, scholars, entrepreneurs, political leadership, students.

As a national focus index, PK-SOFI extrapolates a set of unique global and country variables that are highly relevant to developments in Pakistan and to the region.

Methodology and Approach

Step 1: Choosing the variables

Experts from The Millennium Project and collaborative network of universities and think tanks finalized the selection of the variables to be computed, which became the foundation of this National Focus SOFI

Step 2: Obtaining the historical data

Annual national historical data for selected variables were collected. The data extends 22 years back in time. For the years in which data was missing, the missing points were approximated by interpolation using an equation obtained by fitting the available historical data points

Step 3: Extrapolating the data

The historical data presented in this study ranges from the year 1997 to the year 2019. The value of each variable from 2019 onwards to 2029 were forecasted using various statistical techniques and each variable was given a curve fit that gives it a reasonable coefficient of determination(R2)

Step 4: Non-dimensionalizing the variables

Since each of the 32 variables have a different measure, it was therefore necessary to non-dimensionalize each variable so that they can be computed in comparison. This was done by picking a maximum and minimum value from each data set

Step 5:Weighting the variables

The Lab's collaborative network assigned weightage to each of the variable i.e providing the level of priority up to 10 being most essential. More than 20 experts participated in the National Focus SOFI

Step 6: Best and Worst Values

The Lab's collaborative network also provided the best and worst possible value of a variable in the next ten years

Step 7: Surprise free SOFI Computation

The non-dimensionalized values of each variable per year were multiplied with weightage assigned to that variable. The sum of each variable across the time period of 33 years (1997-2029) was calculated and divided by the sum value of the base year (2019)

Step 8: Inputs to the Trend Impact Analysis

A list of possible developments with their respective probabilities of occurrence is required and then two estimates are required for each development. First is the level of impact if the development occurs and the second is an estimate of the time required to reach this level of impact is required.

Step 9: Running the TIA

With the TIA inputs in hand, the actual TIA solution is made using a Monte Carlo Simulation. The "play" involves choosing a random number between zero to 100 for each development. If the probability of a development in a given year exceeds the random number, it is said to occur. The impact of events are then added algebraically to determine the total impact on the extrapolated curve in a given year.The resulting curve is saved and the process is repeated 100 times.each of these 100 runs can be considered as a mini scenario. Lower Quartile, Median and Upper Quartile is then computed from these 100 mini scenarios

Step 10: Final SOFI Calculation

The standard SOFI process from step 4 to step 7 is repeated once with upper quartile, once with the median and once with the lower quartile.

The Variables

Thirty-two (32) variables were selected by members of AGAHI's Foresight Lab; internal and external debt which weren't present in Pakistan State of Future Index 'Anticipating 2027' were included in the updated edition. Then, twenty (20) years or more of historical data were assimilated from multiple sources to construct the index. These variables were also projected for the following ten (10) years using statistical forecasting techniques and expertise to construct the baseline PK-SOFI for the period 2019-2029.

Variable	Unit	Best Value	Worst Value	Extreme Data Point in the desired Direction	Extreme Data Point in the undesirable Direction	Upper Good Limit	Lower Bad Limit
population	in millions	125.000	185.000	131.057	252.844	125.000	252.844
CO2 emissions (kt)	kt	160,000.000	250,000.000	94,711.276	250,804.400	94,711.276	250,804.400
alternative and nuclear energy (% of total energy use)	% of total energy use	6.000	4.500	5.955	2.009	6.000	2.009
food production index	2004-2006 = 100	150.000	100.000	170.699	80.820	170.699	80.820
forest area (% of land area)	% of land area	2.100	1.200	2.905	1.134	2.905	1.134
freedom level	index (points)	30.000	20.000	57.900	52.800	57.900	20.000
GDP per capita (constant 2010 US$)	constant 2010 US$	200.000	100.000	1,345.980	806.646	1,345.980	100.000
GDP per unit of energy use (constant 2011 PPP $ per kg of oil eq)	constant 2011 PPP $ per kg of oil equivalent	20.000	10.000	13.657	7.442	20.000	7.442
intentional homicides (per 100,000 people)	per 100,000 people	2.000	10.000	6.328	8.552	2.000	10.000
mortality rate (infant; per 1000 live births)	per 1,000 live births	40.000	70.000	42.769	93.600	40.000	93.600
individuals using the internet (% of population)	% of population	85.000	40.000	33.010	0.028	85.000	0.028
CPIA (transparency, accountability, and corruption 1=low to 6=high)	1=low to 6=high	6.000	2.000	4.741	2.433	6.000	2.000
life expectancy at birth (total; years)	years	72.000	65.000	69.505	61.961	72.000	61.961
youth literacy rate (population; 15-24 years, both sexes %)	% of people ages 15-24	95.000	75.000	90.381	55.331	95.000	55.331

refugee population by country or territory of origin	numbers	1,500,000.000	2,000,000.000	5,985.000	335,961.000	5,985.000	2,000,000.000
people killed or injured in terrorist attacks	numbers	9.000	5,000.000	20.000	10,436.000	9.000	10,436.000
physicians (per 1000 people)	per 1,000 people	11.000	7.000	1.174	0.609	11.000	0.609
population growth (annual %)	annual %	1.500	1.800	1.539	2.870	1.500	2.870
improved water source (% of population with access)	% of population	98.000	90.000	38.287	34.642	98.000	34.642
poverty headcount ratio at $1.90 a day (2011 PPP; % of population)	% of population	10.000	20.000	7.900	29.567	7.900	29.567
malaria (confirmed with microscopy)	total registered cases	10,000.000	500,000.000	79,437.000	4,553,732.000	10,000.000	4,553,732.000
research and development expenditure (% of GDP)	% of GDP	0.550	0.330	0.633	0.109	0.633	0.109
tertiary education (universities)	numbers	1,650,000.000	1,500,000.000	4,440,861.630	91,637.000	4,440,861.630	91,637.000
proportion of seats held by women in national parliaments (%)	%	25.000	20.000	22.500	9.015	25.000	9.015
total debt service (% of GNI)	% of GNI	1.500	3.000	0.839	6.629	0.839	6.629
unemployment, (total % of total labor force - national estimate)	national estimate	5.000	10.000	0.400	7.830	0.400	10.000
imports (millions US $)	current US$	47,000.000	45,000.000	10,684.436	81,021.800	81,021.800	10,684.436
exports (millions US $)	current US$	40,000.000	20,000.000	40,127.230	9,668.691	40,127.230	9,668.691
federal taxes (total; millions PKR)	million PKR	5,000,000.000	2,500,000.000	8,836,028.500	293,631.000	8,836,028.500	293,631.000
inflation (consumer prices; annual %)	annual %	5.000	10.000	2.529	20.286	2.529	20.286
internal debt (million US $)	million US $	259,000.000	290,000.000	25,740.66	368,812.52	25,740.661	368,812.520
external debt (million US $)	million US $	145,000.000	170,000.000	33,596.00	171,901.44	33,596.000	171,901.440

Potential Developments

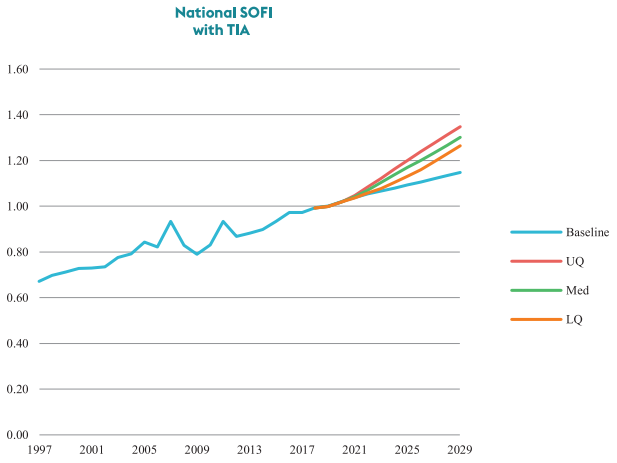
The participants in the Trend Impact Analysis Session provided their assessment of the probability of occurrence for over a hundred potential future developments, which were later distilled and, in many cases, combined to a total of 50. These developments included ones which were domestic in nature, to the ones that have regional implications.

Sr No.	Development	Probability (%)
1	Judicial reforms including improved election processes, education, and paperwork reduction result in a 50% decrease in backlogged cases	5
2	Terrorists make credible threat to explode a dirty bomb and contaminate an urban area of 10 blocks	5
3	Terrorist induced epidemic: e.g. a man-made lethal worldwide epidemic has infected 100,000 people	10
4	Essentially all government agencies in Pakistan adopt the use of formal foresight methods in establishing official policies and plans	10
5	New and effective regulations designed to combat extremism are introduced; Madrassahs improve curricula and quality of teaching and remove divisive and discriminatory narratives.	10
6	Growth rate of the IT industry in Pakistan exceeds 45% per year	20
7	The pharmaceutical industry in Pakistan expands to a value 25% greater than at present	20
8	Women hold 45% of the seats in the National Assembly	20
9	Pakistan becomes self-sufficient in agriculture	20
10	Pakistan falls into recession; economic growth rate drops below zero for two years in a row	25
11	Efficiency of government agencies in Pakistan matches that of industrialized countries	25
12	Pakistan's literacy rate reaches 80%	30
13	Extensive use in Pakistan of social media to promote social goals and objectives: funding reaches 10% of military budget	20
14	Unemployment among Pakistan youth drops to less than 4.5%	30
15	Climate change makes weather patterns less predictable: agricultural production drops by 10%	30
16	Automotive exports from Pakistan increase by 35%	30
17	IT exports increase by 25%	30
18	Pakistan's trade deficit is cut in half	30
19	National electronic currency becomes regulated in Pakistan	40
20	Educational reforms in Pakistan's prove effective as measured by comparative statistics	40
21	Popular dissatisfaction with aspects of governance in Pakistan leads to doubling of the frequency of organized protests and marches	40
22	Repressive police methods are employed and tolerated; these include use of torture, loss of habeas corpus, loss of privacy, etc	40
23	Policies are established that guarantee all persons minimum income, a safe environment, and adequate housing	40
24	Methods for suppressing the HIV virus (Anti-Retroviral Treatment (ART)) are cheap, effective, and available	40
25	Epidemics erupt; questions exist about their origin: natural, facilitated by climate change, or manmade (e.g. by terrorists)	50
26	Climate change continues; temperatures rise, storms increase in frequency and intensity. Pakistan implements plans to cut carbon emissions by 30%	50

27	Pakistan implements plans to cut food waste by 30%	50
28	Kashmir issue resolved; border skirmishes end	50
29	Public opinion, new regulations, and strict enforcement drop corruption in half	50
30	Long range peace accord is established between Pakistan and India	50
31	At least two cities in Pakistan are being remade into smart cities	50
32	Pakistan ends support of terrorist groups; sanctions and diplomatic isolation end	60
33	India distances itself from US and integrates into the region	60
34	Education system revamped: new curricula, facilities, attention to skills and jobs	60
35	Over 97 percent of Pakistan's population has access to electricity	60
36	Rebirth of the importance of religion in daily life; time for prayer and contemplation grows 10%	60
37	Doubling of percent of people in Pakistan on high speed internet	60
38	Growing distrust of the global financial systems as banks make bad and sometimes fraudulent moves and integrity of the system is questioned as a result of intrusion by terrorists	60
39	50% of the respondent are optimistic about Pakistan's future in a public opinion survey carried out	60
40	Earthquake displaces, kills, or injures 100,000 people in Pakistan	70
41	Open and protracted war erupts between US and China	70
42	Pakistan, Iran, and Afghanistan form economic, and political alliances	70
43	Military alliance formed among Pakistan, Iran, Afghanistan and other countries in the region	70
44	In Pakistan, online time of people under age of 30 reaches 50 hours per week	70
45	Pakistan implements economic policies and incentives designed to attract new business, particularly high tech	70
46	Pakistan continues to lag other countries in computing (e.g. quantum computing, computer science, etc.)	70
47	Volume of outsourcing of services by Government agencies to private companies' doubles	70
48	Trade policy of Pakistan favors increased trade with China	80
49	Pakistan continues to rely on debt to fund its economy	90
50	US withdraws from Afghanistan	90

Strategic Relevance – Trend Impact Analysis

As complexities emerge, and the pace of change becomes a critical driver for assessing developments and the direction in which many of the factors would move in – it essential for the decisionmakers to equip themselves with the necessary knowhow of how the evolve nature of the environment will impact the future conditions of the country and what they mean the population.



Although Pakistan's financial position suffered a hit in the initial period after the implementation of the new fiscal

plan, interestingly enough, Pakistan's economic prospects appear to be improving; although at a pace that may not be acceptable to many analysts. Recently, the International Monetary Fund (IMF) had a very positive outlook for Pakistan and said that it was on track for economic recovery. Pakistan has been on the forefront of receiving loans from various agencies including the World Bank, Asian Development Bank, IMF and various other countries, the Economic Corridor, a China - Pakistan led development programme that aims at promoting inter-regional connectivity enabling a great deal of interest to regional as well as global trading stakeholder is changing those dependency dynamics. Natural disasters like earthquakes and floods have caused catastrophic damages not only to the country's economy but have also claimed thousands of lives. Historically, natural disasters such as the 2005 earthquake claimed more than 70,000 lives. Many of these human casualties could have been averted if Pakistan had the infrastructure.

According to Labour Force Survey an area-wise analysis suggests that the literacy rate increased in both rural and urban areas. However, the central challenge of education reform in Pakistan is to improve education quality — measured by 'student learning outcomes', eliminate cheating, corruption in exam boards and out of school children being some of the prominent factors for what students are expected to know or be able to do — rapidly, affordably, and at large scale. Pakistan's market for computer software has seen steady growth for the past several years. According to the Pakistan Software Export Board (PSEB), the total size of the software sector is approximately $6.5 billion, which is expected to grow at least 3.5 percent in the next five years. The local software market is export-orientated; however, it is dependent on imports for the latest technologies and services. During FY 2018-19, Pakistan's software exports were approximately $5 billion, which is 8 percent higher than the previous year. Showing signs of improvement, the leadership is focused on providing greater ease and access to its citizens with mobile applications promising prompt and tangible actions against complaints received. NADRA's 24-hour service to its citizens is a benchmark of service excellence, however, there are certain government departments that still need an overhaul but initiatives like digital Pakistan promise a high-end dividend in the future for its citizens. The country has a very vibrant and forward-looking Pharma Industry. At the time of independence in 1947, there was hardly any pharma industry in the country. Today Pakistan has about 759 pharmaceutical manufacturing units including those operated by 25 multinationals present in the country. The value of pharmaceuticals sold in 2007 exceeded US$1.4bn, which equates to per capita consumption of less than US$ 10 per year and value of medicines sold is expected to exceed US$2.3 B by 2012.

Successful military operations like Zarb e Azb, Operation Khyber, Rah e Rast and countless others to stabilise the tribal region of Pakistan have been effective. The security of the country will further improve as Pakistan successfully restores democratic stability in these areas and make them part of the assemblies and their representations in parliament. The relations between India and Pakistan have been complex and largely hostile due to a number of historical and political events. However, Pakistan has been keen to promote peace and opening up of Kartarpur corridor is an example to

strengthen the relationship between the two countries.

The purpose of conducting the trend impact analysis was to create a base for the policymakers to be analyzing the consequences of future developments on a future trend by systematically examining effects of possible future events that are believed to be important. This in no way gives a precise outlook yet a very generic comprehension of accommodating events in a quantitative projection of the future, taking into account perception of how they may change the quantitative 'surprise free' forecasts of the future.

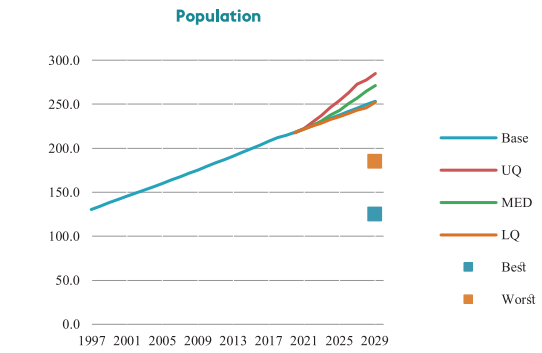
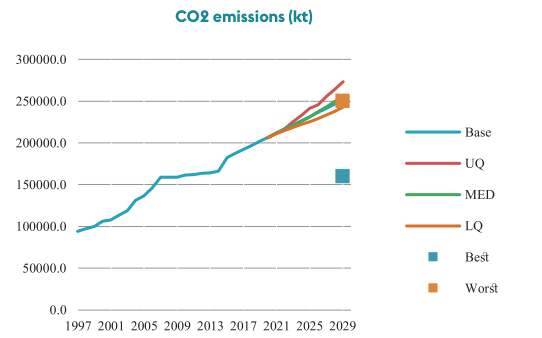
The national focus Pakistan State of Future Index with Trend Impact Analysis provides:

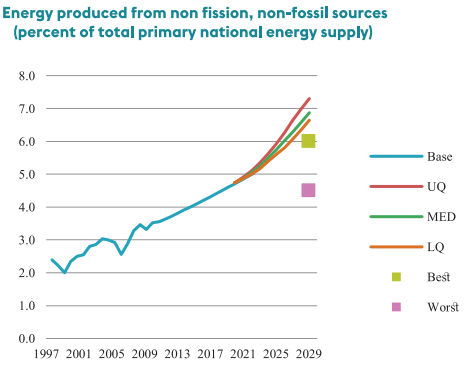
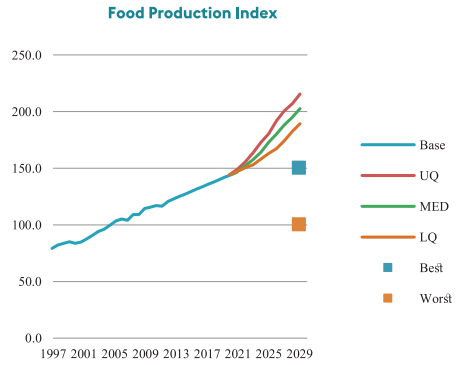
- TIA Provides a systematic means for combining surprise free forecasts with judgement about the probabilities and impact of selected future event
- Impact of events is identified from its 'time of occurrence'
- After identification of expected time of occurrence of an event, the time is identified when
  a) Event starts affecting the surprise free trend line
  b)Event has maximum impact

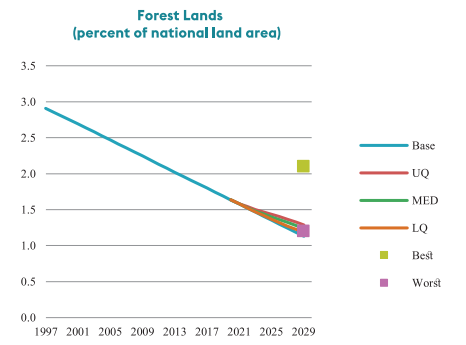
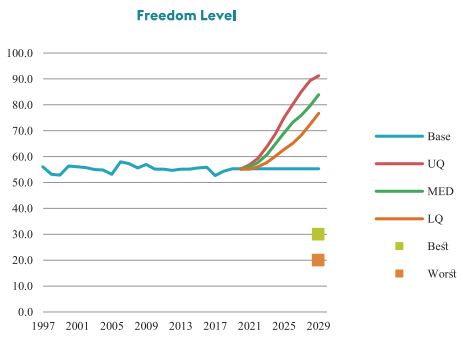
Event impact reaches final or steady state level; the impact of the potential developments indicates marginal change in the overall outlook

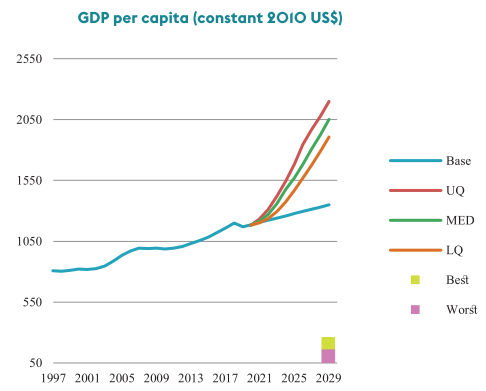
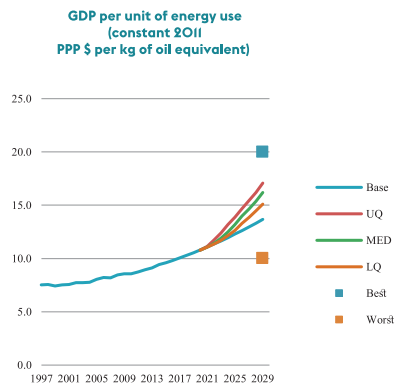
Year	Baseline	Upper Quartile	Median Quartile	Lower Quartile
2019	1.00	1.00	1.00	1.00
2020	1.02	1.02	1.02	1.02
2021	1.04	1.05	1.04	1.04
2022	1.05	1.08	1.07	1.06
2023	1.07	1.12	1.10	1.08
2024	1.08	1.16	1.14	1.10
2025	1.09	1.20	1.17	1.13
2026	1.10	1.24	1.20	1.16
2027	1.12	1.27	1.23	1.19
2028	1.13	1.31	1.26	1.23
2029	1.15	1.35	1.30	1.26

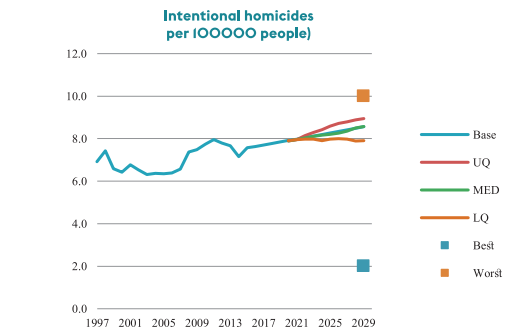
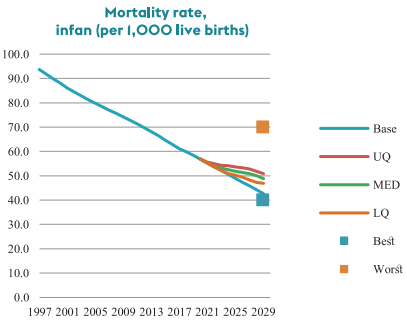
Many of today's burgeoning policy challenges are complex in the sense that they are emergent result of the interaction between many intertwined actors and factors. This then also implies that the solutions to these challenges are likely to be the emergent result of the actions of a variety of different factors that are directly or indirectly involved in shaping the future discourse.

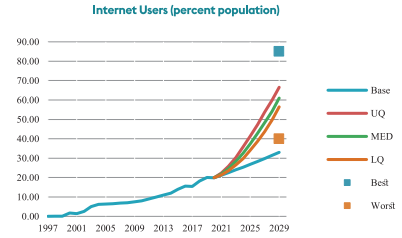
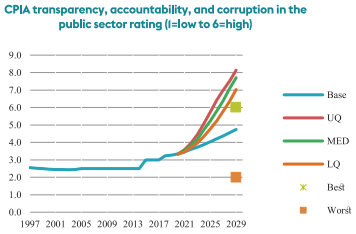
	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Linear
O.99	O.9679
Equation: y = 3.8295x + 126.47	Equation: y = 4882.8x + 89672
Explanation: Population, total is increasing with a consistent increase producing continuous change in drift term and very low variance because values are strictly around the trend historically. Thus, this variable projection was done with constant and a linear function of positive slope.	Explanation: CO2 emissions (kt), is increasing upward historically that is seeing a linear upward trend. Thus, this variable projection was done with a constant and a positive slope producing upward trend
Average 1997-2019	Average 1997-2019
172.426	148265.708

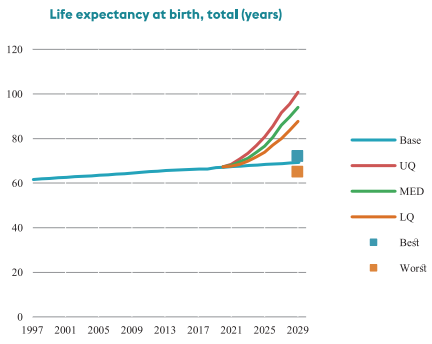
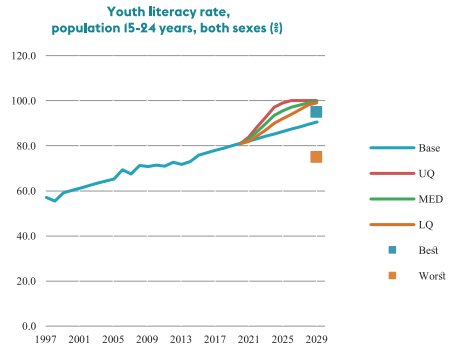
	
SOFI Baseline Trend: Quadratic	SOFI Baseline Trend: Linear
O.9174	O.985
Equation: y = O.OOO8x2 + O.O88Ix + 2.1764	Equation: y = 2.8796x + 75.672
Explanation: Alternative and nuclear energy (% of total energy use), is increasing upward rapidly with slightly variation producing quadratic curve historically that is seeing a quadratic upward trend. Thus, this variable projection was done with a quadratic equation.	Explanation: Food production index (2OO4-2OO6=IOO), is increasing upward historically that is seeing a linear upward trend and values are not showing deviation around variance much. Thus, this variable projection was done with a constant and a positive slope producing upward trend by linear regression
Average I997-2OI9	Average I997-2OI9
3.386	IIO.227

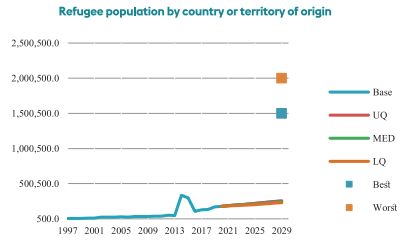
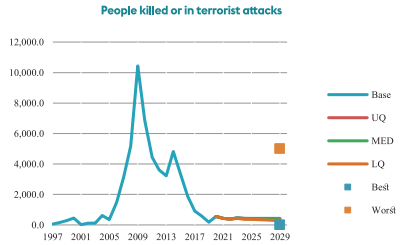
	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Logarithmic
O.99	O.OI
Equation: y = -O.O555x + 2.9653	Equation: y = O.O867ln(x) + 55.O5
Explanation: Forest area (% of land area) witnessed historically decreasing, consistently and producing downward trend. Thus, this variable projection was done with a constant and a negative slope producing downward trend by linear regression	Explanation: Freedom level historical data is showing much variation year to year in terms of variance around trend but still showing stationary behaviour. Thus, this variable projection was done with a log-linear model to check the variation
Average I997-2OI9	Average I997-2OI9
2.299	55.244

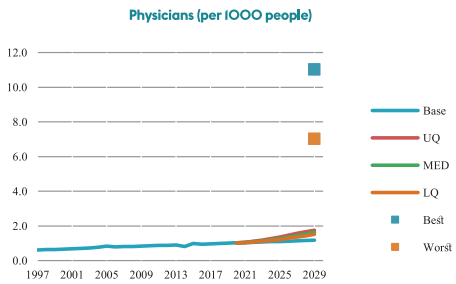
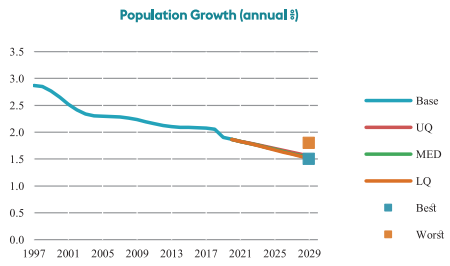
	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Quadratic
0.9546	0.9952
Equation: y = 17.87x + 756.27	Equation: y = 0.0054x2 + 0.0093x + 7.4692
Explanation: GDP per capita (constant 2010 US $) values historically showing upward trend with a slight variation. Thus, this variable projection was done with a linear regression model with a positive slope.	Explanation: GDP per unit of energy use (constant 2011 PPP $ per kg of oil equivalent) historically showing upward trend consistently. Thus, this variable projected with a linear regression with a positive slope
Average 1997-2019	Average 1997-2019
970.706	8.597

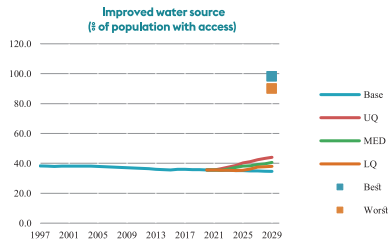
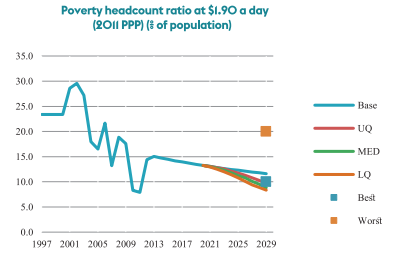
	
SOFI Baseline Trend: Exponential	SOFI Baseline Trend: Linear
0.5014	0.99
Equation: y = 6.4188e0.0087x	Equation: y = -1.5614x + 94.295
Explanation: The intentional homicide data is showing a low upward trend in the beginning and then downward trend. The projection of intentional homicide is done by using exponential equation because this equation was better fit for the future trend as well as historical data	Explanation: Mortality rate, infant (per 1,000 live births) data is showing consistent decrease with changing mean and constant variance and producing linear downward trend. Its projection is done with linear regression having negative slope with a positive constant.
Average 1997-2019	Average 1997-2019
7.149	75.558

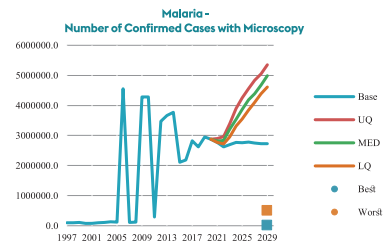
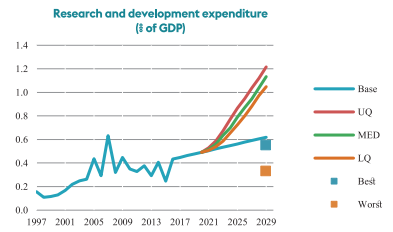
	
SOFI Baseline Trend: Quadratic	SOFI Baseline Trend: Quadratic
0.9735	0.8698
Equation: y = 0.0183x2 + 0.4027x - 0.2722	Equation: y = 0.0039x2 - 0.066lx + 2.6747
Explanation: Individual using the internet (% of population) data was showing over all upward trend and kept moving upward without any anomaly and deviation in the value. The projection of individual using the internet is done by using Quadratic equation because this is the better fit for historical as well as future trend	Explanation: This variable was showing a slight but gradual increase in mean and then it became constant and then produced abrupt increase. All these showing change in mean and variance with upward trend pattern. Thus, this variable projection is done through quadratic equation which matched the historical and future pattern with changing variance showing dispersed values around trend historically.
Average 1997-2019	Average 1997-2019
8.004	2.622

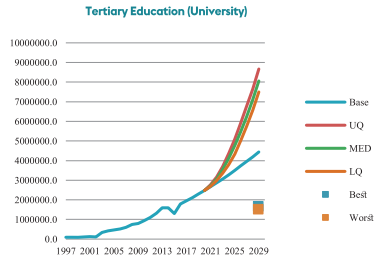
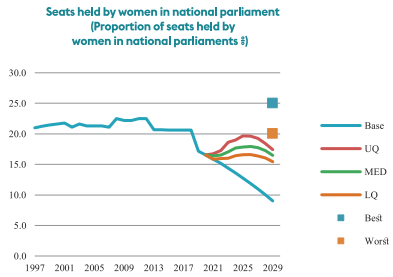
	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Linear
0.99	0.9714
Equation: y = 0.234x + 61.783	Equation: y = 1.0461x + 55.86
Explanation: Life expectancy at birth, total (years) data was showing consistent gradual increase in mean/drift term with constant variance having no anomalies and it was producing linear upward trend. Thus, this variable projection was done by using linear equation with positive slope and drift term.	Explanation: Literacy rate, youth total (% of people ages 15-24) data was showing a slight consistent and gradual increase in mean/drift term with a little bit variation in variance having a few dispersed values around trend but this dispersion not able to produce any anomaly or polynomial. It was producing linear upward trend with changing mean along non-constant variance. Thus, this variable projection was done by using linear equation with positive slope and drift term.
Average 1997-2019	Average 1997-2019
64.591	68.414

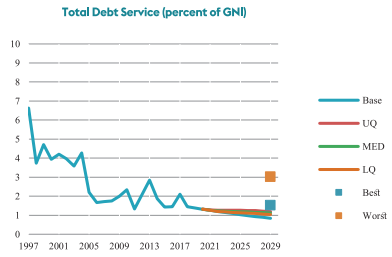
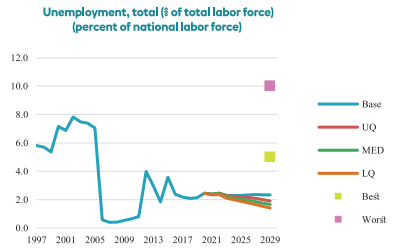
	
SOFI Baseline Trend: Linear	SOFI Baseline
0.4566	
Equation: y = 8926.4x - 36899	Equation: Trend: 3-years Moving Average
Explanation: Refugee population by country or territory of origin data was showing change in mean, variance and tow anomalies. But after two anomalies mean level came down and followed previous pattern and altogether it produces upward trend with changing mean and variance. Thus, this variable projection was done by using linear equation with positive slope and drift term.	Explanation:
Average 1997-2019	Average 1997-2019
790809.470	2273.527

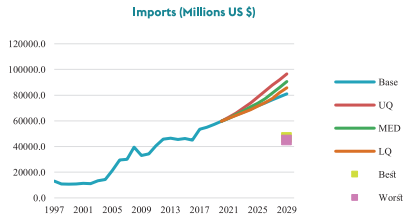
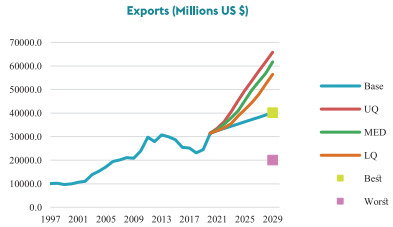
	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Linear
0.9369	0.8731
Equation: y = 0.0172x + 0.6064	Equation: y = -0.0364x + 2.7397
Explanation: Physicians (per 1,000 people) data was showing consistent gradual increase in mean/drift term with a little variation in variance but having no anomalies and it was producing linear upward trend. Thus, this variable projection was done by using linear equation with positive slope and drift term.	Explanation: Population growth (annual %), is consistently decreasing linearly, and its mean and slope are showing negative relationship and producing negative linear trend historically. Thus, this variable projection was done with a constant and a negative slope
Average 1997-2019	Average 1997-2019
0.813	2.303

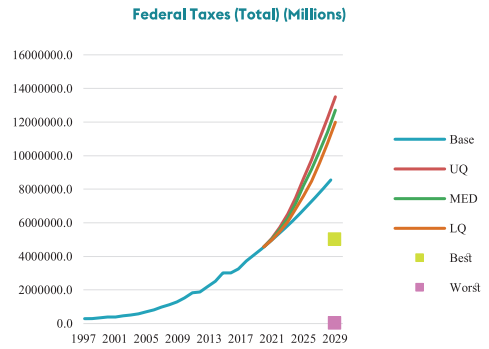
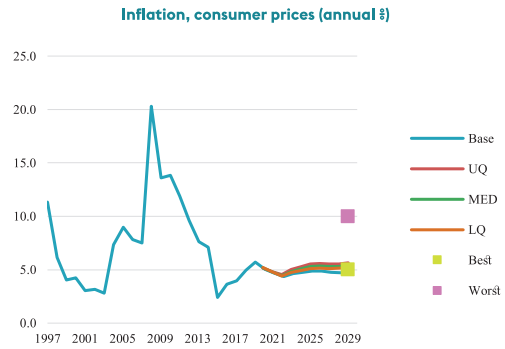
	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Logarithmic
0.8635	0.3775
Equation: y = -0.1139x + 38.401	Equation: y = -5.121ln(x) + 29.529
Explanation: People using safely managed drinking water services (% of population) data was showing consistent gradual decrease in mean/drift term with a little variation in variance but having no anomalies and it was producing linear downward trend. Thus, this variable projection was done by using linear equation with negative slope and drift term.	Explanation: The data of this variable showing downward trend with changing mean and variance. The projection of this data series is done through log-linear regression model as following downward trend.
Average 1997-2019	Average 1997-2019
37.139	18.039

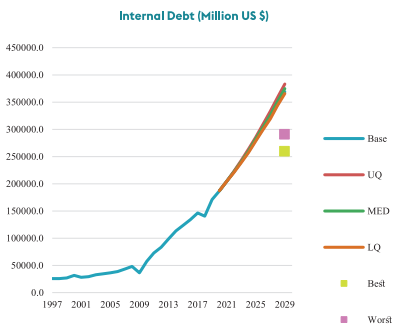
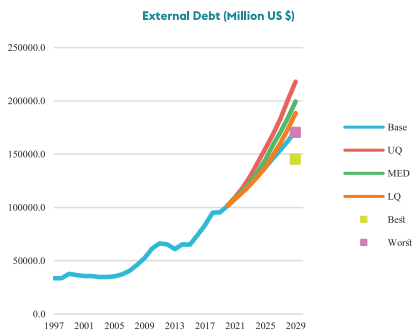
	
SOFI Baseline Trend:	SOFI Baseline Trend: Logarithmic
Equation: 7 year Moving average	0.29
	Equation: y = 0.0143lnx + 0.1482
Explanation: The projection for Malaria is done by 7 year moving average because no curve was shown suited for Malaria trend. Further, there was a continuous irregular trend followed in the series.	Explanation: The data of this variable showing downward trend with changing mean and variance. Variation in observations are quite high around the trend line historically. The projection of this data series is done through log-linear regression model as following downward trend.
Average 1997-2019	Average 1997-2019
1660063.247	0.320

	
SOFI Baseline Trend: Quadratic	SOFI Baseline Trend: Quadratic
0.97	0.39
Equation: y = 3469.4x2 + 20082x - 20.97	Equation: y = -0.0103x2 + 0.2118x + 20.724
Explanation: The data of this variable is showing consistently upward increase with changing mean and variance. Values have small deviation around historical trends in past, and it is showing similar trend will follow in future through regression equation. The projection of this variable is done through second degree polynomial.	Explanation: The historical data of this variable is showing a quadratic decrease. The historical data is not following linear trend rather quadratic with changing mean and variance downward. The projection of this variable is done through quadratic equation, with negative slope of polynomial second degree because this quadratic behaviour going downward, and with a positive linear slope because before quadratic pattern it is showing linear positive trend.
Average 1997-2019	Average 1997-2019
893208.101	21.203

	
SOFI Baseline Trend: Logarithmic	SOFI Baseline Trend:
0.77	
Equation: y = -1.504ln(x) + 6.0977	Equation: 7 year moving average
Explanation: The data of this variable is showing consistent downward decrease, mean and variances are changing consistently due to the variation among values around trend. The projection of this variable is done through non-linear regression model.	Explanation:
Average 1997-2019	Average 1997-2019
2.723	3.704

	
SOFI Baseline Trend: Linear	SOFI Baseline Trend: Linear
O.9385	O.7872
Equation: y = 2369.8x + 2818.4	Equation: y= 961.4lx + 8400.7
Explanation: The values of this variable is showing consistent variation but following an upward trend. The data variation fluctuating around trend historically in Sine wave with upward trend. Thus, there is a positive slope along positive intercept, the projection of this variable trend is done through linear regression with positive slope and intercept.	Explanation: The data of this variable is showing consistent gradual increase producing upward linear trend, but in past few years there have been fluctuations witnessed in exports, but on the whole, it is not changing the pattern of the historical trend. Thus, this variable is showing consistent change in mean, and constant variance except in last two years. The projection of this variable is done through linear regression, with a positive slope and intercept.
Average 1997-2019	Average 1997-2019
31256.418	19937.667

	
SOFI Baseline Trend: Quadratic	SOFI Baseline Trend:
O.99	
Equation: y = 8947.5x2 - 3825Ox + 354451	Equation: 7 year moving average
Explanation: The historical data of this variable is following strictly upward trend, but the trend is not linear rather quadratic in nature. The mean is increasing consistently with a constant variance because values are scattered around trend very closely. The projection of this variable is done through quadratic equation.	Explanation: The projection for Inflation is done by 7 year moving average because no curve was well suited for inflation trend. Further, there was a continuous irregular pattern followed in the series.
Average 1997-2019	Average 1997-2019
1577577.161	7.524

	
SOFI Baseline Trend: Quadratic	SOFI Baseline Trend: Quadratic
O.97	O.93
Equation: y = 418.O8x2 - 3641.2x + 33683	Equation: y = 152.37x2 - 891.53x + 35391
Explanation: The values of this variable are showing non-linear upward trend consistently making quadratic curve. The mean of the series is changing, but there is a very low variation of the values around the trend happened to see excel two points. Over-all variation along the trend remain same. The projection of this variable is done by quadratic equation with a positive quadratic slope.	Explanation: The values of this variable are showing non-linear upward trend consistently making quadratic curve. The mean of the series is changing, but there is a very low variation of the values around the trend happened to see excel two points. Over-all variation along the trend remain same. The projection of this variable is done by quadratic equation with a positive quadratic slope.
Average 1997-2O19	Average 1997-2O19
68587.779	53337.576

CONTRIBUTIONS

ICT EMERGENCE IN PAKISTAN

SYEDA HAJIRAH JUNAID

Introduction

Information and Communication Technologies (ICT) refer to technologies that provide access to information through telecommunications. ICT is almost similar to Information Technology (IT), but primarily it focuses on telecommunication technologies. This includes the Internet, social media forums, cell phones, wireless networks and other communication mediums[1]. In the past few decades, information and communication technologies have provided society with a huge array of new communication capabilities. For example, people can communicate in real-time with others in different countries using technologies such as instant messaging, Voice Over IP (VoIP), and video-conferencing etc. Social networking websites like Facebook allow users from all over the world to remain in contact and communicate on a regular basis. Modern information and communication technologies have created a global village, in which people can communicate with others across the world as if they were living next door. For this reason, ICT is often studied in the context of how modern communication technologies affect society.

The term ICT has been used since 1997 after it first appeared in the journal of Dennis Stevenson[2]. The current definition of ICT is currently used to encompass convergence of computer networks, with audio visual, building management, surveillance and telephone networks through a single mechanism of cabling, signal distribution and management. This has reduced the operational and infrastructural costs[3].

In many countries, information and communication technology (ICT) has a lucid impact on the different social and business counterparts. The impact of ICT on political and regulatory environment is so deep that every government policy making is dependent on the social and communication media. In business and innovation environment, ICT works well with its updated procedures and scenarios that boost up the business processes. In infrastructure building the ICT helps and make the working of organizations within desired skill and affordability. In Pakistan, from the last few decades the role of ICT becomes so prevalent and effective that in every sector's development it plays a vital role whether its education sector or health sector. The consequences show that availability and usage of ICT improve the knowledge and learning skills of the society. This indicates that existence of ICT is improving the environmental efficiency as well as obliging for making policies regarding social sector.

Pakistan has seen a bipolar increase in terms of ICT sector in the past seventy-two years. In the first fifty years, there was a very slow and gradual increase in the ICT sector owing more to the increase in the Postal services and Radio as communication mediums. However, in the latter twenty-two years, the rate of increase has been very steep, especially after the liberalization of the IT and Telecom Sector post 2000. When observing the history of ICT of Pakistan, it can be observed that the definition of ICT has seen a massive transition with the invention of computers, which is why the first fifty years of ICT comprises of Radio Communication, Telegraph, Telex, teleprinters, TV, Fax, Landline Telephones, Wireless etc. while the latter part comprised of Pagers, Payphones, Internet, Mobile Phones, Computers, Smart Phones, OTTs, Mobile Banking etc.

1. Christenson, P. (2018, January 4). ICT Definition. Retrieved 2019, Aug 1, from https://techterms.com
2. Baseer, Q. (2015). Knowledge flows and networks in the ICT sector: The case of Pakistan.
3. ibid

In the first era of ICT in Pakistan, the cost of production of infrastructure for ICT had been higher till the 1990s; but after the de-regularization of services, the government allocated subsidies, opened Telecom licenses and the improved the availability of Chinese devices, thus made ICT accessible, even to the illiterate and lower Social Economic Classes of Pakistan. In 1950s, the literacy of Pakistan was 14% whereas in 2012 it had slowly climbed to 58%[4]. It is important to understand that the increase in literacy in Pakistan hasn't been that significant than the penetration of Mobile Phones especially in the past three decades which has reached 76.7% as of 2019.[5]

In a developing country like Pakistan, the correlation of literacy with ICT used to be in proportion up till the 21st Century; where an illiterate person would not expose themselves to ICT as the level of understanding an ICT devise depended on them being educated. However, since 2005 the gap seems to have massively decreased. In today's age, ICT transcends boundaries of conventional literacy parameters and makes it possible to educate the individuals who couldn't read or write without having them to leave their homes or for them to have a command over any foreign language (especially English). Smart phones have become so user friendly that access to information is just a click away.

Pakistan has seen a steady increase in the ICT sector since its birth. At the beginning, the average Pakistani consumer had access to Radio connected to a transmitting wire that was connected from the top of the house, followed by the presence of transistors and Tele-talk points present only at the railway stations and military stations. Tele-talks had manual rotating chargers which functioned through transmitting messages via the train wires. Most people in Pakistan did not have any access to personal telephones or telegraphs. The presence of Telegrams was possible through sending messages via Morse-codes by a telegraph operator or telegrapher, this was sent and deciphered through the Post Master General who was trained to operate telegraphs. In 1955, tele-printers started emerging in Pakistan, where messages could transmit through Point to Point (P to P) communication followed by National and International Telex/ Multiplex where the Point to Many (P to M) message could be sent and received through any telex machine. A decade later, on the same Telex line, computer communication began with offices through Computer Interference, using a Point to Point modem. These computers were called Z80-82 processor computers in 1979-80[6]. During the same time period, a network of co-axial cable lines for telephones was laid down nationwide which laid the foundation for telephones. Using the same telephone lines, internet was introduced in 1992-1993 in Pakistan, in a few years this was followed by wireless communication. This was finally replaced with optical fiber, which revolutionized the way messages have been communicated ever since.[7]

Despite the fact that after Pakistan came into being, the issue of educating the people and making an enriched educational policy is a huge task for the new state. The main objective was to literate the people with respect to the advancements in the education sectors including technological advancements. As time passes, it is indispensable to implement the ICT in the educational sector to perk up educational planning. Usage of ICT helps students to perform well and augment their skills of knowledge for the improvement of their

4. Education for all Global Monitoring Report, 2006. Retrieved 2019, Aug 10, from http://www.unesco.org/education/GMR2006/full/chapt8_eng.pdf
5. PTA Telecom indicators, 2019. Retrieved 2019, Aug 10, from https://www.pta.gov.pk/en/telecom-indicators
6. Interview with Dr. S M Junaid Zaidi on 20th June, 2019
7. ibid

learning skills. For the improvement of educational efficiency of the students, ICT is very essential. More the availability and usage of ICT in education sector more will be the efficiency of students. ICT could be helpful at regional, national and international level to enhance the educational efficiency of the students in the form of internet and digital libraries. The impact of ICT on education sector in Pakistan is quite high and positive.

Technology in the Entertainment Industry

As far as the showbiz is concerned, after the creation of Pakistan, Lahore became the first hub of films and cinema industry in 1947. Due to shortage of funds and filming equipment, the industry stumbled for a year and on 7th August 1948, the first Pakistani feature film was released, it was called Teri Yaad. It was premiered at Parbhat Theatre in Lahore. In 1956-57 an exhibition was conducted which displayed Television for the first time. Taleem-e-Balghan was the first program which was aired at this exhibition. Pakistan Television (PTV), the first national television center was launched on 26th November 1964. PTV had a monopoly over national TV till the 1990s, when local private channels started to emerge after 2000.

Technology integration with the Post

In the postal sector, on 15th of August 1947, the very first Postmaster General was established to facilitate the role of the Post Office. The Post department operated under the PT&T, and on the 1st October 1947, it started printing "Pakistan" over the British Indian postage stamps. A few years later, Headquarters in the provinces were gradually established. On 13th of September 1950 the Sindh and Baluchistan circle were setup while on 1st July 1968 NWFP circle established its HQ in Peshawar. On the 16th of December 1975 Northern Punjab Circle was formed with its HQ in Rawalpindi. In 1959, this department introduced First Class Mail in the country and in 1986 Airex service restarted; making express mail far easier for the users. On 1st January 1987 UMS was introduced, which in essence not only revolutionized the Post but brought in private companies, which split the monopoly of the Post department.

In the late 1980s, Pakistan saw a rapid increase in the adaptability of new technological equipment and infrastructure and on 4th July 1988, Fax became operational in Pakistan while on 15th August 1988 Fax Money Order Service was introduced and on 1st August 1992, Pakistan Postal Services Corporation was incorporated. On 1st September 1996, Pakistan started Computerized Tracking system of Express Post items for five major cities. By 1996, there were 13,414 Post Offices in the country where one Post Office was allocated for approx. 10,000 people, which covered 60 sq. km.

Introduction of the GSM and Digital Technology in Pakistan

In 1990, new Telecom policies were introduced by the government where multiple services were deregulated. The private sector was asked to develop Cellular Card Payphone Services and Paging Services. By 1997 these services had expanded to; Cellular Mobile and Paging Services, Card operated Pay phone services, Trunked Radio Services, Data, Internet and Electronic Services, Audiotex, Voice Mail and Information services, Pak Satellite Project, Software Development and Data Banks, Manufacturing of Telephone Sets, Fax, Computer Terminals, Modems, Answering Machines and Devices and Manufacturing of Digital Exchanges, Terminal Equipment, Copper, Fiber Cables, and Jointing Material. Through these services 0.1 Million customers were

availing Cellular services, approx. 4,000 Payphones and 30,000 customers were availing paging services.

In 1995, Pakistan government realized the growing need of software worldwide and decided to establish a board to protect companies in Pakistan which were looking to capitalize the need to export IT services. It was first named Private Software Export Board but later on 'Private' was substituted with 'Pakistan' in 1997. The board was entrusted with the task for the formation of a national software policy to safeguard the interests of Pakistan's software industry. In 1998, it was incorporated as a company under the Companies Ordinance of 1984.[8]

On 15th December 1995, Pakistan Telegraph and Telecom had been transformed into Pakistan Telecommunication Corporation, which was governed by the PTC Act No. XVIII of 1991. On 1st January 1996, PTCL converted into Pakistan Telecommunication Company Limited (PTCL), to which it currently stands. This transformation took place under the Pakistan Telecom Reorganization Ordinance of 1995. However, by this time PTCL, being a monopoly, charged a premium for the landline local calls and customers were quite perplexed.[9]

In 1990, Pakistan saw its first ever Cellular Telephone Network called Paktel come into existence, it was set up by Cable and Wireless. A few years later Millicom formed Instaphone which emerged as Paktel's competitor till the early 2000s after which Millicom acquired equity interests of Paktel. Both these companies carried out AMPs services till 2004. The biggest Telecom Company in Pakistan, Mobilink started its operations in 1990, it was owned by Saif Group and Motorola Inc. It was the first company to have launched GSM operations in Pakistan and by the late 1990s, it had overtaken Paktel and Instaphone in terms of its subscriber base. In 2001, government of Pakistan launched Ufone, a relatively affordable GSM mobile network which not only appealed to the masses but after its Free SIM offer in 2005, broke all barriers of price.

In 1992-93, the first ever dial-up email was setup in Pakistan by Digicom Pakistan (Pvt) Ltd. In 1994, Digicom Pakistan also launched the first Internet service in Pakistan while in 2001 Micronet Broadband launched the first DSL in the country. Pakistan also saw its first E-Commerce in 2001 which operated under www.beliscity.com

In July 2003, the Government of Pakistan introduced the Deregulation Policy for the Telecom Sector, under this policy, foreign investors were invited to bid for Local Loop (LL) for 14 PTCL regions and Long Distance International (LDI). In 2006, Etisalat purchased a 26% stake of PTCL and took over managerial control of the company including that of Ufone as well.[10]

In 2005, another two Telecom licenses was auctioned where Telenor, a Norwegian Telecom Operator and Warid, an Abu Dhabi based company were given the licenses. China Mobile (Pak) later known as Zong acquired an equity of Paktel and started operations in April 2008. Thus, by 2008, a Telecom based competition had started in the country where each of the operators was lowering its price to attain maximum customers. By 2016, ICT had evolved in Pakistan in such a way that the Pakistan Software Export Board (PSEB) awarded the top IT companies of Pakistan awards for highest exports. Amongst the top three; Netsol Technologies, Inc., Systems Limited and S&P Global Pakistan were the highest

8. PTA Telecom indicators, 2019. Retrieved 2019, Aug 10, from https://www.pta.gov.pk/en/telecom-indicators
9. ibid
10. ibid

exporters. In 2018, the Telecom Sector had a base of 150 Million subscribers with a tele-density of 74%. Broadband customers comprised of a sizeable base of 58 Million. Mobile Financial Service customers have reached 38.5 Million while the Mobile data customers have bypassed 50 Million which accounts to about 21% of the total population of Pakistan. 3G and 4G were simultaneously launched in Pakistan in 2014 whereas 5G technology is expected to be launched in 2020.[11]

Pakistan has seen its fair share of monopoly and free market products plus varying price points when it comes to the ICT sector. The masses despite having a language barrier never halted to accept new technology and received the change with open arms. After 2001, the governments have also introduced ICT policies and worked on governance papers which are people-friendly and have focused on the curriculum and training programs which have revolved around ICT to facilitate in reaching the strategic goal for Pakistan.

Concluding remarks

ICT was seen as a tool to carry out simple calculations and to undertake simple tasks in the past and its applications in industry and business were not known. Then, slowly and gradually it entered almost everywhere and in every walk of life. The scientists, at that time, would never have thought that ICT would revolutionize the industry and would change the way the people would live. The merger of internet with cellular phone has changed the entire spectrum. As a result, the world is now experiencing the 4th industrial revolution. Today, knowledge economy, information society, knowledge-based industry, global village etc. are the common buzz words. These are all coming from the ICT which is the engine of this revolution and the life, now, is unthinkable without ICT. It has been intruded almost everywhere with the greatest advantage, unlike other technologies, is that it is a great equalizer. It has empowered a common person and brought the world in hand at affordable cost.

In Pakistan the penetration of ICT in comparison to other industries was quite rapid and it has been observed through this article that how quickly the technology was adapted. Pakistan may not have the literacy numbers which can stand in front of developed countries however, the penetration of mobiles, computers and the internet is quite substantial for a developing country. The availability of network made it possible to have mobile banking, e-health and virtual education in far-flung areas. The use of social media by the state actors, military and media have made information accessible to every Pakistani without any discrimination. The dialogue between the state and the masses through social media have made it possible for the government to have an inclusive policy making stance. More inclusive models of civic engagement need to be devised at the state level so that the tax payer's money can be transparently used for the welfare of the country.

11. PTA Telecom indicators, 2019. Retrieved 2019, Aug 10, from https://www.pta.gov.pk/en/telecom-indicators

INTERNET AS A MEDIUM FOR SKILLS TO ENHANCE YOUTH EMPLOYABILITY

YUSUF HUSSAIN

Introduction

One of the country's largest prevailing problem is unemployment. The unemployment rate stands at 4.1%, according to 2018 Labor Force survey of International Labor Organization. International Labor Organization defines, the unemployment rate measures the number of persons who are unemployed as a percent of the labor force (i.e., the employed plus the unemployed). On the positive side, with the advent of 3G / 4G services in Pakistan, the country has seen rapid growth rate in tele-density and the internet access. As of April 2019, Telecom Indicators Pakistan, as reported by Pakistan Telecom Authority, show there are 67 Million (32.14%) 3G / 4G Subscribers in Pakistan and 70 Million (33.14%) Broadband Subscribers. Over the past year, internationally, the freelancing industry has really started to see some solid growth across several fields. This industry is expected to generate gross service revenue between $15 billion and $25 billion by 2020.

Pakistan is the world's fourth largest provider of online freelancers with estimated registered number of online freelancers ranging in several hundreds of thousands. Most of the work done is for international clients; therefore, money earned by them is brought into the country, mainly as foreign remittances. While accurate data on money brought by freelancers is not available, estimates range from $ 500 Million to $ 1.3 Billion annually. This amount is just a fraction of the country's potential as, with its large population, increasing internet connectivity, broadband penetration, young and educated youth, thousands of IT graduates and million-plus enrolled university students, Pakistan can increase the number of freelancer's manifold. This will help bring invaluable foreign exchange into the country, and more importantly, reduce unemployment as the number of fresh graduates passing out every year is a lot more than the number of new jobs created.

IGNITE's DigiSkills Programme

DigiSkills.pk Training Program is Pakistan's first Online Training Program to empower the youth with skills that are in-demand in freelance market. It consists of multiple online skill-based training courses. The very unique feature of this program is that the course content has been designed specifically for a Pakistani audience in a mix of Urdu-English language. The program aims at not only developing key specialized skills, but also imparting knowledge about various freelancing and other employment and entrepreneurial opportunities available internationally and locally.

It is believed that the next step in the connected world is to enable any human being to teach, be taught and execute actions remotely but in the digital demeanor. In this way, human skills can be delivered or acquired without any physical boundaries, spreading knowledge globally at a faster and more efficient way. This is commonly referred to as the Internet of Skills and is expected to be a key component of the future digitalized world. DigiSkills.pk advocates here for the emergence of an entirely novel Internet which will enable the delivery of skills in a digital platform to help unemployed youth foster a better profile to match the global trend of digital market. We outline the technical challenges and equip with the right discipline of technical components, which will enable shaping such a vision.

The program has been structured into three specialized components:

- Outreach
- Training
- Monitoring and Evaluation

Outreach Component focuses on getting the trainees enrolled through cost effective marketing campaigns. Training Component ensures a state of art on-line learning management platform, where trainees can log in and view the training videos. The trainee learnings are frequently gauged during the course via Quizzes and Assignments.

Artificial Intelligence based Advance Analytics as a Component

The motivation for engaging AI (Artificial Intelligence) techniques into digiskills.pk program is that in each batch thousands of trainees enroll themselves, as it is a free program. However, retaining them to complete the program is a challenge. An approach was needed to to gain better insights for better results. So an algorithm was developed which is based on a technique that identifies candidates and their characteristics with the highest probablity of finishing the course. The AI-based Predictive Model was trained on data accumulated from the first and the second batch. 75% of data was used to train the model and remaining 25% of data was used to validate the model.

For predictive analysis, a few models were considered and tuned. These include Logistic regression model, Random forest model, Gradient boosting qualifier, Neural networks and balanced bagging classifier. These models are the ones that performed best on the underlying dataset. The precision and recall scores achieved by Random Forest and balanced bagging classifier were 83% and 78%.

Statistical Data of program enrollment

The Monitoring and Evaluation Component makes sure that everything is being done as per plan and advises as to how the program can be improved further by using Business Intelligence and Artificial Intelligence Techniques. Batch-I started in August 2018, with only Four Courses, and 30,804 enrollment count. In Batch-II the courses offered were increased to eight and enrollment count was 81,119. Batch-III started in April 2019 with 200,331 enrollments offering 10 courses.
Trainees from all over Pakistan have enrolled in the program. However, most of the trainees that are enrolled into the program belong from Punjab.

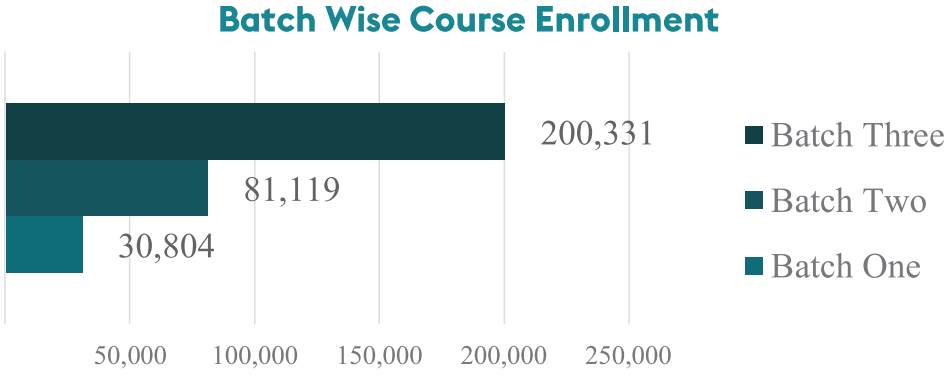


Figure: Enrollments by Batch

Trainees from all over Pakistan have enrolled in the program. However, most of the trainees that are enrolled into the program belong from Punjab.

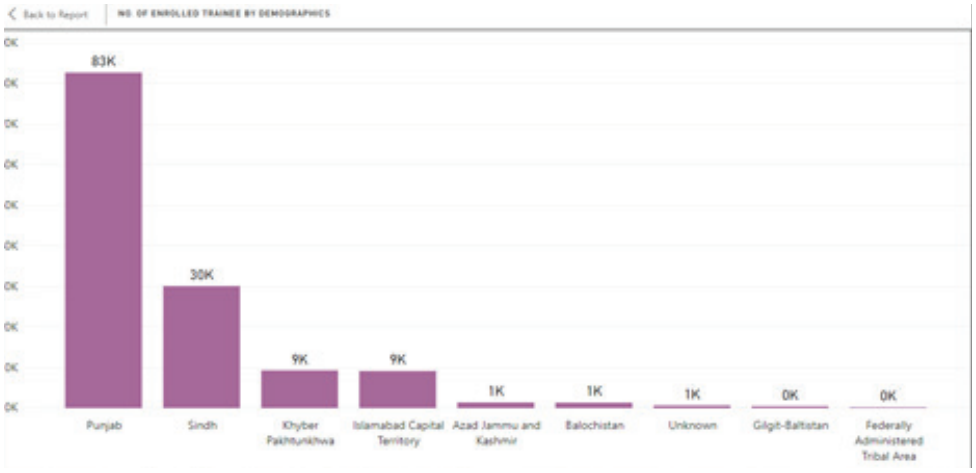


Figure: Enrolled Trainees Based on Demographics

Large numbers of female have also registered for the program. There is 1:3 ratio for Female to Male.

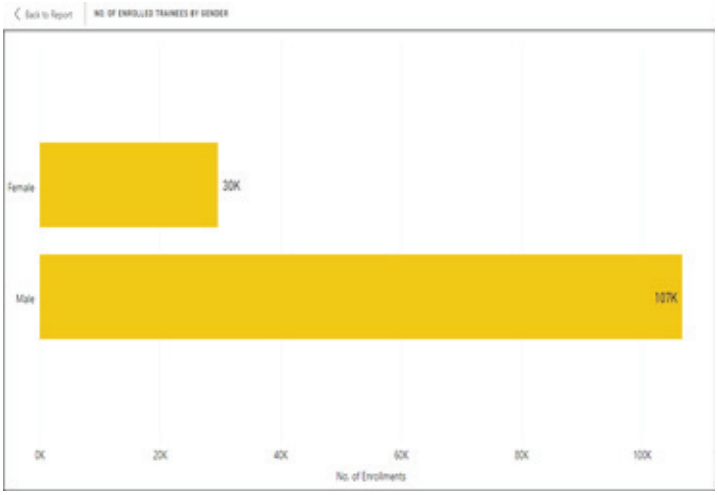


Figure: Gender wise Breakdown of Enrolled Trainees

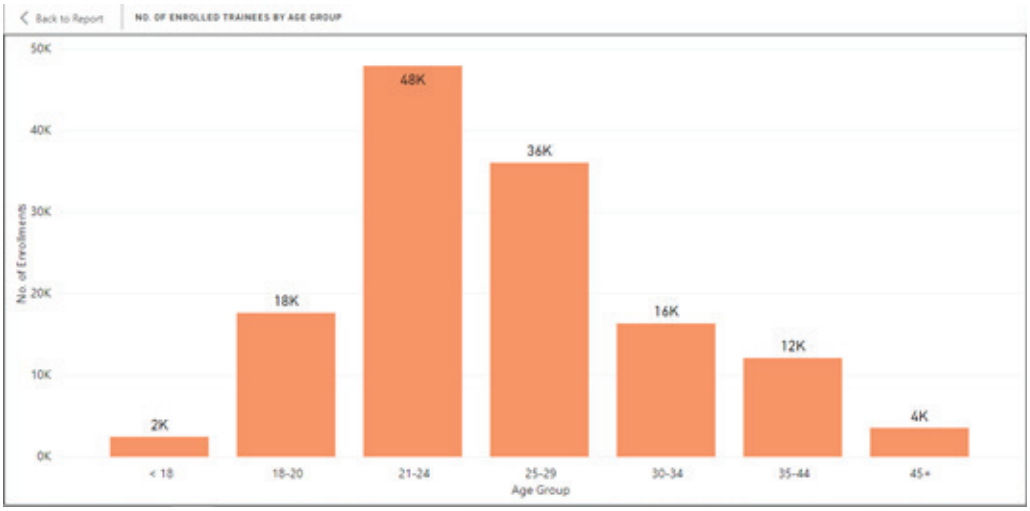


Figure: Age wise Breakdown of Enrolled Trainees

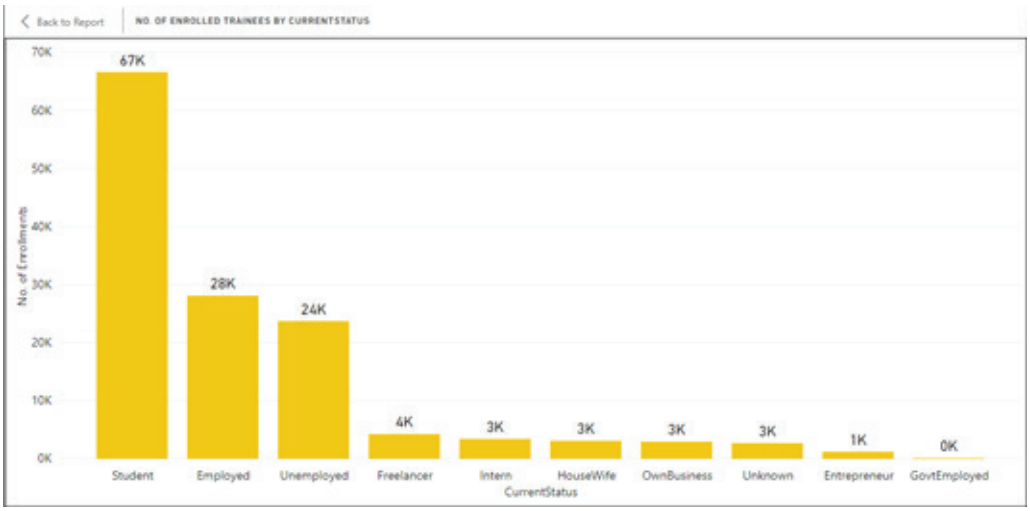


Figure: Breakdown of Enrolled Trainees with respect to Current Status

The diagram below contains a pie chart having breakdown by Internet Availability and ISPs used by the enrolled Trainees. As evident from the chart below, we can see that DSL, Cable Internet and EVO/3G/4G are being used by the Enrolled Trainees.
The program is very popular with young students, majority of our trainees are students between the ages of 21 and 29.

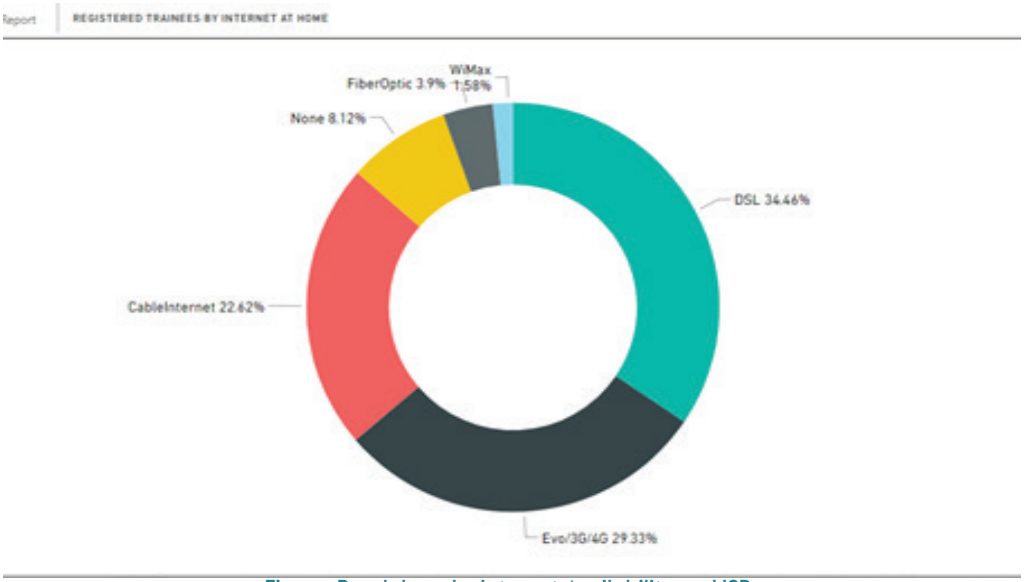


Figure: Breakdown by Internet Availability and ISPs

The diagram below contains a pie chart having breakdown by devices being used by the enrolled Trainees to access LMS. The chart below reveals that most of the trainees are using mobile and desktop/laptop to access the LMS content. Whereas a very small chunk is using tablets.

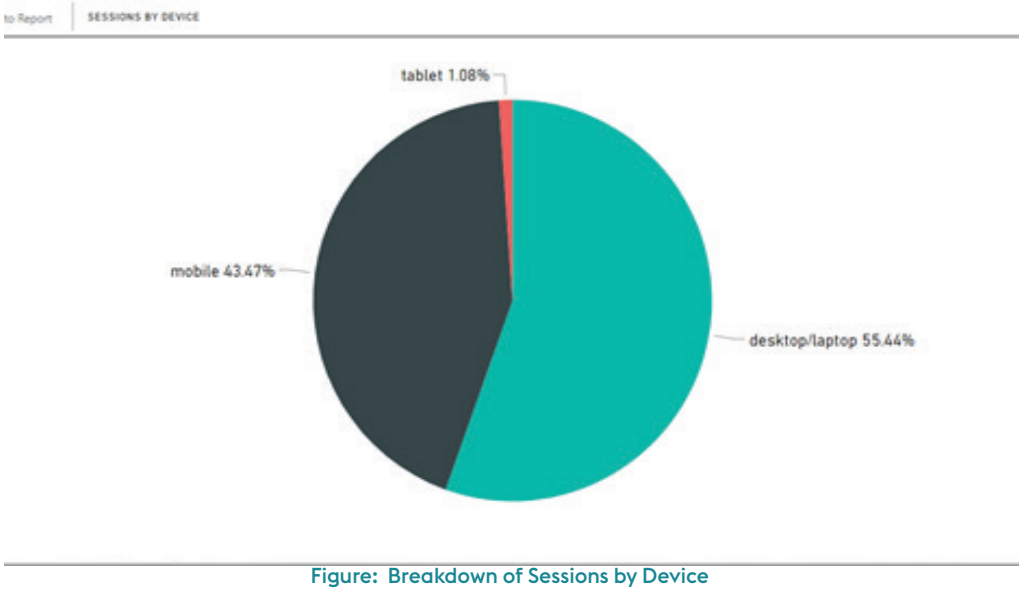


Figure: Breakdown of Sessions by Device

Continued Improvements

Digiskills.pk program is backed by data analytics for continued learning and improvement of the program.

Figure: Real Time Data Analytics Process

Data from learning management system, Campaign Management Tool, Social Media, Interactive Call Responses, AI based Chat Bot, Surveys, Coaches, etc. is gathered and is analyzed to learn what its trainees and others are saying about the program and try to improve the program continuously. Following are few of the examples of insights generated from the system and actions taken accordingly.

Outreach Component

Outreach data feed analytics showed that digital media campaigns have high return on investment as well as high retention rate.

Medium of Awareness	Batch I - ROI	Batch II -ROI
Digital Media (Web Banner, Blog Post, Social Media)	2.38%	3.24%
Print Media (News Paper)	0.33%	0.33%
Electronic Media (Radio & TV)	0.18%	0.19%
PR Media (Events)	0.12%	0.67%

Furthermore, DigiSkills.pk Data comparison of outreach work plan and trainee signup date, Newspaper ads and Radio spots have direct attribution to signups on LMS and shows up as peaks in the sign-ups as evident in the graph below. Blog placement is also attributing in the signups, social media content is an on-going activity and showing impact even after the campaign month.

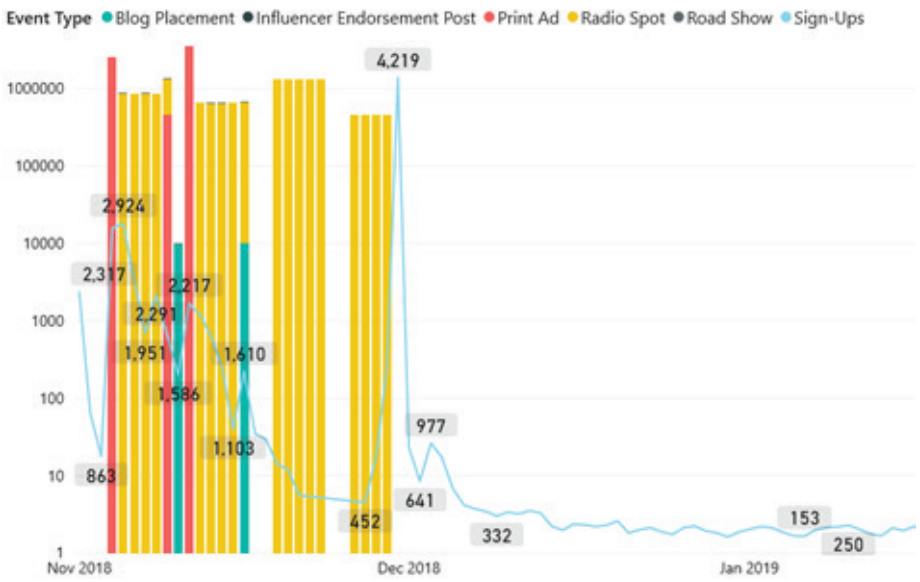


Figure: Outreach vs. Sign-ups by Date

Based on the above findings and comparison of Campaign Management Data, LMS data and data from Digital Media, the marketing campaigns were/ are re-designed to attain maximum enrollments cost effectively.

Training Component

Based on the first batch's data, it became evident that the targets for each batch needed to be revised. Consequently, the enrollment targets were more than doubled for the following batches.

Likewise, at the start of the second batch, alumni trainees requested that they should be provided means to view the content of previously enrolled courses (in case they need to revisit anything previously taught). Based upon this feedback, section in LMS was created for alumni trainees to login and view their course content from previous batches as well.

At the start of the program, the weightages of Quizzes and Assignments was set at 15% and 25%. However, our data analysis revealed that trainees showed keen interest in Quizzes and Assignments, and their participation in Quizzes and Assignments was very high. Based on this input, these weightages were adjusted so that maximum trainees could benefit from the program.

Similarly, the passing criteria is currently set at attaining 60% marks, which comprise of trainee activities on LMS, such as watching videos, taking quizzes and assignment submission. This criterion has been set after deep analysis of multiple possibilities and adjusting them.

At the end of first batch, trainees were given Certificate of Participation. Many trainees had expressed their views on social media that they should be given certificate of completion instead of participation if they have met the passing criteria. After internal discussions

and consensus, the Certificate of Participation was replaced by Certificate of Completion.

With a year into the program, our social media data analytics showed, that many trainees have expressed their view that the digiskills.pk website has become cluttered, making it difficult to find required information on the digiskills.pk portal. Based on this finding, the new design of the digiskills.pk website is currently underway, to provide more appealing and easier to use interface.

Coaches are key differentiator of this program compared to any other online training program. A coach is tied with each trainee and his/her responsibility is to answers to the trainee queries and guide him/her during the project. Each coach's progress is monitored and analyzed. Based upon trainee behavior analytics, coaches have been given additional tasks of making motivational calls to his/her trainees, who are lagging in the course progress, and request them to login to LMS and make up for the missed lectures. Similarly, at the end of Batch II, our analytics on course completion data showed that females have a higher probability of passing the course compared with males, and housewives have higher completion rate in the female trainee segments. Similarly, our analytics showed that trainees from remote areas, have high tendency to complete the course compared to trainees belonging to major cities. Similarly, students with master's degrees have higher retention rate than students with bachelor's degrees. Based on this information, marketing campaigns have been adjusted to target trainees who have higher retention and completion rates.

Surveys and Feedbacks

During the life of the program, several surveys are scheduled to gather feedback from trainees to improve the overall program, such as retained trainees survey, dropout trainee's survey and earnings survey.

Under retained trainee's survey, it was cited that that the layout of LMS is not very user friendly, and it is hard to navigate in the LMS. Trainees must click 5 to 6 buttons to reach the desired page. To address the issue, the LMS was redesigned and in the current LMS design, trainees can navigate to the desired page in less than 3-Clicks. Similarly, Video Rating Option was included, so trainees can rate the videos and their content. The ratings are shared with the trainers and videos with low rating are again reviewed by the trainers and are improved in the following batches.

In another survey, it was identified that female trainees were reluctant to provide their street addresses, which was mandatory for registering with digiskills.pk. Based on this finding, the street address was made optional, and it resulted in increased number of female trainees.

Program Results

After Sixty Days of Completion of Batch-I, a telephonic survey to gather data related to earnings of trainees and impact of DigiSkills.pk Training Project on trainees' income was carried out.

Based on survey results, it is estimated that 2,294 (or 14%) of overall Batch I Trainees are freelancing and earning money post-training.

Occupation Status of Interviewed Trainees	
Already Freelancer	5%
Started Freelancing after DigiSkills.pk Training	9%
Unemployed (Housewives, Students etc.)	47%
Employed in any other field	39%

Those trainees who are freelancing, on average, earn $29 per day. Thus, it is estimated that collectively, 2,294 trainees earn $66,526 US per day.

Delving deeper, it was analyzed that individuals who were freelancing before participating in digiskills.pk training had now more than doubled their per day incomes from $21 (before training) to $45 (after training).

ENTREPRENEURIAL ECOSYSTEM IN PUNJAB

ZAEEM YAQOOB KHAN AND DR. IZZA AFTAB

Abstract

The Punjab Information and Communication Technology (ICT) Policy approved by the Punjab Cabinet in June 2018 rests on five distinct pillars, one being entrepreneurship. To realize the linked goals in the policy, the Punjab Information Technology Board (PITB) initiated efforts to support the entrepreneurial ecosystem across the province of Punjab. Establishment of incubation and acceleration platforms and E-rozgaar centers to support self-employment has been widely hailed as manifestations of this very commitment.

The presented study is a descriptive and prescriptive analysis to appraise related objectives of the Punjab ICT Policy. The study focuses on the inclusiveness part of the policy and equitable access to the ecosystem through the analysis of secondary data received from Plan9 (PITB sponsored technology incubator) regarding founders of start-up applications and founder winners of the cycles eight through twelve to furnish a mapping of the average winner with the corresponding average citizen of Punjab in the concurrent wave of Household Integrated Economic Survey (HIES) to identify the distance. In each cycle Entrepreneurial Scores were calculated for represented districts of Punjab. The study estimates the Entrepreneurial Potential Index by collecting primary data from leading districts in Punjab. This is the first time such an exercise is done. This index has direct policy ramifications as it not only validates outreach but argues for wider outreach in key districts. This can help influence employment in Punjab. The entailing recommendations advocate for the state infrastructure to act more entrepreneurially and pay attention to the low-hanging fruit for a more inclusive policy backed by evidence provided in the analyses of primary and secondary data.

Introduction

Most developing nations in the world are undergoing a demographic shift with a soaring youth bulge. There are a bigger number of young people in the world today than we have ever had before, more so in urban areas. However, these phenomenal numbers do not seem to match with opportunities that can guarantee social mobility of this stratum of the society and resultantly contribute to economic growth. A consequence of this disparity is an unprecedented number of youth that are unemployed. Many of these young feels alienated from economic activity making them even vulnerable to crime and violence besides adding to social and political instability. According to ILO, the global youth unemployment rate stands at an incredible 13 percent, three times higher than the adult rate of 4.3 percent (ILO, 2018).

Entrepreneurship presents an opportunity to include the ostracized and estranged youth into the mainstream economic activity. Starting a new business and launching it requires skillset, knowledge, networks and resources that can only be guaranteed through an entrepreneurial ecosystem (Ali, 2014).

We define an entrepreneurial ecosystem as
"[A] set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory." (Stam & Spigel, 2016)

With its young and educated workforce, Turkey is an attractive market for entrepreneurship. It is strategically located between key markets in Europe, the Middle East, Russia, and Central Asia. Turkey's economic future depends on its successful entrepreneurs and a supportive ecosystem (grants, subsidies, and incubator spaces). The Turkish government and other public institutions have done a good job in laying the framework for Turkey's entrepreneurial ecosystem. The Turkish Ministry of Science, Industry and Technology, and the Scientific and Technological Research Council of Turkey (TUBITAK) extend grants, subsidies, and other incentives for entrepreneurs. The number of venture capitalists is increasing every year ("Turkey's Entrepreneurial Ecosystem: Values over Valuations - Turkish Policy Quarterly", 2017). Startups have become a vital part of the Turkish economy and with more coherent policies on creating shared values and inclusiveness, the country can quickly return to the fast-track growth pattern it had for many decades prior and re-join the "global economic fast lane." Total early stage investments in 2017 in Turkey increased by 102% compared to the previous year making it a member of league one of Europe 2017 Early Investment Leagues (Ünsal, 2018).

The East Asian miracle, Malaysia, has been fortunate as government policy has been geared towards providing the key fundamentals for entrepreneurial development especially for startups. The Malaysian ecosystem has been installed via government policies and private sector initiatives to enable such support. Several factors including governmental initiatives with clear entrepreneurial criteria, media communications, export focus, spaces and coaching, IT infrastructure, education, new and incremental innovations, R&D, private-sector driven (SME's and corporates), talent support and localized capacity building has allowed startups in Malaysia a supportive environment. However, based on expert feedback, some aspects of the ecosystem require improvements when benchmarked against the global economy (Xavier, 2016). Malaysia is rated favorably by Global Entrepreneurship Monitor (GEM) for its good infrastructure, access to finance and good internal market dynamics (GEM, 2015). Adding to this, the SME sector has been growing rapidly in the last decade, outpacing economic growth. This has helped push up the contribution the sector makes to 37.1% of GDP (SME Corporation Malaysia, 2018). Despite this, fewer Malaysians are starting new businesses. When compared to similar economies, the country has a low and declining early-stage entrepreneurship (TEA) rate, having fallen from 7.0% in 2012 to just 2.9% in 2015. This has been accompanied by a decline in the number of Malaysian adults that view entrepreneurship as a good career choice (Xavier, 2016).

On the other hand, the youth unemployment rate in Egypt is the highest in the Middle East and North Africa region. While the overall unemployment rate was 9 percent in 2010, the unemployment rate for young men and women aged 15 to 24 reached 33.7 percent and 61.3 percent respectively. Moreover, 53.6 percent of young Egyptians express a preference for having their own business over a salaried job while only 1.2 percent are self-employed. All entrepreneurs face a number of barriers to launching and expanding their businesses, including lack of business and financial management knowledge, constrained access to credit, or negative attitudes towards entrepreneurship. In 2013, Egypt tested the effects of edutainment to

promote entrepreneurship and taught useful skills and good business practices to youth by showing them role models and providing them with information about where to seek financial and managerial support for launching their own businesses. The findings showed that an intervention like a reality TV show can help viewer perceptions regarding ease of doing business and the level of discrimination faced by women while pursuing entrepreneurship. The program also increased the knowledge of the non-highly educated youth (Barsoum et al., 2016).

Pakistan is experiencing a youth bulge with approximately 54.4 million individuals (around 29 percent of the population) between the ages of 15 and 29 with challenges and opportunities in terms of youth employment. Youths between 15-29 years make up 41.6 percent of Pakistan's total labor force (between 15-64 years). The youth employment, however declining before 2007, has seen a sharp increase in 2015. According to estimates by ILO, unemployment between the ages of 15 and 24 in Pakistan is 10.8 percent. This is higher than other countries in the region including India, Bangladesh and Nepal, only better than Sri Lanka. There is higher joblessness in the youth in Pakistan as compared to older people. The number of individuals who attain working age every year in Pakistan is expected to rise from the current 4 million to around 5 million by 2035. At the current participation and unemployment levels and considering the number of retirees, Pakistan needs to create 0.9 million jobs annually over the next five years. However, if the labor force participation rate increases to 66.7 percent, Pakistan will need an additional 1.3 million jobs on average every year for the next five years (UNDP, 2017).

One solution to reduce the burden of youth employment on an already shrinking labor market would be to make way for entrepreneurship. According to Global Entrepreneurship Monitor, 67% of the adult working age population (18-64) in Pakistan considers starting a new business as a desirable career choice. As many as 25% of the working age adult population was found to exhibit entrepreneurial intentions higher than Algeria, Iran, Turkey and Malaysia (GEM, 2012).

A structured effort towards developing of an ecosystem in Pakistan as a formalized institutional commitment came about through the institution of the Punjab ICT Policy. The first draft of the Punjab ICT Policy was presented by the Punjab Information Technology Board (PITB) on October 25, 2016 in the Third PITB Roundtable. The draft was an effort to revisit the National IT Policy formulated in the year 2000. As a consequence of the devolution plan, a number of federal domains became provincial subjects. The urgency to revamp the policy was catalyzed by the paradigmatic evolution in Information and Communication Technologies guided by new approaches such as Big Data, Internet of Things, IT-enabled services, Blockchain that became the cradle of birth for EdTech, FinTech, and E-Governance initiatives.

The first policy draft, thus, was produced as a result of what appeared to be a rigorous consultationary exercise. It was a comprehensive draft that focused on six key areas including Industry, Education, Health, Governance, Citizens and Start-ups and Micro, Small and Medium Enterprises (MSMEs). It broadly laid out 6Es (Education, Engagement, Empowerment, Economy, Entrepreneurship and Employment) as key principles to put the province of

Punjab on the frontier of a nation-wide technological awakening and transition towards a truly knowledge-based economy.

An important feature of the policy was its emphasis on creating an enabling environment for the entrepreneurial ecosystem to flourish in the field of IT, IT Enabled Services (ITES) and EHM (Electronic Hardware Manufacturing). It went on to declare, *"[e]ntrepreneurship being key to sustainable development and technological advancement"* (PITB, 2016, p. 9).

The policy henceforth necessitated a series of governmental commitments to inculcate a culture of innovation and entrepreneurship across all levels and strata of the society to match up with the similar approaches in emerging economies and the region such as those in India, Malaysia and Turkey (PITB, 2016, p. 27).

With regards to the goal for sustaining the proposed entrepreneurial culture, the policy draft laid out a comprehensive set of institutional interventions including extending support for the creation of a top-notch ecosystem, providing nationwide and global reach to local startups, easing the complications in the regulatory environment for new businesses with a focus on achieving low cost compliance, reducing the cost of failures, enabling access to funding opportunities and facilitating networking opportunities across various incubators in the province.

The detailed set of policy commitments for the realization of the goal are as follows:

The Government shall:

- provide an exemption to startups from all provincial taxes for a period of 3 years.
- set up a one-stop center for registration, facilitation and exits of start-ups.
- Introduce self-certificate based compliance for startups.
- launch a government-backed venture capital fund for provision of finances to potentially viable startups.
- provide a comprehensive set of incentives for Venture Capital funds and Angel Investors, to encourage investment in local startups.
- introduce Applied Entrepreneurship Training Program, with free trainings for managements of incubators and accelerators.
- facilitate partnerships with global accelerators/incubators to build facilities in Public-Private Partnership mode
- launch University-Incubator Partnership Programs to provide access to research and development facilities.
- encourage the development of specialized incubators in the vicinities of universities and specific industries.
- establish a common database for consolidation of information regarding incubators and accelerators in Punjab
- Organize trade-fairs and road shows for Startups both locally as well as facilitate their participation in international events.
- launch Punjab Startup Award, which shall provide seed funding to innovative startups that address pressing needs or solve a current problem.
- provide support to cover operational costs of startups operated by women, families of deceased soldiers/police officers, minorities etc.

It is a given that public services should be inclusive and accessible to all. Although, the policy formulation process was kept inclusive, forward-looking, joined-up, outward looking and evidence-based (PITB, 2018), however, it missed an important aspect in its detailed set of policy commitments. It appeared to fall short in its pledge to enable access of the Government-supported entrepreneurial ecosystem to enterprising individuals from the least developed districts especially Muzaffargarh, D.G. Khan and Rajanpur and others that fall into the province-wide lower HDI category including Jhang, Bhakkar, Toba Tek Singh, Khanewal, Vehari, Pakpattan, Bahawalpur, Bahawalnagar, Mianwali, Chiniot, and Lodhran. These districts were also found in the lowest Youth Development Index (YDI) regions across Punjab (Najam & Bari, 2017). The policy did not make any explicit reference as to how the Government plans to level the playing field for the needy and deserving individuals from deprived areas.

The first draft remained open to public consultation, feedback and recommendations for over a year. The final Punjab ICT Policy 2018 draft which categorically declares "entrepreneurship" as a key pillar was approved by the Punjab Cabinet on May 31, 2018 (Haider, 2018). It is a promising commitment to play a significant role in providing infrastructure, regulatory environment and incentives to create the said entrepreneurial culture (PITB, 2018). In terms of delivering the commitments, PITB has remained rather proactive through its various initiatives, the likes of the technology incubator Plan 9 (founded 2012) with claims to further the very vision of supporting the entrepreneurial ecosystem and is widely hailed as the largest technology incubator of the country. Plan9 claims to have graduated 160 new ventures over the course of first ten cycles with a gross valuation of USD 70 million and a success rate of 60%. It continues to assert that as many as 30 startups have raised the gross investment of USD 3.5 million ("Plan9| Pakistan's Largest Technology Incubator – Where Ideas Take Flight", 2018).

The PITB's accelerator PlanX (founded 2014) claims to have accelerated 37 start-ups (past the incubation stage) with a total investment of USD 4 million raised in two years ("Homepage PlanX Accelerator", 2018).

Besides Plan9 and PlanX, a number of startup incubators and accelerators have come up over the course of past five years within the province of Punjab including Microsoft Innovation Center, Social Innovation Lab, Invest2Innovate, Arpatech Hatchery, National Incubation Center, Nspire and others, co-working spaces such as TechHub Connect, Daftarkhwan besides a plethora of independent initiatives by public and private universities ("List of incubators in Pakistan", 2018).

Apparently, it does seem like things are looking up for setting the stage for precisely the kind of environment that PITB envisioned. According to United Nations Development Program, 31% of Pakistanis remain at a loss on account of prevailing inequalities ("Human Development Reports", 2018). Their lives could have been better if we were a more equal society. A study of various socio-economic indicators also shows that disadvantaged groups and those living in rural areas are not proportionally reaping the rewards of economic growth. Equity Index of Opportunities (EIO) for Pakistan indicates a decrease in equitable distribution of employment opportunities over a ten-year period

(Asghar & Javed, 2011). Hence, it will be important to inquire whether the process for applications is being kept inclusive at Plan9 or not as it is crucial for inclusive growth to ensure that the benefits reach the poor, marginalized and socially excluded groups of the society.

The idea of inclusiveness was approached from the lens of a more equitable participation from disadvantaged districts of the province of Punjab. What would be of interest is to see how many founders of start-up applications hailed from lesser developed districts and how many of them made it to the incubation stage at Plan9. Inclusiveness was also approached from the lens of gender to see how women founders performed in the applicants' ratio vis-à-vis their male counterparts. As noted by a study of the Asian Development Bank that in spite of progress witnessed in education, the improved capabilities of women do not seem to have been translated into their equal participation in economic and political activities and the gender gaps remain significant particularly in South Asia with few exceptions (Niimi, 2009).

In light of these considerations, our research centered on the question whether Plan9 is providing equitable access to beneficiaries based on gender and districts of origin. Besides these, the study also analyzed the founder applicants' data with regards to characteristics such as age, education and degree major to undertake a mapping exercise with the average citizen of Punjab to identify policy gaps in making the ecosystem more equitable and accessible.

The Methodology

Plan9 provides a comprehensive six-month program called an "incubation cycle" to aspiring entrepreneurs with a new business idea (aka "startup") from across Pakistan. The incentives offered by Plan9 to the incubatees include free-of-charge office space, a monthly stipend, uninterrupted power-supply and internet-connectivity, mentoring, training and workshops, legal advice and access to a funding network and connectivity with potential partners, investors and clients. Ever since its inception in 2012, Plan9 has been steadily inducting up to 15 startups twice a year for a duration of six months called a "Cycle" through semi-annual events popularly known as "Launchpads". Each Cycle is announced bi-annually on the Plan9 website, social media, online and print media. It has recently concluded its 14th Launchpad event. All 18 years or above citizens of Pakistan who have a product-based idea with a technology component are eligible to apply. Each team should comprise between two to five members who are not currently employed and can commit to wholeheartedly dedicate themselves to their business idea for the next six months.

Applications are invited through an online form. The stepwise selection process comprises acceptance of online applications, shortlisting of selected teams, invitation to the Launchpad event, presentation of business idea (pitch), and rating by a panel of judges and selection of top-scoring teams for incubation in a two-stage process subject to a qualifying round elevator pitch leading to a final round. While the Launchpad takes place in four major cities i.e., Lahore, Karachi, Islamabad and Faisalabad, it is open for everyone who meets their basic eligibility criteria. The study began with an analysis of the data of those who tendered applications to Plan9 from Cycle 8 through Cycle 12 to observe the discernible characteristics of

aspiring start-up founders[12] such as their age, gender, province, district, degree level, major and their incubation status. A separate profile of an average winner for each cycle was generated through this analysis.

In each cycle, the provincial entrepreneurial score for each of the districts of Punjab was calculated as follows:
Entrepreneurial Score (ES) = $\sum\theta/n$

where,
θ *= Applicants from a district*
n = Total applicants across all districts of Punjab

Upon the conclusion of this analysis the profile of an average citizen of Punjab with a comparable profile was mapped against the cycle-wise profiles of the winners using secondary data from the corresponding wave of Household Integrated Economic Survey (HIES). The HIES is published by the Pakistan Bureau of Statistics and has been conducted, with some interruptions, since 1963. In 1990 the HIES questionnaire was reviewed to match the requirements of a new system of national accounts. The four surveys between 1990-91, 1992-93, 1993-94 and 1996-97 were done with the revised questionnaire. In 1998, the HIES data collection methods and the questionnaire were revisited to integrate HIES with the Pakistan Integrated Household Survey (PIHS). In 1998-99 and 2001-02, HIES was conducted as an Integrated Survey with PIHS. Later in 2004 it was retitled to Pakistan Social and Living Standards Measurement (PSLM) Survey. PSLM (District Level) Survey and PSLM/ HIES (National/ Provincial level) Survey are being conducted on alternating years. Before the 2015-16 survey, six rounds of HIES were conducted during 2004-05, 2005-06, 2007-08, 2010-11, 2011-12 and 2013-14.

The HIES 2015-16 dataset comprises 157,775 observations from all over Pakistan with 63,056 observations from Punjab. The survey was conducted under Change of Base of National Accounts (CBNA), by integrating Family Budget Survey (FBS) which is used for computation of weights for Price Index and Household Integrated Economic Survey (HIES) which covers in detail the Income & Consumption of the household. Consumption expenditure is used as a proxy to evaluate people's welfare. Expenditure is calculated at the household level adjusted[13] by its size and composition. The data was intended to be used for developing a series of socio-economic indicators e.g. literacy rates, primary enrolment rates, use and access to Information and communication technology (ICT), proportion of households with access to water, and sanitation; household consumption expenditure and income from various sources ("Household Integrated Economic Survey (HIES) 2015-16 | Pakistan Bureau of Statistics", 2019).

The HIES 2015-16 data-set is based on a comprehensive questionnaire that captures a number of variables of interest in a study of entrepreneurial proclivities as argued in the literature including gender, age, education, employment status, household income besides consumption expenditure and consumption patterns at national and provincial level with urban and rural breakdown. The gap between the Plan9 winner and an average citizen of Punjab is presented to identify prospects for interventions. This is done with the intention to promote entrepreneurship in Punjab. To validate findings and to see if the real-time situation is any different, the profile of the average winner of the latest cycle, i.e. Cycle 12 was chosen and

12. Only those who have a verifiable Computerized National Identity Card Number were considered for the analysis.
13. The adjustment is necessary to assess a proper ranking of households.

mapped against matching individuals in districts that fare prominently in their Entrepreneurial Score (ES) on a threshold. This is done to understand what sets these districts apart from the others and possibly replicate their success in other districts.

Prior to collection of primary data, an IRB request was made to the Research Ethics Committee of Information Technology University (ITU) which received approval on March 25, 2019. The questionnaire comprised 10 very simple questions to assess potential for entrepreneurship in individual respondents. The survey instrument captured key variables such as age, gender, education level and major, urgency to implement business idea, access to entrepreneurial role models, risk-aversion, individual's ability to innovate and the very essential capacity to monetize. It would have been interesting to identify how entrepreneurial individuals are, subject to literature as our survey is cognizant of literature.

After the sample size calculation exercise, the instrument was circulated in the four districts of Punjab i.e. Lahore, Rawalpindi, Chiniot and Gujranwala (all beyond the threshold ES of 5) for primary data collection by the SNA teams deployed by PITB in these districts. Results were compiled for an estimation of what we have named the Entrepreneurial Potential Index (EPI). The exercise led to estimations of two versions of EPI as indices weighted equally on the basis of six dichotomous variables including proximity to a role model, innovativeness, urgency of entrepreneurial intent, risk-taking, ability to monetize/sell and whether or not the individual majored in Computer Science (or allied disciplines) and Engineering.

First version is a measure of five factors (without the effect of the major or discipline) as follows:

$EPI_1 = \sum(\rho,\lambda,\psi,\beta,\sigma)$
[where $0 \leq EPI \leq 5$,]

The second version also captures the effect of the major or the discipline as follows:

$EPI_2 = \sum(\rho,\lambda,\psi,\beta,\sigma,\varphi)$
[where $0 \leq EPI \leq 6$]

A description of the variables is given below.

- Role Model (ρ)
- The availability of a Role Model to the aspiring entrepreneur. Whether the individual has an accessible role model who is an entrepreneur. It is denoted by 'ρ' (rho).
- ρ = 1 if the individual has a role model in his family, friends or among co-workers, else ρ = 0.

- Innovativeness (λ)
- It is captured on the Likert scale with values between 0 and 10. We use 'ω' (omega) to capture this value.
- 'λ' (lambda) denotes how innovative a person is.
- $\lambda = 0.1 \times \omega$

- Urgency (ψ)
- It measures the urgency of entrepreneurial intent. It is captured on the Likert scale on a range of 1 to 5. The values obtained on the Likert scale are symbolized by 'ε' (epsilon).
- We use 'ψ' (psi) to denote Urgency.
- $\psi = 0.2 \times \varepsilon$

- Risk Taking (β)
- This variable tells us whether a person is a risk-taker or averse to risk. We use 'β' (beta) to represent it.
- For the measure of β, we first measure

'α' (alpha) which is our Risk Aversion Co-efficient as follows:

- α = (Amount (PKR) invested)/(Total amount (PKR)offered to the individual)
- α is then compared against a statistically significant Risk Aversion Co-efficient for Pakistan Stock Exchange calculated at 0.45 (Rafique, Iqbal, Zakaria & Mujtaba, 2019).
- For α ≥ 0.45, β = 1, else β = 0

- Selling Ability (σ)
- The ability of an individual to monetize is captured by asking whether the person has sold a product or a service in the past. We use 'σ' (sigma) to indicate the ability of a person to sell.
- For a person, who has sold something, σ = 1 else σ = 0

- Effect of Major/Discipline (φ)
- This variable captures the effect of degree discipline or major.
- We use 'φ' (phi) to measure it.
- For Computer Science and Engineering graduates φ = 1 since they have a higher proclivity to embrace entrepreneurism as per literature suggests.
- For all other disciplines φ = 0.5

The Entrepreneurial Score and both versions of EPI are a contribution to the existing stock of knowledge that would help us understand the entrepreneurial potential of individuals and districts for evidence-based policy-making for the intended outcomes.

FINDINGS FROM SECONDARY DATA

The secondary data on the characteristics of applicants was received from Plan9 and an analysis was conducted by first looking at the founder applicants' data of various Cycles to study their characteristics including Gender, Districts, Educational Profile (including their Degree Levels and Majors) and Provinces. The profile of winners of cycles eight through twelve were observed to make a comparison of the average winner with the average citizen of the province of Punjab as per the Household Integrated Economic Survey 2015-16 data.

Going over the summary statistics from secondary data of Cycle 8 through Cycle 12, the key take-aways thus far have been as follows:

Gender Parity

The founder applicant data shows low gender parity, the representation of women across the cycles is shown in Table 4a and Figure 4a. There are far too few applications from women founders. The trend continues on to reflect on the number of male founder winners versus female founder winners and it is observed that an absence of clear policy with regards to gender equality is favoring the male as shown in Table 1a.

Plan9 Cycle	Applicants		Winners	
	Male	Female	Male	Female
01	90	12	7	0
02	77	6	15	1
03	72	4	11	1
04	82	12	15	2
05	59	6	10	3
06	116	11	17	0
07	63	14	10	3
08	178	28	9	1
09	314	26	14	1
10	60	13	10	3
11	213	33	16	0
12	338	47	14	1
Total	1662	212	148	16

Table 4a: Number of Male versus Female applicants and winners across Cycle 01 through 12.

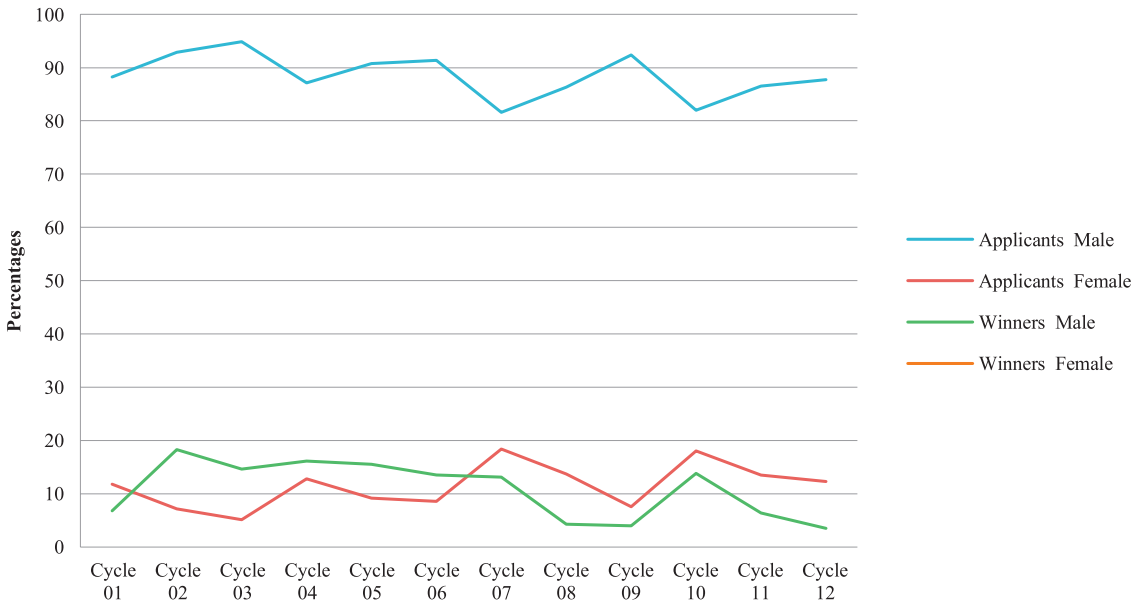


Figure 4a: Male Applicants versus Winners and Female Applicants versus Winners across Cycle 01 through 12.

DISTRICT EFFECTS

Sr. No.	Cycle No.	Findings on District Profile of Punjabi Applicants
1	8	• 25 districts of Punjab represented except: **Attock, Bhakkar, Dera Ghazi Khan, Jhelum, Layyah, Lodhran, Mandi Bahauddin, Mianwali, Narowal, Rajanpur and Toba Tek Singh.** • Lahore takes the lead with maximum applicants with comparatively negligible representation from other districts except Chiniot and Vehari.
2	9	• 31 districts of Punjab except **Bhakkar, Hafizabad, Lodhran, Mianwali and Muzaffargarh.** • Lahore takes the lead with maximum applicants followed by Chiniot.
3	10	• 17 districts of Punjab represented • Lahore takes the largest share with representation from Chiniot, Kasur, Narowal and Sahiwal.
4	11	• 31 districts of Punjab represented except five: **Attock, Bhakkar, Chakwal, Dera Ghazi Khan and Mandi Bahauddin.** • Lahore takes the lead with maximum applicants followed by Rawalpindi.
5	12	• A total of 33 of 36 districts of the province of Punjab were represented leaving out only **Mandi Bahauddin, Rajanpur and Toba Tek Singh.** • Lahore takes the lead with maximum applicants followed by Chiniot, Rawalpindi and Gujranwala.

Table 4b: Summary of district-wise representation across Cycles 8 through 12.

In terms of district representation, we can observe through the cycles that they have been fairly inclusive in steady receipt of applicants across all districts with Cycle 12 as the most inclusive cycle district-wise with 33 of the 36 districts represented. A comparison of 14 districts from North, Central and South Punjab is shown in Table 4c.

Entrepreneurial Scores							
Cycle	**Lahore**	**Rawalpindi**	**Chiniot**	**Gujranwala**	**Sheikhupura**	**Sialkot**	**Okara**
1	61.16	13.43	1.49	2.99	4.48	1.49	1.49
2	52.86	7.14	4.29	4.29	1.43	7.14	7.14
3	50	0	2	6	6	4	4
4	55.71	11.43	5.71	0	4.29	1.43	1.43
5	54.35	2.17	8.7	2.17	2.17	4.35	4.35
6	51.43	6.67	3.81	6.67	1.9	0.95	0.95
7	48.33	8.33	0	6.67	3.33	1.67	1.67
8	64.37	2.29	5.14	1.71	1.71	2.29	2.29
9	50.5	3.01	5.35	3.68	4.35	4.01	2.01
10	60.6	3.03	4.54	1.51	0	0	0
11	46.15	7.69	0.45	3.17	4.07	1.36	1.36
12	44.07	5.47	6.69	4.56	3.34	2.13	2.13
Mean	53.29	5.89	4.01	3.61	3.089	2.57	2.40
Entrepreneurial Scores							
Cycle	**Multan**	**Sahiwal**	**Vehari**	**Gujrat**	**Bahawalpur**	**Bahawal-nagar**	**Faisalabad**
1	2.99	1.49	1.49	0	0	0	0
2	1.43	0	2.86	1.43	1.43	2.86	1.43
3	0	2	2	8	4	0	0
4	2.86	2.86	0	0	1.43	0	0
5	2.17	0	2.17	0	0	0	0
6	2.86	2.86	3.81	0	1.9	1.9	0
7	6.67	3.33	0	0	0	1.67	1.67
8	0.57	1.14	4	2.86	0.57	1.14	0.57
9	1.34	1.67	1	2.34	2.01	1	1.34
10	0	4.54	1.51	1.51	1.51	1.51	0
11	3.62	2.26	1.81	3.17	2.71	1.81	0.9
12	3.65	1.52	1.22	1.52	0.3	1.52	0.61
Mean	2.36	1.97	1.82	1.74	1.32	1.12	0.54

Table 4c: Percentage of applicants from prominent cities of Punjab

As observed in Table 4c and Figure 4b, a very strong urban agglomeration effect in line with the studies discussed in the literature is observable in case of Lahore. But it is particularly striking to note negligible representation of applicants from Faisalabad, Sialkot and Gujrat that are more industrialized cities. As one proceeds through cycles, Lahore is observed giving way to other districts in Punjab.

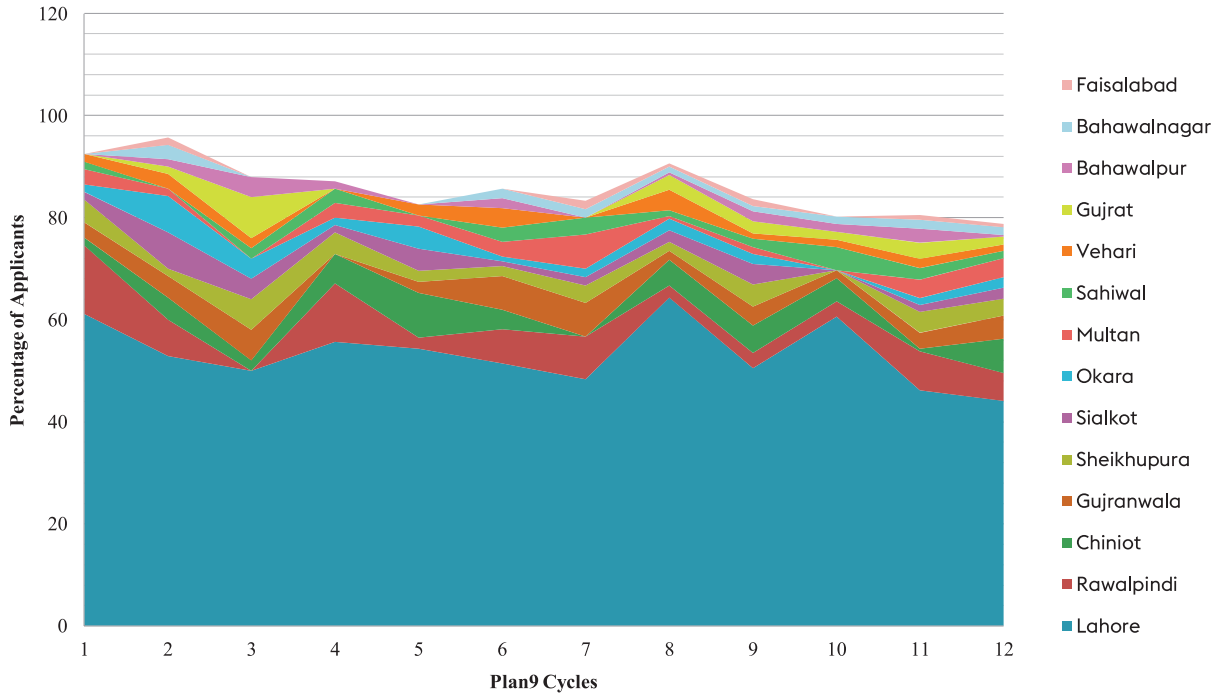


Figure 4b: Percentage of leading 14 districts in Punjab-wide applicants across Cycles 01 through 12.

4.3 Academic Profile

4.3.1 Degree-Levels

Sr. No.	Cycle No.	Findings on Applicants Degree Level
1	8	Almost all founder applicants had completed education beyond an under-graduate degree with the exception of just one diploma holder.
2	9	98% of the founder applicants had completed education beyond an under-graduate degree.
3	10	Data not available.
4	11	99% of the founder applicants had completed education beyond an under-graduate degree.
5	12	It is also observed that the vast majority of the founder applicants (97%) had completed education beyond an undergraduate degree.

Table 4d: Degree levels of applicants across Cycle 8 through 12.

As shown in Table 4d, with exception of Cycle 10, we see that almost all applicants were educated and had successfully completed at least a bachelor's degree.

4.3.2 Academic Major & Discipline of Choice

The majors of founder applicants with a Bachelor's degree are shown in Table 4e.

Sr. No.	Discipline/Major	Cycle 08 (%age)	Cycle 09 (%age)	Cycle 10 (%age)	Cycle 11 (%age)	Cycle 12 (%age)
1	Accountancy & Finance	0.56	2.22	--	3.08	3.13
2	Engineering	16.38	11.56	--	18.51	21.60
3	Business & Management	19.77	10.22	--	7.4	7.31
4	CS/IT/Software Eng.	56.49	64.44	--	58.64	60.62
5	Social Science & Econ.	1.13	1.78	--	0	2.09
6	Sciences & Bio-Tech.	1.13	0.44	--	4.94	1.74
7	Medicine	0	0.89	--	0.62	1.04
8	Media & Design	2.26	0.44	--	0	0.69
9	Other	7.41	8	--	20.37	3.13
Total		100	100	--	100	100

Table 4e: Majors of founder applicants with a Bachelor's degree across Cycle 8 through 12.

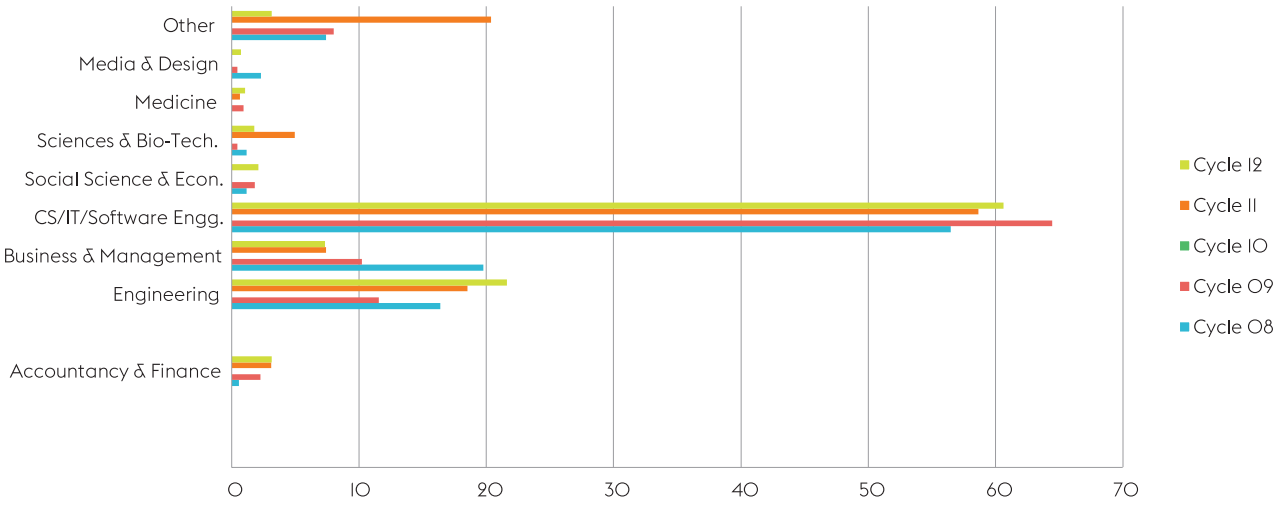


Figure 4c: Majors of Bachelor's applicants across Cycle 8 through 12.

As can be observed in Figure 4c, with the exception of Cycle 10, Computer Science major for the undergraduates is over-represented followed by Engineering and then Business Management.

The majors of founders with a Master's degree are shown in Table 4f.

Sr. No.	Discipline/Major	Cycle 08 (%age)	Cycle 09 (%age)	Cycle 10 (%age)	Cycle 11 (%age)	Cycle 12 (%age)
1	Accountancy & Finance	--	--	--	2.32	1.38
2	Engineering	--	--	--	9.3	6.94
3	Business & Management	57.69	25.64	--	34.88	31.94
4	CS/IT/Software Engg.	11.53	53.84	--	16.27	26.38
5	Social Science & Econ.	--	5.12	--	2.32	6.94
6	Sciences & Bio-Tech.	--	--	--	4.65	4.16
7	Medicine	7.69	--	--	2.32	--
8	Media & Design	--	2.56	--	2.32	4.16
9	Other	23.07	12.82	--	25.58	18.05
Total		100	100	--	100	100

Table 4f: Majors of applicants with a Master's degree across Cycle 8 through 12.

As evident from the Table 4f, the maximum graduate applicants came with a background in Business Management followed by Computer Science as can also be observed in the Figure 4d.

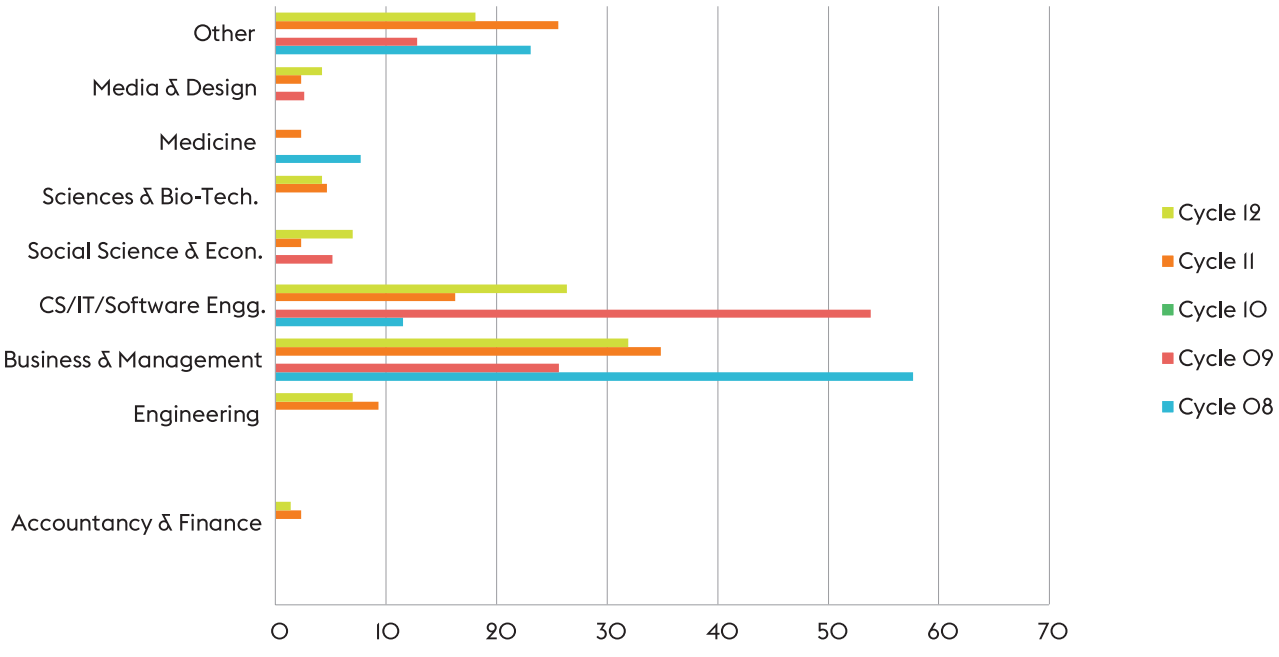


Figure 4d: Majors of Master's applicants across Cycle 8 through 12.

A summary of majors of cycles 8 through 12 is available in Table 4g below.

S. No.	Cycle	Findings on Applicants' Discipline/Major
1	8	• About 73% founder applicants with majors in Computer Science and Engineering related disciplines versus about 20% from Business and Accountancy at the Bachelor's level. • 58% of those with a graduate degree were observed to have had a background in Business and Management.
2	9	• About 84% founder applicants with majors in Computer Science and Engineering related disciplines versus about 12% from Business and Accountancy at the Bachelor's level. • More than half of applicants with a graduate degree were observed to have a background in Computer Science and a quarter with Business and Management.
3	10	*Data unavailable.*
4	11	• 78% founder applicants with majors in Computer Science and Engineering related disciplines versus about 7% from Business and Accountancy at the Bachelor's level. • One third of applicants with a graduate degree were observed to have had a background in Business and Management followed by Computer Science (16%) and about 9% with an engineering background.
5	12	• 81% founder applicants with majors in Computer Science and Engineering related disciplines versus about 10% from Business and Accountancy at the Bachelor's level. • One third of applicants with a graduate degree were observed to have had a background in Business and Management followed by Computer Science (26%). An equal number graduate of applicants with background in Engineering and Social Sciences.

Table 4g: Summary of majors of all applicants across Cycle 8 through 12.

This shows that a bulk of founder applicants at the Bachelor's level are coming with a Computer Science and Engineering background whereas those at the Master's level have done a degree either in Business and Management or Computer Science.
These observations have external validity with evidence discussed in literature from United States of America and Singapore where having a STEM background would markedly increase chances in trying luck with a new venture followed by those with a background in Business. Similar suggestions were observed in the Singapore study where graduate Engineering and Computer Science were found to have greater interest in entrepreneurship.

4.4 PROVINCIAL EFFECTS

As shown in Table 4h and Figure 4e, the bulk of applications are coming from Punjab followed by Sindh, Khyber-Pakhtunkhwa and Islamabad Capital Territory. However, a negligible representation is observed from Azad Jammu Kashmir, Gilgit-Baltistan and Balochistan.

Sr. No.	Province/Federating Unit	Cycle 08	Cycle 09	Cycle 10	Cycle 11	Cycle 12
1	Islamabad Capital Territory	1.94	3.24	1.37	6.1	1.3
2	Punjab	84.95	87.94	90.41	89.84	85.45
3	Sindh	9.22	5.59	2.74	1.63	9.09
4	Khyber-Pakhtunkhwa	2.43	2.35	4.11	1.63	2.6
5	Balochistan	0	0.59	0	0.81	0.52
6	Gilgit-Baltistan	0.49	0.29	1.37	0	0
7	FATA	0	0	0	0	0.26
8	Azad Jammu Kashmir	0.97	0	0	0	0.78
	Total	100	100	100	100	100

Table 4h: Percentage of applicants across all federating units of Pakistan.

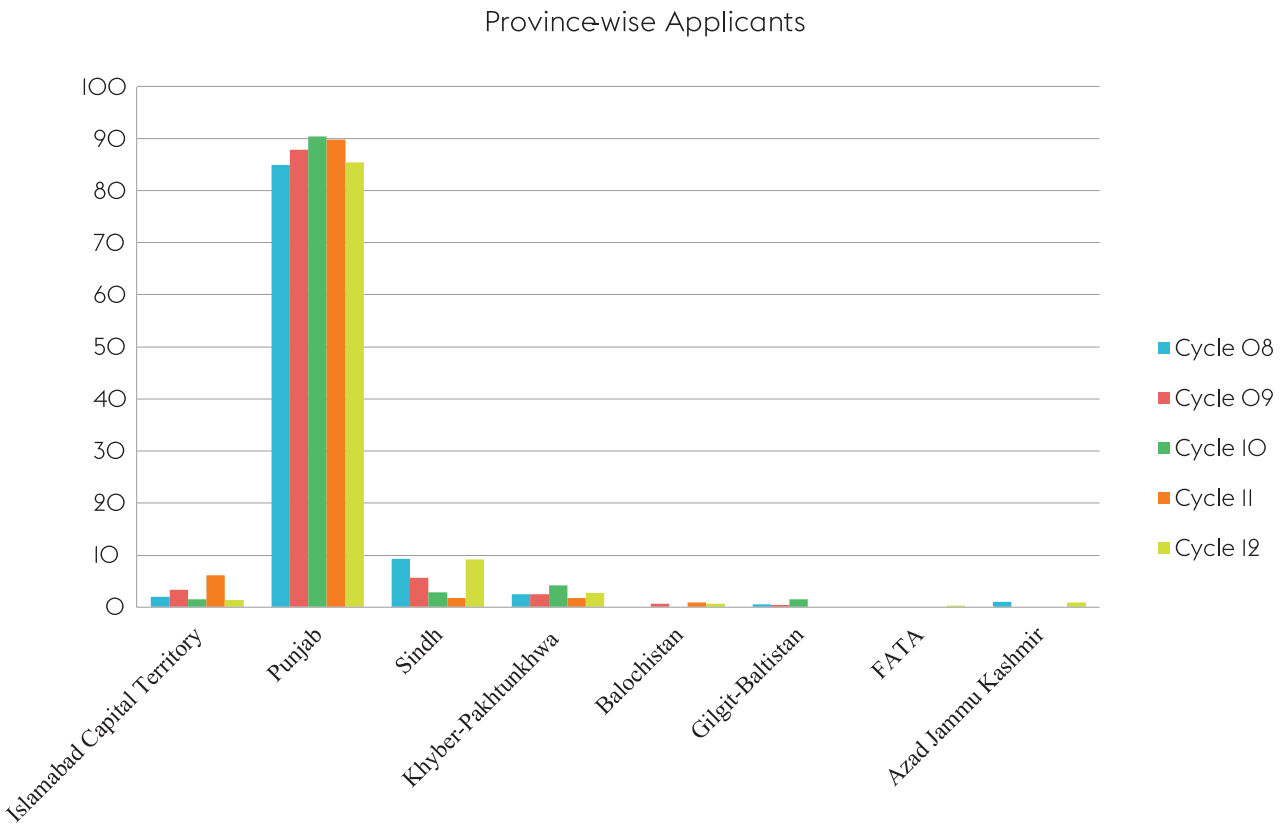


Figure 4e: Province-wise applicants across Cycle 8 through 12.

The analysis shows clearly that Punjab is over-represented which implies that Plan9 has somewhat missed its prescribed policy target in its outreach to other provinces.

4.5 Mapping with Average Punjab Citizen

Sr. No.	Cycle No.	Number of Applicants	Success Rate	Profile of Average Winner
1	8	2O6	4.85	Male from Lahore, Punjab with a Bachelor's degree
2	9	34O	4.4I	24 year old male from Lahore, Punjab with a Bachelor's degree.
3	IO	73	I7.8O	Male from Punjab
4	II	246	6.5	Male from Lahore, Punjab with a Bachelor's degree or above.
5	I2	385	3.9O	26.5 year old male from Lahore with a Bachelor's degree or above.

Table 4i: Number of Applicants, Success Rate and Findings on Winners of Cycle 8 through I2.

The founder applicants and founder winner profiles clearly signal a male from Lahore, Punjab as over-represented. The mean age of the winner is around 26.5 years and in terms of qualification; he has a Bachelor's degree and most likely has a major in Computer Science or Engineering.

The most gender-inclusive and district-wise well represented cycle was Cycle IO among the five cycles with the highest female applicant ratio of I8% and highest success rate of 23% for females besides representation of founder winners from districts Vehari, Sialkot, Sahiwal, Okara, Gujrat, Chiniot, Narowal and Lahore. Unfortunately, unavailability of data on the age-demographic, degree-levels and disciplines of choice puts the study at a disadvantage in profiling the founder winner with detailed characteristics as in the case of the other four cycles.

However, in terms of our mapping exercise between average winner and average Punjab citizen, the most better off in terms of average monthly income and mean household income is the average Punjab citizens who were mapped against Cycle 8 and Cycle II as shown in Table 4j. The only apparent factor differentiating these vis-à-vis mapped profiles with other cycles is the relaxation of the age demographic but not necessarily the academic profile as we can also see that the worst off of all them is where the average education is just about seven years.

Sr. No.	Cycle (average)	Age (average)	Education (average)	Monthly Income (mean)	Household Income (per annum)	Entrepreneurial Persons (%age)
1	8	38	I6	4I,656	5I6,392	5.28
2	9	24	I6	23,OO2	254,878	O
3	IO	25	7	I9,595	242,88O	I.69
4	II	38	I6	42,O57	52O,829	4.89
5	I2	26	I6	29,84I	346,O24	2.I3

Table 4j: Snapshot of average characteristics of mapped Plan9 cycles with HIES 2OI5-I6.

Results from Primary Data Collection
To validate our findings from secondary data (the latest Launchpad event conducted by the time of the study i.e. Cycle 12), a primary data collection exercise was performed to estimate the Entrepreneurial Potential Index in the four leading districts of Punjab with the highest calculated Entrepreneurial Score (on a threshold of 5) including Lahore, Rawalpindi, Gujranwala and Chiniot (as observed in Table 4c).

5.1 ENTREPRENEURIAL POTENTIAL INDEX

5.1.1 Sample Size Calculations

A = Total 26 year old in Pakistan = 2493
B = Total 26 year old males in Pakistan = 1193
C= Total 26 year old males in Punjab = 466
C_1 = 26 year males in Punjab (No Education) = 37
C_2 = 26 year males in Punjab (Educated) = 357
C_3 = 46, C4=17
D = C/B = 466/1193 = 0.390 x 2493 = 972.27
E = C_1/C = 357/466 = 0.766 x 972.27 = 744.76
F= Undergrad = C_2/C ×E = 46/357 ×744.76 = 95.96
G = Grad = C_4/C ×E = 17/357 ×744.76 = 35.46
N = G + F = 35 + 96 = 131

For N with a Confidence Interval of 95% and Margin of Error at 5%, the required Sample Size = 98.
The sample calculations for districts with ES > 5 are as follows:

- Sample for Chiniot = 6.69/(100)×98=6.55 ≅7
- Sample for Gujranwala = (4.56)/(100)×98=4.46 ≅4
- Sample for Rawalpindi = 5.47/(100)×98=5.36 ≅5
- Sample for Lahore = 44.07/100×98= 43.18 ≅ 43

5.1.2 EPI Results from Prominent Districts
The study was carried out as per the sample size above in the four leading districts of Punjab.

SR. NO.	DEGREE & MAJOR	CITY	EPI1	EPI2	SR. NO.	DEGREE & MAJOR	CITY	EPI1	EPI2
1	Bachelor's degree in Other	CHINIOT	2.9	3.4	5	Bachelor's degree in Media & Design	CHINIOT	4.9	5.4
2	Bachelor's degree in Other		2.8	3.3	6	Master's/M.Phil degree in Social Science & Econ.		3	3.5
3	Bachelor's degree in Other		2.8	3.3	7	Bachelor's degree in CS/IT/ Software Engg.		3.6	4.6
4	Bachelor's degree in Social Science & Econ.		3.5	4	8	Master's/M.Phil degree in Social Science & Econ.		2.6	3.1
9	Bachelor's degree in CS/IT/ Software Engg.	GUJRANWALA	3.6	4.6	14	Master's/M.Phil degree in Media & Design	RAWALPINDI	4.5	5
10	Bachelor's degree in Other		2.3	2.8	15	Bachelor's degree in CS/IT/ Software Engg.		4.6	5.6
11	Bachelor's degree in Business & Management		4	4.5	16	Bachelor's degree in Engineering		2.6	3.6
12	Bachelor's degree in Engineering		1.4	2.4	17	Bachelor's degree in CS/IT/ Software Engg.		3.4	4.4
13	Bachelor's degree in Engineering		3.6	4.6	18	Bachelor's degree in CS/IT/ Software Engg.		2.8	3.8
SR. NO.	**DEGREE & MAJOR**	**CITY**	**EPI1**	**EPI2**	**SR. NO.**	**DEGREE & MAJOR**	**CITY**	**EPI1**	**EPI2**
19	Bachelor's degree in Social Science & Econ.	LAHORE	4.6	5.1	21	Bachelor's degree in Other	LAHORE	3.9	4.4
20	Master's/M.Phil degree in Business & Management		3.8	4.3	22	Bachelor's degree in Other		4.7	5.2
23	Bachelor's degree in Media & Design		4.2	4.7	36	Bachelor's degree in Sciences & Bio-Tech.		4.5	5
24	Bachelor's degree in CS/IT/ Software Engg.		4.6	5.6	37	Master's/M.Phil degree in Business & Management		4.7	5.2
25	Bachelor's degree holder Accountancy & Finance		4.3	4.8	38	Bachelor's degree in Engineering		4.7	5.7
26	Bachelor's degree in CS/IT/ Software Engg.		3.5	4.5	39	Bachelor's degree in Engineering		4.7	5.7
27	Bachelor's degree in Other		3.4	3.9	40	Bachelor's degree in Business & Management		4.9	5.4
28	Bachelor's degree in Engineering		4.6	5.6	41	Bachelor's degree in Engineering		4.7	5.7
29	Bachelor's degree in Other		3.6	4.1	42	Bachelor's degree in Other		3.4	3.9

SR. NO.	DEGREE & MAJOR	CITY	EPI1	EPI2	SR. NO.	DEGREE & MAJOR	CITY	EPI1	EPI2
30	Bachelor's degree in Engineering	LAHORE	3.7	4.7	43	Bachelor's degree in CS/IT/ Software Engg.	LAHORE	4.5	5.5
31	Master's/M.Phil degree in Social Science & Econ.		4.5	5	44	Bachelor's degree in Engineering		4.7	5.7
32	Bachelor's degree holder Engineering		3.8	4.8	45	Bachelor's degree in Engineering		4.8	5.8
33	Bachelor's degree in Other		4.9	5.4	46	Bachelor's degree in Engineering		4	5
34	PhD (or above) in Other		3.6	4.1	47	Bachelor's degree in Other		4.7	5.2
35	Master's/M.Phil degree in Social Science & Econ		4.5	5	48	Bachelor's degree in Engineering		4.7	5.7
49	Bachelor's degree in Engineering		3.9	4.9	62	Master's/M.Phil degree in Other		4.7	5.2
50	Master's/M.Phil degree in Social Science & Econ.		4.7	5.2	63	Bachelor's degree in Business & Management		4.7	5.2
51	Bachelor's degree in Other		3.5	4	64	Bachelor's degree in Accountancy & Finance		4.7	5.2
SR. NO.	**DEGREE & MAJOR**	**CITY**	**EPI1**	**EPI2**	**SR. NO.**	**DEGREE & MAJOR**	**CITY**	**EPI1**	**EPI2**
52	Bachelor's degree in Engineering	LAHORE	4.6	5.6	65	Master's/M.Phil degree in Other	LAHORE	4.7	5.2
53	Bachelor's degree in Engineering		3.7	4.7	66	Bachelor's degree in Other		3.9	4.4
54	Master's/M.Phil degree in CS/IT/Software Engg.		4.7	5.7	67	Bachelor's degree in Other		4	4.5
55	Bachelor's degree in Engineering		4.9	5.9	68	Bachelor's degree in Engineering		3.3	4.3
56	Master's/M.Phil degree in CS/IT/Software Engg.		4.9	5.9	69	Bachelor's degree in Engineering		4.7	5.7
57	Master's/M.Phil degree in Other		4.6	5.1	70	Bachelor's degree in Business & Management		2.7	3.2
58	Bachelor's degree in CS/IT/ Software Engg.		4.8	5.8	71	Bachelor's degree in Engineering		4.7	5.7
59	Bachelor's degree in Engineering		3.2	4.2	72	Bachelor's degree in Other		4.7	5.2
60	Bachelor's degree in Engineering		4.6	5.6	73	Bachelor's degree in Other		4.9	5.4
61	Master's/M.Phil degree in Other		4.7	5.2	74	Bachelor's degree in Engineering		4.7	5.7

Table 5a: Results of EPI_1 and EPI_2 estimates (for four districts of Punjab, ES>5).

5.1.3 Interpretation of EPI Results

The threshold values decided at the outset for EPI1 and EPI2 are as follows:

- For EPI1, if EPI1 ≥ 2.5 then the individual is entrepreneurial otherwise not entrepreneurial.
- For EPI2, if EPI2 ≥ 3.0 then the individual is entrepreneurial otherwise not entrepreneurial.

The mean scores of EPI for each of the four cities are given in Table 5b and Figure 5a. A separate exercise to calculate mean scores of the six component variables of EPI is shown in Table 5c and Figure 5b.

Sr. No.	District	EPI_1	EPI_2	% Entrepreneurial
1	Gujranwala	2.98	3.78	60
2	Chiniot	3.26	3.83	100
3	Rawalpindi	3.58	4.48	100
4	Lahore	4.33	5.06	100

Table 5b: Average EPI_1 and EPI_2 calculations in four districts of Punjab.

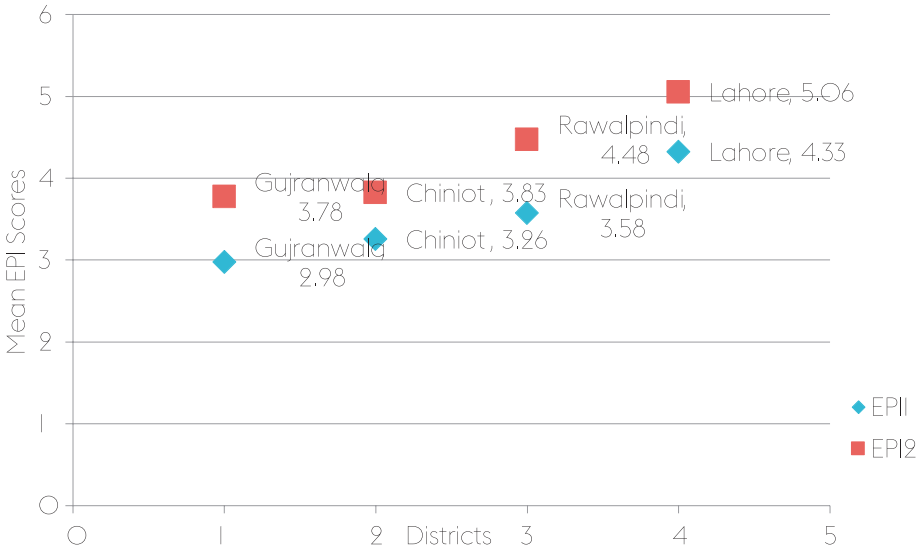


Figure 5a: Average EPI across four districts of Punjab.

Sr. No.	District	$\bar{\rho}$	$\bar{\lambda}$	$\bar{\psi}$	$\bar{\alpha}$	$\bar{\beta}$	$\bar{\sigma}$	$\bar{\varphi}$
1	Lahore	0.96	0.83	0.84	0.76	0.96	0.73	0.73
2	Rawalpindi	0.6	0.82	0.76	0.64	1	0.4	0.9
3	Chiniot	0.25	0.84	0.93	0.79	1	0.25	0.56
4	Gujranwala	0.4	0.82	0.76	0.56	0.6	0.4	0.8

Table 5c: Estimations of mean values of EPI component variables.

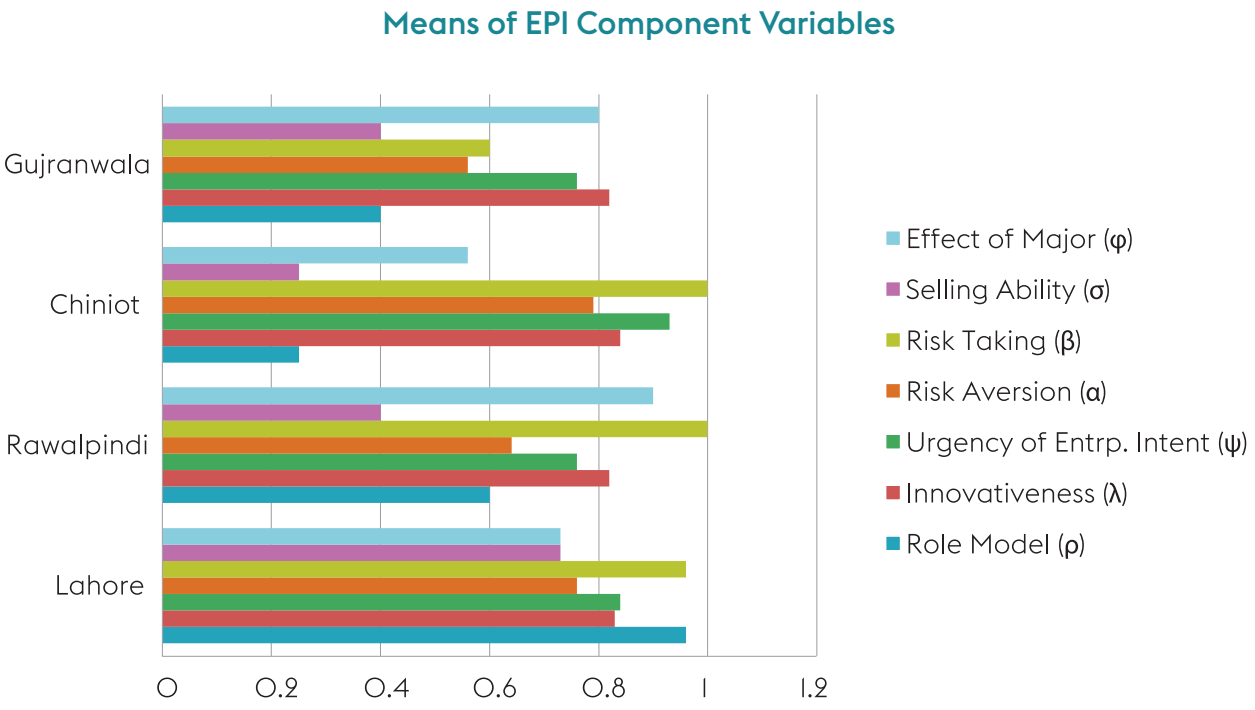


Figure 5b: Mean scores of EPI variables

As evident, the interpretations of the estimations are as follows:

Lahore

- Lahore emerges as the most entrepreneurial city of Punjab with the highest average EPI score.
- A total of 56 observations from Lahore were analyzed.
- 100% respondents from Lahore qualify to be entrepreneurial.
- 79% of these hold a Bachelor's degree, 20% hold a Master's/M.Phil Degree and one holds a PhD degree.
- 36% of these are Engineers and 11% have a background in Computer Science related discipline.

Rawalpindi

- Rawalpindi has the second highest average EPI score.
- A total of five observations from Rawalpindi were analyzed.
- All of the respondents from Rawalpindi were found to be entrepreneurial.
- Four of these hold a Bachelor's degree while one holds a Master's/M. Phil Degree.
- Three have a background in Computer Science related discipline; one each of these is an Engineer and a Media and Design person.

Chiniot

- Chiniot has the third highest average EPI score.
- A total of eight observations from Chiniot were analyzed.
- All eight respondents from Chiniot qualified to be entrepreneurial.
- Six of these hold a Bachelor's degree, while two have a Master's/M.Phil
- One individual each with a Computer Science related and Media and Design backgrounds while three individuals each with a Social Sciences background and those mentioned under the category "Other" .

Gujranwala

- Gujranwala had the least average EPI score among the four districts.
- A total of five observations from Gujranwala were analyzed.
- Three of these qualified to be entrepreneurial (60%).
- All of these hold a Bachelor's degree
- One individual each with a Business and Management and Computer Science related backgrounds, two are engineers and one belongs to the category of disciplines mentioned under the "Other".

Concluding Remarks

The Punjab ICT Policy is a comprehensive and proactive commitment by the state. Plan9 being a state-sponsored unit, is a demonstration of the state's resolve to remain conscientious, non-reactive entity with the foresight to play its rightful role in driving innovation, creating new markets and catching up of the economy to the much-needed innovation-driven stage. The state, through the Plan9 platform, has established itself as a self-assured entrepreneurial entity, willing and able to take on early, capital-intensive, high-risk areas (Mazzucato, 2015).

All the aforementioned findings lead us to infer that the prevailing policy direction of the state is correct. Nevertheless, in the spirit of a learning and ever-evolving entity it must pay heed to evidence to act entrepreneurially itself through an intuitive, well-informed and integrated approach to deliver the policy promise.

Based on our findings, it is reassuring to see that all the Plan9 cycles have been fairly inclusive in steady receipts of applications from across districts of Punjab with the last cycle most inclusive with representation from 33 of the 36 districts of the province. However, the bulk of applications are being received

from Lahore followed by Rawalpindi, Gujranwala and Chiniot. We further observe that in the absence of clear policy considerations for gender parity, the female founders are unfavorably affected at the application stage and consequently at the winning stage.

What is further heartening is to note the results from primary data collection exercise also attest the findings from secondary data analysis, which is a testimony to the entrepreneurial potential of Punjab being very ably captured by Plan9.

It is also evident that all those who make it to the application process at Plan9 are self-selecting themselves into it. These are reasons enough for the state to focus on the low hanging fruit and concentrate its energies on making its offerings accessible to all those who are eligible to benefit from the existing pledge in an equitable manner. In doing just that, the state needs to intensify efforts to improve the sense of entitlement among people in general and as a capability enhancer and an enabler to help the start-up environment in particular.

Resultantly, the policy must heed the combinatorial role of several factors to produce an integrated yet catalytic impact on entrepreneurial agency especially through expansion of what Debraj Ray would argue as the aspirations window (Ray, 2003). It must mediate to bring the goal post closer to make it more proximal and attainable. An intervention that can somehow make the *gap*[14] smaller in all likelihood can work wonders. At any rate, it would be advisable to infuse an element of prestige looking at the agent's self-image as a function that gains additional utility from an identity matching her ideal and a non-pecuniary incentive may capture entrepreneurism as a rational choice for an actor (Akerlof & Kranton, 2000).

6.2 POLICY RECOMMENDATIONS

A broad set of recommendations are being made here for the state for an all-inclusive. Policy for the support of entrepreneurism in Punjab as follows:

6.2.1 Inclusion of Women

It is brazenly evident across all cycles that women were immensely underrepresented among startup founders. The policy recommendations to encourage and include women in the entrepreneurial ecosystem are given below.

A concerted outreach effort is required to encourage women to become part of the entrepreneurial ecosystem. This can be done by instituting quotas for women founders in each cycle.

Policy intervention is needed at the institutional level to strengthen the property rights and enable access to capital and resources for women.

An entrepreneurial network such as "Herself" must be supported to encourage interaction with women role models and expand their aspirations window.

6.2.2 Education Levels and Majors

It can be very conveniently established from the results that a majority of applicants and winners have completed an undergraduate degree and the three majors in order of importance to take the entrepreneurial leap are Computer Science and Engineering followed by Business and Management. We have seen relaxing the minimum educational level from a bachelor's degree does not fare well for entrepreneurial culture in our findings for the average citizen when mapped against Cycle 10 winner. But evidence from literature suggests that Polytechnic students is also a motivated

14. Aspirations gap between what an agent has versus what the agent aspires (Ray, 2003).

lot but has not been proven in Pakistan. It is also evident that Plan9 has been accepting applications from holders of Polytechnic Diploma besides High School graduates but their numbers among winners are close to none. In case of former, given the evidence partly holding external validity for Pakistan in Computer Science and Engineering, we should make an attempt to include Polytechnic institutions as part of any outreach effort. In the case of latter, we have also seen in the studies that peer effects especially in adolescence can have a positive effect on entrepreneurial propensity. If we include a younger demographic with the minimum acceptable educational criteria, the state would be acting proactively in planning ahead in the spirit of an entrepreneurial state.
The following is recommended in this regard:
a. An outreach to all tertiary level educational institutions offering majors in Computer Science, Engineering and Business both in public and private sector.
b. An outreach to polytechnic institutions and possibly helping in imparting basic selling and marketing skills besides business knowledge.
c. An outreach to Higher Secondary Schools and Colleges across Punjab to include people with more diverse educational profile.
d. There remains room to include majors beyond Computer, Engineering and Management to include creative fields importantly Media and Communication Design and possibly work to make these disciplines more interdisciplinary through a state-policy.

6.2.3 Age

It is essential that we reap the rewards our demographic dividend and we have observed that age demographic plays importantly for entrepreneurial culture, but we see very few applicants beyond 30 years of age. The mean age remains between 24 and 26 in cycles where applicants reported their age. Literature puts the mean age of 39 years for U.S.-born founders. The median ages in the United States and Pakistan stand at 38 years ("United States - Country Profile - 2018", 2019) and 24 years ("Pakistan Demographics Profile 2018", 2019) respectively.

As per our findings the two cycles where the entrepreneurial activity was better pronounced were those where the average age of the citizen was around 38 years.

A concerted effort is thus required to include diverse age demographic into the Plan9 incubation process albeit with a different set of incentives than what is being offered to young fresh-out-of-college graduates.

6.2.4 Provincial Representation

Punjab takes the lion's share of all applicants and winners across all cycles. Although, Plan9 has a mandate for Punjab, it must not be restricted just to the province and must do its best to attract the best talent from across Pakistan to enter into the entrepreneurial landscape which shall as a consequence improve the growth of economy in the province and the country.

As can be seen besides a very small representation from Sindh and Khyber-Pakhtunkhwa, there is negligible representation from Balochistan, Gilgit-Baltistan, FATA and Azad Jammu Kashmir. The analysis on the average Pakistani citizens suggests that there may be many eligible persons in other provinces who unfortunately are not drawn towards Plan9.

There must be a determined effort to reach out to other provinces and encourage applications nationwide to make Plan9 a magnetic hub for startup aspirers.

6.2.5 District Representation in Punjab
Overall Lahore seems to be overrepresented, in all likelihood owing to its agglomeration effects as per the urban economic theory. Our primary data analysis validates the same in providing evidence that individuals from Lahore are more entrepreneurial followed by Rawalpindi, Chiniot and Gujranwala respectively.

It is also important to notice that districts that are historically more entrepreneurial especially Faisalabad and Gujrat are hugely underrepresented as per our analysis. It was also noted that despite that there is a Launchpad event now being held in Faisalabad, there are too few applicants form there. Multan and Vihari tend to do a lot better than them. A very obvious reason for that is because Lahore has a location advantage in comparison to other cities. But this asks for an aggressive outreach to the cities that are traditionally more business friendly including Faisalabad, Sialkot and Gujrat. The least represented districts across Cycle 8 through 12 are Bhakkar, D.G. Khan, Lodhran, Mandi Bahauddin, Mianwali and Toba Tek Singh. Districts including Attock, Layyah, Jhelum, Muzaffargarh, Hafizabad, Chakwal and Rajanpur are also underrepresented. Many of these are in South Punjab.

A good way to engage a number of eligible persons and encourage people where Plan9 does not have a footprint is to utilize the resources of the more accessible E-Rozgaar Centers conveniently located in all 36 districts of Punjab.

6.2.6 Success Rate
It was observed that on average each cycle has a target of between 10-15 (average 14) winners irrespective of the total number of applicants; hence we see an irregular trend in the success rate. It would make more sense to keep a percentage as a target for success rate instead of a number since an incoherent applicant to winner ratio would be quite unfair to those where competition is fierce and unnecessarily reward applicants who otherwise would have missed the mark.

6.2.7 Ability to Sell
In our comparative analysis of the average citizen of Punjab against our winner in each cycle, we made another interesting observation through tracking of occupation codes of the profession that was favored by a sizable majority i.e. Sales Work.

Sr. No.	Compared Average Citizen (in relation to)	Sales Workers (%age)
1	8	15.71
2	9	25.04
3	10	18.56
4	11	13.58
5	12	10.65

Figure 5b: Mean scores of EPI variables

On the basis of our observations made on ability to sell and monetize we can conclude that a majority of those employed have this ability and can be easily nudged to consider entrepreneurship as an occupational choice through awareness and outreach efforts.

6.2.8 Mapping of Applicants and Tracking of Winners
It is also evident that many important characteristics of the applicants were

not properly recorded. Information on variables especially degree levels, disciplines, city of origin, last attended institution, type of institution, occupational details, family background, asset ownership, location of residence, urgency of entrepreneurial intent and ability to monetize are vital to build a thorough understanding of the individual.

Therefore, a proper mapping exercise is recommended to ensure that the data of the applicants is properly recorded and maintained for a better informed and evidence-based policy exercise in future.

It is a no-brainer that many of the past winners who graduated out of the incubation stage would have made to it to running successful enterprises by now. It is further recommended to track the performance of all the winners over time and keep a record of their future developments. An annual progress report can be produced and published not merely to claim credit for the achievements being made but also to curate role models and success stories that will help in reduction of aspirations gap and expansion of aspirations window for start-up aspirants.

6.3 Comparison with GEM 2012 Report

The latest painstaking exercise on the start-up entrepreneurial environment of Pakistan was performed by the Center for Entrepreneurial Development, Institute of Business Administration, Karachi in the Entrepreneurial Environment Global Entrepreneurship Monitor (GEM) Pakistan Report published in 2012.

The report lays out its findings based on a survey conducted on 2000 adults of working age (18-64) in Pakistan. It measures entrepreneurial characteristics including attitudes, activities undertaken and aspirations to furnish a snapshot of the entrepreneurial environment in Pakistan. The report declares Pakistan in the factor driven economy group with limited opportunities for modern entrepreneurship[15]. The Total Early Stage Entrepreneurial Activity (TEA)[16] for Pakistan stands at 11.57 and is significantly lower for the factor-driven economies in the peer group. About 24% of the 11.57% of the working age adult population are involved in opportunity entrepreneurship. The percentage of working age adult population in Pakistan trying to set a new business is 8.29% that is lower than the average of other factor-driven economies[17] (Global Entrepreneurship Monitor, 2012).

In line with our findings the report puts the male TEA rate for Pakistan higher than the female TEA rate (17 times higher for males versus females). According to their estimates, for every 23 males pursuing early stage start-up there is but one female aspirant in Punjab. However, the twelve Plan9 cycles show a noticeably better male to female ratio among founder applicants, roughly at 8:1 while for winners it comes to about 9:1 with the majority hailing from Punjab.

Contrary to our findings GEM report rates Sindh and Khyber Pakhtunkhwa highest in entrepreneurial activity. The highest nascent entrepreneurship[18] rate of 19.30% is reported for the latter versus 6.90% of Punjab (slightly over Sindh but even less than Balochistan). In spite of the fact that participants from Peshawar, Lahore and Hyderabad are most likely to agree to start a new business, the startup activity from Punjab was much less evident. Moreover, the percentage of early-stage opportunity entrepreneurship activity in Khyber Pakhtunkhwa is also found to be much higher (13.60%) than Punjab (4.40%). However, the study findings exhibit much

15. The institutional environment is cited as one of the reasons for a start-up activity lower than the regional average.
16. Total Early Stage Entrepreneurial Activity Percentage of 18–64 age group who are either a nascent entrepreneur or owner-manager of a new business.
17. It is 15.42% for Ghana, 14.67% for Peru and 14.68% in Chile.
18. Percentage of 18–64 age group who are currently a nascent entrepreneur, i.e., actively involved in setting up a business they will own or co-own; this business has not paid salaries, wages or any other payments to the owners for more than three months.

less interest from provinces other than Punjab with too few applicants from Sindh and Khyber Pakhtunkhwa in comparison at Plan9. This is consistent with the recommendation to include people from other provinces and increase nationwide reach of the ecosystem.

It was established through the report that 67% of the adult working age population considers starting a new business as a desirable career choice. As many as 25% of the working age adult population was found to exhibit entrepreneurial intentions higher than Algeria, Iran, Turkey and Malaysia. Given our analysis the establishment of the Plan9 incubator in 2012 and the consequent ecosystem in Lahore are the likely discernible factors pointing to being harbingers of affirmative action in support of the entrepreneurial culture in Punjab. A thought-provoking aspect of the GEM report is its rather extended range for the age demographic, which also is a reaffirmation of our policy recommendation to include higher age groups but with a different set of incentives into the ecosystem.

6.4 Limitations

The scope of the study remained limited to the performance of only one public-funded incubator i.e. Plan9. It also remained restricted to select cycles of Plan9 due to unavailability of critical data. Owing to a dearth of information on relevant characteristics and discrepancies in the secondary data, many important factors stressed in the literature for a better profiling of applicants and winners could not be accounted for. A more informed profile of the applicants and winners across all the previously held cycles would have enabled us in undertaking a more sophisticated mapping exercise with different waves of the Household Integrated Economic Survey (HIES) and Pakistan Social and Living Standard Measurement (PSLM). In the absence of any analysis confirming internal validity, the assignment for the construction of the Entrepreneurial Potential Index remained rather modest. Given the paucity of time, the primary data collection exercise for EPI estimation also stayed constrained in both its scale and scope as it could only be performed the in the prominent cities of the Cycle 12 only.

Further Research

A country-wide study on all incubators and the overall incubation environment and entrepreneurial ecosystem will go a long way in adoption of a National Entrepreneurship Policy. An analysis of the trend of applicants and winners across all public as well as private incubators is recommended to understand the gaps between average eligible citizens and successful start-up founders. A detailed analysis of the characteristics of the aspiring start-up entrepreneurs is also recommended through an exhaustive list of personality and environmental variables. This could help in configuring a refined and robust model for the calculation of EPI scores. The EPI estimation exercise can be extended to other cities of Punjab and possibly Pakistan to elicit a better snapshot of potential locations to expand on the existing commitment by the state.

CHINA PAKISTAN ECONOMIC CORRIDOR AND HUMAN DEVELOPMENT: A DISTRICT LEVEL STUDY

KAINAT YOUNAS

Abstract

The cardinal objective of this research inquiry is to explore the potential challenges of human development that will emerge from a game changer China- Pakistan economic corridor (CPEC) while providing a quantitative analysis of the prevailing situation of human development in Pakistan's districts. Furthermore, study utilized the people centric approach to understand the significance of human development and its correlation with the CPEC at the district level study.

Introduction

International politics is greatly influenced by geo-political and geo-strategic interests of the states. Economic interests are the major driving force behind the behavior of international politics. In this context, China Pakistan Economic Corridor is a practical reality, a multi-billion dollars project. It is a major component of "Belt & Road" Chinese initiative. This corridor will start from Kashgar in north-western China running through the Gwadar in Balochistan and ending on the Arabian Sea via roads, railways and pipelines. It will pass through all Pakistan provinces including Punjab, Balochistan, Khyber Pakhtunkhwa, Sindh and Gilgit Baltistan in northern Pakistan to reach the Khunjrab pass and beyond. It is viewed as a game changer development project that will not only transform the fate of the South Asia but also help in making Pakistan a well-developed and modern state. According to experts and government officials it will improve the trade activities, overcome energy crisis, increase people to people contact, develop infrastructure, and boost the economy of Pakistan.

This game changer project is hailed as a "win-win situation" for both states. Today, this mega project reached at the cost of approximately $51.5 billion will not only increase the economic activities of both countries but will also connect South Asia with Central Asian region. China will have access to old and new markets with an alternate route; shipping time will reduce from 45 to 10 days from China to Europe. The Long-term Masterplan holds a brief role of both countries about different segments of cooperation in which Chinese enterprises will play an important role in agricultural, transportation, textile, improving market presence already established by Chinese enterprises including Haier, ChinaMobile, Huawei and China Metallurgical Group Corporation in mining and minerals.

Many believe that this project is mainly designed to benefit the Punjab province and other three provinces will be neglected. Controversy over central, western and eastern routes is also observed. Apart from biased views, provincial politics, and propagandist stigma, "human development" is a discourse that is constantly being neglected by the government. Pakistan is among one of the lowest human development countries and it falls at 147th number out of 188 countries. It has 58.7% literacy rate and 5.4% unemployment rate with the total population of over 200 million.

Questions arise what is for the local people in this project which is commonly known as a game changer? Will these mega projects like infrastructure development, energy projects facilitate the human development? If locals will get benefit from these projects, then how far these projects will improve human standard of living?

Human development is an approach that is more focused about people opportunities rather than the economy. It also deals with enlarging the people's choices. HDI is considered as a best tool to measure the development of any country because it is the combination of all economic and social indicators that are responsible for development. As stated by Mahbub-ul-Haq (Pioneer of Human development approach):

"The objective of development must be viewed as a selective attack on the worst forms of poverty. Development goals must be defined in terms of progressive reduction and eventual elimination of malnutrition, disease, illiteracy, squalor, unemployment, and inequalities. The concerns for more production and better distribution should be brought together in defining the pattern of development."

Multiple primary and secondary sources have been consulted for this study. But the main primary source that is being used for the statistical data is Pakistan Social and Living Standard Measurement Survey (PSLM) 2OIO-II. The following indicators of PSLM survey are used: education enrolment, number of hospitals and drinking water statistics at district level.

Free and Fair Election Network (FAFEN) observes and expands the scope for general elections, mobilize voters and political reforms including federal and provincial legislation. FAFEN provided data of district wise registered voters Pakistan Telecommunication Company Limited provided the data for broadband subscribers in the study.

Theoretical Framework

STEEP and cross impact analysis is being used as a theoretical framework. STEEP is an acronym for Social, Technological, Economic, and Environmental and Political indicators. STEEP is a tool to evaluate the various external factors impacting a business or community. STEEP is studied here in the context of human development. STEEP method is helpful to gain an insight into current and future developments of the external (macro) environment.

Research Methodology

To examine the impact of CPEC projects on the locals in the context of human development discourse, Mixed Method research is being used by integrating both qualitative and quantitative methods in a single study to address the research queries. A district level study has been conducted by employing data from multiple mediums including primary and secondary sources. In this study STEEP has been used as theoretical construct to understand the present development trends after CPEC in the different districts. It includes different variables such as Social (population, major language groups, number of hospitals and educational enrollment), Technological (internet users), Economical (unemployment rate), Environmental (tap water) and Political (registered voters). This study covers districts of Punjab, Balochistan, Sindh and Khyber Pakhtunkhwa provinces. This study is based upon the three core pillars of human development: long and healthy life, access to knowledge and decent standard of living. Focus group study has been also conducted for locals' review about CPEC and human development related to it.

Limitations

There were few limitations regarding the study. Firstly, for local reviews interviews have been conducted in which Interviewees were unable to answer as they were unaware about the CPEC projects and its dimensions. Reasons were multiple mainly lack of interest, awareness, and education about their own rights and list goes on. There was also contradiction in participant's responses. Lack of operational details, inaccuracy of data, problem related to authentic sources, different statistics in different sources, lack of research on bottom level (district), lack of response from official institutes regarding data collection, old census were mainly observed as impediments that limited the study. Two indicators (Unemployment rate and broad band user's) statistical data is being used province wise rather than district wise due to the lack of research and data at district level. Mostly references are taken from the newspapers articles because this is the first study to conduct a district level research related to CPEC on the human development aspect.

Correlation of STEEP with Districts Profile

STEEP	Social							Technological	Economic	Environment	Political
	Population (2010)	Language & Major linguistic groups		Health Hospitals	Education (Gross Enrollment rate) 2010-11			Internet Users	Unemployment rate 2010	Water (Tap water) 2010	Registered Voters 2010
Districts		1st Major Group	2nd Major Group		Primary Out of (120-140)	Secondary Out of (120-100)	Tertiary Out of (70-90) Literacy rate				
Khyber Pakhtunkhwa Cluster											
	1,125,953	Saraiki	Pashto	90	63	38	31	179,569	0.54	30	606,959
		64.87	29.71								
Peshawar	2,736,249	Pashto	Hindko	72	93	53	51			63	1,393,144
		87.54	6.85								
Battagram	392,701	Hindko	Pashto	94	94	47	41			77	204,980
		46.84	40.29								
Mansehra	1,498,691	Hindko	Pashto	99	103	53	54			50	742,674
		46.84	40.29								
Haripur	885,359	Hindko	Pashto	96	116	88	66			76	531,866
		92.32	3.68								
Punjab Cluster											

Sahiwal	2,294,776	Punjabi	Urdu	94	100	67	53	940,883	1.89	15	1,190,424
		98.07	1.42								
Rahimyar khan	3,910,610	Saraiki	Punjabi	98	69	42	42			07	1,904,615
		62.62	27.31								
Bahawal-pur	3,209,198	Saraiki	Punjabi	96	71	41	45			08	1,522,061
		65.15	28.39								
Jhelum	1,152,457	Punjabi	Urdu	99	123	95	72			62	783,571
		96.58	1.93								
Lahore	7,885,794	Punjabi	Urdu	99	110	84	75			86	4,410,095
		86.18	10.19								
Faisalabad	6,759,786	Punjabi	Urdu	94	101	71	64			24	3,622,748
		97.47	1.17								
Muzaffar-garh	3,281,699	Saraiki	Punjabi	91	77	37	38			22	1,681,436
		96.83	7.47								
Rawalpindi	4,188,069	Punjabi	Urdu	99	117	103	76			64	2,645,608
		83.89	7.46								
Balochistan Cluster											
Quetta	980,324	Pashto	Punjabi	93	103	92	61	40,948	0.06	74	559,939
		36.47	18.85								
Lasbela	491,219	Sindhi	Balochi	95	61	26	30			26	182,697
		56.23	21.13								
Khuzdar	541,453	Brahvi	Balochi	91	92	34	42			53	165,593
		62.08	33.80								
Zhob	357,098	Pushto	Nil	88	54	28	28			21	96,278
		98.09									
Gwadar	240,590	Balochi	Nil	100	97	21	35			62	93,650
		98.25									
Sindh Cluster											
Karachi	12,612,157	Urdu	Punjabi	97	106	88	79	241,530	0.56	92	6,350,816
		54.3	13.6								
Hyder-abad	1,888,570	Sindhi	Urdu	100	104	61	67			71	923,140
		56.48	28.10								
Sukkur	1,149,091	Sindhi	Urdu	96	82	52	54			30	527,635
		73.54	12.66								
Tharpark-ar	1,146,521	Sindhi	Urdu	80	84	26	37			05	471,831
		71.78	8.39								
Thatta	1,397,058	Sindhi	Nil	92	62	25	35			23	663,543
		92.06									

Sources: PSLM district report 2010-11 see at http://www.pbs.gov.pk/node/356

Statistics has been derived from multiple sources including FAFEN, Pakistan Bureau of Statistics and PTCL through firsthand knowledge on the request by author.

Khyber Pakhtunkhwa

S. No	Districts	HDI Value	Ranking
1	D.I Khan	0.442	Low
2	Peshawar	0.534	Low
3	Battagram	0.412	Low
4	Mansehra	0.506	Low
5	Haripur	0.573	Medium

Source: Quantifying Human Development Household Survey Data

D.I Khan

D.I Khan District is located on the Indus highway. It is a less developed district of Pakistan and most of the population lives below the poverty line. According to the Social Policy and Development Centre report D.I Khan is among the lowest HDI value districts of Pakistan. Only 8% of population is using clean water. Upgradation of D.I. Khan - Zhob, N-50 Phase-I (210 km) is the part of CPEC project and its procedural formalities are to be completed shortly.

Peshawar

Peshawar district is the capital city of Khyber Pakhtunkhwa province. It is considered as one of the ancient cities of the world. HDI is low falls under the category of lowest human development index that is 0.534. There are two projects of CPEC for Peshawar district one is expansion and reconstruction of existing Line ML-I and second is Peshawar-Karachi Motorway (Multan-Sukkur Section). Like in other districts, Peshawar although considerably developed – the two projects do not directly influence human development.

Battagram

Battagram district is the part of Khyber Pakhtunkhwa province. It was among the most affected districts in 2005 earthquake. Remaining portion of KKH Thakot-Raikot N35 (136 Km) in the infrastructure development comes under the CPEC projects. Locals have objection as CPEC does not contain any human development investment health, education and decent living standard is out of reach for the local community.

Mansehra

Mansehra is the North Eastern district of Khyber Pakhtunkhwa Province. District Mansehra is one of the most diversified and richer districts of Khyber Pakhtunkhwa province. Agriculture, mining and tourism are the significant features of Mansehra. Suki Kinari Hydro power Station is located at the River Kunhar a tributary of river Jhelum. It's a medium-term project that would be completed till 2020/2021. Suki Kinari is the first hydropower project in the KPK province that is being developed by private sector and it is the largest hydro independent power producer in Pakistan. Mansehra district features low human development of 0.506.

Haripur

Haripur district is the part of Hazara region of Khyber Pakhtunkhwa province. Haripur district is rich in natural resources with two significant water reserves Tarbela and Khanpur dams. Rural population is dependent on agriculture. Haripur district is industrialized as compared to the other districts of Khyber Pakhtunkhwa. Due to its location it is vulnerable to natural disasters. Haripur district is on medium ranking for human development index. Havelian Dry port (450 M.) listed under CPEC project at Haripur district.

Punjab

S. No	Districts	HDI Value	Ranking
1	Sahiwal	0.554	Medium
2	Rahimyar Khan	0.440	Low
3	Bahawalpur	0.462	Low
4	Jhelum	0.627	Medium
5	Lahore	0.670	Medium
6	Faisalabad	0.554	Medium
7	Muzaffargarh	0.427	Low
8	Rawalpindi	0.646	Medium

Source: Quantifying Sub-National Human Development Household Survey

Sahiwal and Rahimyar Khan District

Sahiwal district is among one of the most economically important districts of province Punjab as well as Pakistan. Rahimyar khan district is located in the South of Punjab. More than 50% people of Rahimyar Khan generate their income through agriculture. South Punjab belt feels discriminatory attitude as basic facilities like drinking water, healthcare and education are neglected by the government, and people have strong sense of feeling that they need a new province. Rahimyar Khan and Sahiwal 2x660MW Coal-fired Power Plant is located 15 kilometers to the north-east of Sahiwal and is currently under construction and has been operational since 2017. Expansion and reconstruction of existing Line ML-I railway track is part of the project starting from Karachi passing through Sahiwal and Rahimyar Khan all the way to Peshawar. Road infrastructure is not included in the both districts. Moreover, easy mobility for better enrollment result is neglected. On the other hand; there is not even a single project for healthcare. Coal Power plant may have potential to facilitate the economy, but these projects are not linked to human development. By neglecting education and health, community benefits are marginalized.

Bahawalpur

Bahawalpur is one of the largest districts of Punjab that covers the area of 24,830 sq. km. Major economic sectors are agriculture and livestock. 58.7% workforce is associated with agriculture, forestry, and fishing sector. It falls in the high deprivation district category. Bahawalpur district includes two CPEC projects, one is Quaid-e-Azam 1000MW Solar Park and other is Expansion and reconstruction of existing Line ML-I Railway track (1,736 km sq.). Quaid-e-Azam solar park project is an initiative to use solar power to fulfill the demand of energy; PV technology has been used to make it operational. Like other districts this too has no correlation with human development.

Jhelum

Jhelum district falls in the Rawalpindi division. It is an industrial area. Jhelum is placed in the category of those CPEC districts that scored least number of projects. Karot Hydropower Station is proposed to build on Jhelum River. It has capacity to generate 720 MW. According to government it will be connected to national grid system in 2020. Electricity generating power plants could be useful for the smooth running of industries and to enhance investment opportunities. Indirectly, locals could gain from the project in improving decent life standard by constant power supply in hospitals and educational institutes.

Lahore and Faisalabad

Lahore district is the capital city of Punjab province. After Karachi, Lahore is the second main commercial hub of industrial area with largest development budget. It is far better than other districts in terms of human development. However,

health facilities are not adequate to fulfill the demands of locals as number of government hospitals are very less relative to the ratio of population. Whereas, clean drinking water facilities are also a main issue for the local community. Rehabilitation & Upgradation of Karachi-Lahore Peshawar (ML-I) Railway Track (1,736 kms) passes through different districts. By keeping in view the existing condition of Lahore district in terms of human development aspect, this project negates the reality and shows the negligence of government. Matiari to Lahore Transmission line is another project of CPEC. It is central to the transfer of more than 4,000 megawatts of electricity. Critics say Government accepted an upfront tariff for a single project that will only facilitate the Punjab province. Decline in Electricity shortage may increase the production of goods and services with opportunity of improvement in employment rate but the fear of Chinese workers in job sector with the ethnic tug among provinces may cause sense of anger in the community.

Faisalabad district is famous for its industrial sector. Approximately 80% of its population use water sources of Chenab channel for the irrigation purposes. Matiari to Faisalabad Transmission line under CPEC will generate 2000 MW with 10% overloaded capability for 2 hours. It is the only project that is located at Faisalabad district. It could have an indirect impact on the lifestyle of locals.

Muzaffargarh

Muzaffargarh also lies at the southern Punjab belt which is among the least developed areas of Punjab province. It has one of the lowest HDI value that is 0.459 according to the UNDP human development indices at districts level in Pakistan. Most of its population is dependent on agriculture because of the fertile land of this area. Unfortunately floods in 2010 hit the Muzaffargarh district adversely. Muzaffargarh Coal Power Project is the part of CPEC that is destined to lift up the district's fate. Project details are not available yet although sources explain its capacity to install 1320 MW energy. However, this project created trouble for the locals on the issue of land acquisition and pollution issues. Moreover, the district needs infrastructure, health and educational institutes as literacy rate is a big issue.

"This (land acquisition) has deprived me and my family of livelihood," says Hasan Gabol, an affected farmer.

Locals become more insecure as the amount paid by the government for their land is not according to the markets rates. Locals' grievances may strengthen that could eventually lead to a big challenge for government.

Rawalpindi

It is situated in the north-western part of the country. It has special importance as it is known as twin city with Islamabad capital of the country. As compared to other areas of the country, Rawalpindi falls among the top 10 districts that have shown better results in National Sub Human development household survey. It has highest literacy rate among 142 districts. Health and unemployment along with water scarcity are more critical issues of the district. Expansion and reconstruction of existing Line ML-I is the project that will be expanded and reconstructed by the authorities. Optical fiber cable is the telecommunication project that passes through the Rawalpindi district. It will directly impact the technological accessibility for locals and contribute to the decent lifestyle for locals.

Balochistan

S. No	Districts	HDI Value	Ranking
1	Quetta	0.496	Low
2	Lasbela	0.415	Low
3	Khuzdar	0.400	Low
4	Zhob	0.403	Low
5	Gwadar	0.492	Low

Source: Quantifying Sub-National Human Development Household Survey

Quetta

Quetta is one of the most developed districts of Balochistan province. CPEC projects include Quetta Mass Transit and Quetta Water Supply Scheme from Pat feeder Canal. Quetta Mass Transit project is the railway track route that will cover a 48.5 km route from Kuchlak to Spezant. It will provide cheap and easily accessible travel facilities to the locals. Both these projects have the potential to improve living standard of the locals.

Lasbela

District Lasbela is located in the south of Quetta city. Due to fertile land agriculture is the livelihood of majority of locals. People in general are poor and it has highest mortality rate in the province. 49.11% children at the age of 10-14 are out of school, low on HDI. HUBCO coal power plant is part of CPEC. Hub power company will have 24% of stakes in the power plant and 74% shareholders are from Chinese company. Only 2% stake is reserved for the Balochistan Government. Second project is also related to the energy sector Gaddani Power Park Project. There is no investment to improve human development for Lasbela where education, health, and poverty are at risk.

Khuzdar

Khuzdar district is situated at the south-eastern part of Balochistan. Khuzdar-Basima Road N-30 (110 km) project is the part of CPEC. It is the only project located at Khuzdar district including Basima. This project can directly impact mobility.

Zhob

Zhob district lies at north-east of Quetta city. Area wise, Zhob ranks among the 10th largest districts in Balochistan. The district has an important geo-strategic location. 52.95% children are out of school at the age of 10-14 years. Zhob is not a developed district of Balochistan. Within CPEC upgrading of D.I.Khan-Zhob, N-50 Phase-I (210 km) is included.

Gwadar

Gwadar is the most significant district of Balochistan. It has a large number of CPEC projects. Gwadar has its geo-strategic significance as it is the third deep sea port of Pakistan and once it will get fully operational China would have plenty of ease in the form of feasible trade routes towards Europe and Middle Eastern economies. Gwadar East-Bay Expressway has a two-way railway track. This 6- lane expressway along with 30-meter-wide railway corridor connects the Makran coastal highway through 2300 acres of Free trade zone of Gwadar port. Objective of this project is to connect the area with the major national highway networks for smooth flow of imports and exports. Gwadar International Airport is situated 16 km north of the city center of Gwadar. Dredging of berthing areas & channels is the project proposed to carry out the smooth shipments entry and exit berthing facilities. Development of free zone aims to create backup port industry. Necessary facilities of fresh water treatment, water supply and distribution include water supply, distribution system, desalination plant, sewerage collection

system and treatment plant as planned in the masterplan of Gwadar as a mega port city. This project is proposed to cater the future water demand. This project is very significant for human wellbeing.

Pak-China Friendship Hospital is one of the social development sector projects in CPEC. Pak-China Technical and Vocational Institute at Gwadar aims to enhance the skills of the population, active locals participation and their role for the development of not only their area but to improve their own level of awareness and skills. Gwadar Smart Port City Masterplan has been completed. For the local population industrial pollution will affect the living environment. Therefore, waste management policy and tools should be introduced. Development of Gwadar University is the Social Sector Development project and need of hour for the locals. Access to knowledge, education, and awareness is pivotal for human development. This would create direct impact on education sector for locals. Upgradation and development of fishing, boat making and maintenance services to protect and promote livelihoods of local population seems one of the important initiatives by the Government for the local source of income. This project could meet the grievances of locals too. Gwadar Coal / LNG / Oil Power Project has an objective to install 300 MW of electricity to meet the demand of energy and power sector. It is important for business and domestic sector. Easy mobility, access of institutes, health and educational sector will flourish that would have a positive impact on the lives of local community.

Sindh

S. No	Districts	HDI Value	Ranking
1	Karachi	0.654	Medium
2	Hyderabad	0.513	Low
3	Sukkur	0.478	Low
4	Tharparkar	0.372	Low
5	Thatta	0.422	Low

Source: Quantifying Human Development Household Survey Data

Karachi and Hyderabad

Karachi is the largest industrial zone of the country and the most populous city of Pakistan. It is a major contributor to the national economy and the biggest employment generating district in the province. Karachi is the part of Sindh province and its HDI is low as compared to Islamabad in. It is the largest city mainly organized into central, eastern and western Karachi. According to SPDC report no. 96 Karachi is the only district of Sindh that is not included among the lower human development category with 0.654 HDI that falls under the medium level. Hyderabad is also the part of Sindh province. It is among the least developed districts with lowest HDI 0.513 according to the same report.

Peshawar-Karachi Motorway (Multan-Sukkur Section), expansion and reconstruction of existing Line ML-I is the part of CPEC projects that includes Karachi and Hyderabad. Dawood 50MW wind Farm, Bhambore is also part of Hyderabad. Railway and motorway tracks could be beneficial in terms of economic activities but do not cover facilitation nor development of the education and health sector with decent standard of living.

Sukkur

Sukkur district also falls among the least HDI value. It has 0.478 HDI. Sukkur is dependent on the Indus River and agriculture is the main livelihood of the locals. Sukkur has worse health and education conditions as significant gender gaps exist in literacy and under five age group mortality rate is 147 out of 160. Poverty is significantly high as 58% of the population earns below 1800 rupees per month. Peshawar-Karachi Motorway (Multan-Sukkur Section) is the part of CPEC that is under construction since 2016. This project does not facilitate education, health and living standard of the people from the people centric approach.

Tharparkar

Tharparkar is the desert region located in the southern part of Sindh province. The opportunities are very limited. Locals mainly rely on livestock. Scarcity of water, climate conditions are worse with poor health and education facilities. Locals mostly migrate to other areas for economic opportunities. Engrothar 4x330MW Coal-fired, Thar with commercial operation dating June 2019 and SSRL Thar Coal Block I - 6.5 metric tons per annum. These are the CPEC projects in Thar. These coal projects are included in the early harvest projects of CPEC to meet the demands of energy. Energy will solve multiple issues including industrial and agricultural development with economic uplift. Facts show human development seem to be stagnant after CPEC because education, health and living standard is not the focus.

Thatta

It is the second largest district of Sindh province after Tharparkar. Mostly locals are dependent upon the agrarian sector. Health, education, and water conditions are not encouraging in Thatta. It falls under the category of lowest HDI that is only 0.422. Port Qasim Electric Company Coal Fired, UEP 100MW Wind Farm, Sachal 50MW Wind Farm, Pakistan Wind Farm II 2X50 MW (Jhimpir, Thatta) are all the projects that are part of CPEC and located in the district. Thatta is the only district which has four power plants that are part of CPEC. These all four projects are included in the early harvest projects of CPEC. These projects lack the direct potential for human development improvement.

Potential Challenges

Similarities in potential challenges among all CPEC projects in each district are observed. These potential challenges will not cover overall regional challenges (Indian and security factor) or beyond. Baseline of these potential challenges is related to the internal risks for locals at district level. Question arises are all these potential challenges based upon on facts or assumptions? Most important internal challenge is about the challenge of equitable projects and their chunk for each province or district. In each district profile mentioned in this review, the nature of the projects is not equitable especially with reference to the human development discourse that is needed in each of the district. Economic benefits are not equal for each district that could accentuate the internal discord like ethnic problems (provinces grievances over projects and their benefits). Importantly, coal energy projects are major source of global warming due to the emissions from burning coal and methane gas. This may create challenge related to environment and health for locals.

Chinese business is favored over local businesses. Flow of Chinese goods and labor will impact the interest of locals and Pakistani business community. Chinese workers and the spending related to their

security are also questionable. Locals concern that all white- and blue-collar jobs will be created for Chinese. Unemployment issue remains unaddressed. Many locals fear that the influx of Chinese and other workers coming from other parts of Pakistan, will marginalize the local communities.

Identity is a challenge. Keeping in view the present ethnic problems of Pakistan this consequence is also lingering from the CPEC. Due to the influx of Chinese their culture will also dominate the local areas that would make not only ethnic problems more severe but disputes over distribution of resources will be a challenging task for the government to manage. It is a visible fact and will concern the locals.

List of On Record Interviews Conducted by Author

Interviews have been conducted by the Students from different Universities including Quaid-e-Azam, National University of Modern languages, Islamic International and National Defense University Islamabad. Interviewees were selected from the different districts currently studying in different Universities of Islamabad. Sessions were brief and only few questions were asked from them related to CPEC as opportunity for their district/province and CPEC as challenge for their district/province.

Questionnaire:

- According to you how CPEC is an opportunity for your districts or province?
- How do you see CPEC as a challenge for your district or province?
- What is your perception about the CPEC as a game changer corridor for the districts of Pakistan?

Living standard of local Community

Decent living standard for locals is also significant element of human development

Interviewees List	**Venue**	**Date**	**Timing**	
	Islamabad Club	18thFebruary	11:00 pm	
Punjab	**1st Response/ Opportunity**			**2nd Response/ Challenge**
Mayra Khan	Positive Impact on education and health after CPEC			Environmental degradation
Majid Khan	Indirect impact on life standard of locals			Law and order situation
Hassan Tariq	Positive impact on education and health			Environmental degradation
Noman Azfar	Zero investment in human development			Acquisition of local's land
Sehrish Khan	CPEC could address the unemployment problem			Ethnic conflicts
Interviewers List	**Venue**	**Date**	**Timing**	
	Quaid-I-Azam University, DSS department	26thFebruary	2:30 am	
Balochistan	**1st Response/ Opportunity**			**2nd Response/ Challenge**
Nasir Qurtaba	No investment in human development			Ethnic conflicts
Shahdab Baloch	No investment in human development			Displacement issue
Mahmona Mahmood	Indirect Impact on health and education			Threat to local community business
Aleem Hayat	Employment rate will be increased			Demographic changes
Hassan Ayub	Indirect impact on life standard of locals			Ethnic conflicts

Interviewers List	Venue	Date	Timing	
	Quaid-I-Azam University, IR department	IIthFebruary	IO:OO pm	
Sindh	**Ist Response/ Opportunity**			**2nd Response/ Challenge**
Tariq Salar	Direct impact on lifestyle of locals			Displacement issues
Raffiya Naeem	Indirect impact on health and education			Threat to local Community business
Arif Sindho	Zero investment in human development			Displacement issues
Kashif Memon	Indirect impact on life standard of locals			Ethnic conflicts
Interviewers List	**Venue**	**Date**	**Timing**	
	Islamabad Club	I8th February	II: OO pm	
Khyber Pakhtunkhwa	**Ist Response/ Opportunity**			2nd Response/ Challenge
Haseeb Khan	It could solve the employment issue			Environmental issues
Eman Fatima	Life standard of locals will improve			Demographic Changes
Fizza Javid	Health and education sector will improve			Displacement problems
Raza Touqeer	Life standard will be improved			Environmental Issues
Asif Raza	Health and education will be improved			Ethnic Conflicts

discourse. CPEC projects related to energy will indirectly impact the living standard of locals as electricity will generate local business and employment opportunities. Social development projects including water schemes, vocational training centers, and fiber optic will directly impact the life of local community positively. Vocational training center will improve skills of the local community ensuring participation in the economy. Optic fiber will play significant role in the telecommunication sector.

Initial Findings

Keeping in view the three core elements of human development; Education, health and decent living standard presented by Mahbubul Haq and present trends of districts in STEEP approach, gives a dismal picture of the districts even after CPEC. Few projects including water schemes, university, hospital, and vocational training center will directly impact the all three main factors of human development. Problems lie in the planning, unequal nature, and distribution of projects allocation for the districts. Each district has different dimensions and needs; projects should have been designed accordingly. Gwadar is the only district that will get benefit from the CPEC in terms of human development of locals as all social development projects are part of it including one project of water scheme in Quetta district. While CPEC is being implemented Government must scrutinize and plan a strategy to overcome the emerging challenges.

A HUMAN-CENTRED APPROACH TO UNDERSTANDING AND ASSESSING GENDER PARITY IN PAKISTAN

SADIA TARIQ

Abstract

Up to now, the issue of gender inequality and the desire for higher gender parity have been viewed from various pertinent and valuable lenses; feminist, political, policymaking, socio-cultural, religious, economic, etc. While appreciating and incorporating valuable knowledge of conceptual frameworks, lessons learned, proposed and practiced solutions from these various lenses, it would be appropriate to take one more step and propose the addition of another lens to the existing stock of knowledge. The human-centered approach will be viewing and interpreting both quantitative and qualitative data in this area through the concepts of empathy and personal space, which are critical mental functions - whose presence and absence have an important impact on gender inequality and parity in any society. This approach will explore how gender parity is actually a 'human' (not man or woman or any other gender for that matter) issue which requires a focused connection with and cultivation of these very 'human' mental capabilities in individuals. Given the current quality, quantity and multiplying rate of progress in contemporary human society the issue of gender parity assumes critical importance. In order to concretize the optimum potential of Science and Technology for stable and holistic human progress, harnessing the positive consequences of gender parity will be of vital importance. Gender parity, in turn, has an integral connection with the essential mental capabilities of empathy and personal space requiring their intelligent development in human beings. The human-centered approach will explore this connection. It will comment on the work and findings of all stakeholders (citizens, state, socio-economic sectors, civil society), especially in the Pakistani context, and also share some ideas on how to introduce and promote this approach in the larger social milieu of Pakistan.

Backdrop and significance of a human-centered approach

There is an informed consensus today that present and future growth and well-being of human societies in economic, political, technological and socio-cultural (education, health, etc.) domains critically needs the full development and deployment of half of the world's total capability pool. In fact, it is underscored that "societies cannot afford to lose out on the skills, ideas and perspectives of half of humanity to realize the promise of a more prosperous and human-centric future that well-governed innovation and technology can bring". This clearly means we need to monitor and reduce the existing gender inequality in the world and promote greater inclusivity. Where gender equality and parity, by necessary implication, also include men and the issues of their progress and well-being.

In fact, it would be pertinent to mention here the conclusions of United Nations Economic and Social Council in 1997 which very aptly and rightly state the mainstreaming of the global gender perspective as "the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetrated. The ultimate goal is to achieve gender equality".[20] This succinctly sums up the

present consensus and vision of the world in relation to gender parity and equality. While moving in this direction numerous interventions and solutions have so far been proposed and implemented in both developed and developing countries. These range from making laws and policies promoting and ensuring gender parity reducing inequality, and discrimination. Projects around awareness and sensitization for gender parity in education, health, technology, business and the service sector have subsequently been implemented. Analysis of some of the results of these interventions made by numerous non-governmental groups/organizations, Governments and various International bodies indicates that they have been a mixed bag.

There has been progress on many fronts, especially in developed countries, but in many other regions of the world the gap between the vision, policy, planning, legislations, and their implementation on the ground is still quite glaring and cause of concern for all stakeholders. To take an example, in Japan, in order to increase the participation of women in the labor force, various policies like legislation for expanding childcare and tax deduction for dependent wives were adopted in 2013. This led to a huge increase in female labor force participation and a marked lowering of national unemployment.[21] While if we take the case of Pakistan, a prominent pro-women law 'Prevention of Anti-Women Practices Act 2011' was passed. There were major loopholes in the way of its successful implementation hence it could not have any significant impact on reducing gender-based violence and inequality in Pakistani society. These loopholes included factors like lack of knowledge of this law even among judges and lawyers, no training received by individuals from any NGOs or other groups on this new enactment, the victims had no knowledge of the act, FIR could not be registered under this law which means it could not prevent or deter any of the offences against which it had been legislated, patriarchal mind-set of law enforcement agencies, general public, etc.[22]

Many developed societies where women empowerment, gender parity and equality have been achieved to a larger extent are also becoming breeding grounds for new kinds of problems and disorders. Increased suicide rates, depression and various forms of mental disorders are emerging in highly progressive and developed societies. There are websites and social media groups which encourage self-harm and even describe its methods.[23] Interestingly, suicide rates are higher for males compared to females in high-income countries. According to some estimates its more than 3 times higher than the female rates.[24] We also find in these societies that men are falling behind women on some indicators like healthy life expectancy, secondary education and life satisfaction. And it is increasingly being recognized that issues in which men are disadvantaged are understudied and not taken into account in the measures of gender inequality.[25]

The situation we confront today can be summed up in the following manner:

- In significant parts of the world gender inequality and its consequences are a serious problem requiring sustained effort on many fronts by all segments of society.

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23. Nathaniel P. Morris, "There are websites that promote suicide. That's not okay," Washington Post, April 23, 2017, https://www.washingtonpost.com/national/health-science/there-are-websites-that-promote-suicide-thats-not-okay/2017/04/21/58690ffc-2050-11e7-be2a-3a1fb24d467a_story.html
24. Lindsay Lee, Max Roser and Esteban Ortiz-Ospina, "Suicide," Our World in Data, 2019, https://ourworldindata.org/suicide
25. Gijsbert Stoet and David C. Geary, "A simplified approach to measuring national gender inequality," PLOS ONE, January 3, 2019 https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0205349&type=printable

- Then we have those societies where gender equality is very high; there is equality of opportunities, rights, and benefits in all spheres but new problems are arising there.

This raises the question that should the less developed or developing societies mindlessly follow in the foot-steps of these 'role model' societies?

Are there any other causes, apart from the known manifest ones, for the gap between the vision and implementation of gender parity and equality?

Are the present scope and elements of the vision and specific efforts for reducing gender inequality and promoting gender parity sufficient to produce happy, stable integrated and harmonious individuals and societies?

This study will explore these questions and their relevance specifically to Pakistan, which according to the 'Global Gender Gap Index 2018' report published by the World Economic Forum (WEF), is the second worst country in terms of gender parity in the world, ranking 148 out of 149 countries.[26] Whether it's economic empowerment, participation, and opportunity, health, education, laws and policies, political participation in local government or parliament, participation in Science and Technology and its applications like IT, women are lagging far behind men. The efforts to address this gap by both the state and non-governmental organizations ranges from legislating and policymaking to all forms of awareness raising and socio-economic development projects on the ground. There is slow progress on all these fronts marred with all kinds of constraints and obstacles. Given the present state and trajectory of gender parity in our society the picture of the foreseeable future is gloomy.

Pakistan's parliament has passed some important laws to create a better and safer environment for women and to encourage and promote their participation in the social, economic and political development of the country. The International Community not only has commitments from Pakistan on many important declarations such as Sustainable Development Goals for achieving more gender parity but has also invested immensely in this area. Although Pakistan has a considerable representation at the highest echelons of national and international forums yet the gap between vision, intent and the actual implementation is worrisome.
In this backdrop we propose the 'human-centered' approach to viewing, assessing and addressing gender inequality, discrimination and violence which inflicts human societies in general and Pakistan in particular.

I.The human-centered approach to gender parity; its pillars and elements

"Both men and women should feel free to be sensitive. Both men and women should feel free to be strong...it is time that we all perceive gender on a spectrum not as two opposing sets of ideas."

-Emma Watson

There are two pillars of the proposed human-centered approach to gender inequality and parity—'Empathy', and 'Personal Space'. These are essentially 'human' mental capabilities which, among others, define the essence of being a feeling and thinking human being, be it a woman or a man (or any other gender, for that matter). They have an integral connection amongst them and when put together they can enable us to go deeper into and better understand the critical mental component of the issue of gender inequality, discrimination, and violence This understanding, in turn, can empower us to design more

26. World Economic Forum, "The Global Gender Gap Report 2018," December 17, 2018, 11, http://www3.weforum.org/docs/WEF_GGGR_2018.pdf

intelligent interventions for reducing gender inequality and moving towards gender parity.

A.Empathy

Empathy, generally speaking, is a naturally evolved mental ability to experience, interpret and understand how another person feels, thinks, behaves or acts. It is this ability or capability which enables us to be concerned about other people and to care for them. It guides or moves us to act in thoughtful ways not only towards other human beings but also other living things. It is also viewed as a tool to connect meaningfully to others through recognizing their value.[27] Moral development along with positive, healthy personal and social relationships are also believed to rest on the bedrock of empathy. While its absence can lead to all kinds of destructive and conflicting behaviors with negative repercussions both for individuals and society.[28]

A word of caution is advised here that while connecting, sensing and relating with the emotions, needs, thinking, behaviors, etc., of other people we should not get overwhelmed or caught up in those empathic feelings and experience.[29] We should have a clear awareness of the distinction between our own emotions, feelings, etc. and the other person's emotions, feelings, etc., which is critical in the practice of empathy. Otherwise we can get drowned in our empathic feelings which would not only cause us tension and distress but also reduce us to harboring mere sympathy or sentiment with no actual intent to undertake any serious internal or external actions in relation to those feelings and experience.

The origins of the mental process of empathy can be found at both developmental and evolutionary levels; in human infants and social animals like apes, elephants, dogs and also in some birds.[30] Rudiments of empathic behavior are clearly visible in babies. Contagious crying in response to the cries of others, sensitivity to the facial expressions of the mother and other people and imitation of those facial emotional expressions (of fear, sadness, surprise) reveal the clear origins of empathy in human beings.[31] They are responses to social stimuli and tell us how the emotional connection with others is there from birth. The overall social interest and social response or behavior varies in newborns and is not uniform which means it is bio-genetic in part.

Recent body of work reveals evidence of strong empathic behavior in mammalian and bird species with prolonged parental care.[32] For instance, in elephants and chimpanzees sophisticated emotional capacities have evolved to cooperate with social partners and provide them with support in conflicts and comfort in distress. Like in human infants, rapid facial mimicry is found between mother and child baboons. Similarly, in bonobos, emotional contagion between kin and friends has also been studied.[33] Sensitivity to the pain of others is also a phenomenon found not only in developed mammals but has also been observed in rodents. Thus, we find a strong case for the evolutionary origins and development of sophisticated empathy in contemporary humans.

The developmental and evolutionary origins of human empathy clearly imply that we are dealing with a largely nonverbal mental process which has followed an evolutionary trajectory coming from our animal ancestry. And the functioning of this process is not just determined by social construction

27. Elizabeth A. Segal, "The Case for Empathy," aeon, April 23, 2019 https://aeon.co/essays/a-sophisticates-primer-on-empathy-and-its-limits
28. Elizabeth A. Segal, M. Alex Wagaman and Karen E. Gerdes, "Developing the Social Empathy Index: An Exploratory Factor Analysis," Advances in Social Work, Fall 2012, http://journals.iupui.edu/index.php/advancesinsocialwork/article/view/2042/3904
29. Segal, "The Case for Empathy"
30. Leonardo Christov-Moore et al, "Empathy: Gender effects in brain and behavior," National Center for Biotechnology Information, September 16, 2014 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5110041/pdf/nihms828103.pdf
31. Ibid.
32. Ibid.
33. Ibid.

and environment but also has a genetic component with its own influences. Thus, today when we talk of the absence of empathy in individuals we must assess, interpret and understand it in the light of these facts so that we can do a fair, more comprehensive, intelligent and informed analysis of this issue.

There are two interactive levels of empathy; interpersonal and social. The first is made up of 'affective' (emotional) and 'cognitive' empathy. Where emotional empathy is a process generated by neuronal mirroring, i.e., overlapping activation of neuronal networks through which we feel and experience something and those which get activated when we see other people experiencing and feeling the same thing. This creates the subjective experience of emotional resonance which makes us feel what the other person is feeling.[34] This is largely a physiological and unconscious process and can be influenced by factors like racial bias, gender bias or other such mental patterns. For instance, in some studies it has been observed that the mirroring process becomes weak when we come in contact with a person of another race and this reduces the feelings of empathy or emotional resonance and connection with that person and vice versa.

Cognitive empathy, on the other hand, is a more reflective and relatively conscious process in which we employ our cognitive processes to acquire a more accurate knowledge and understanding of the emotions, feelings and other processes and contents of another person's mind.[35]This process actually extends to 'intellectual' empathy in which we try to imagine and understand the ideas, convictions and viewpoints of other people from within. That is, we may disagree or be critical but we try to make our common humanity the basis for understanding precisely what the other person thinks and believes and the reasons behind his or her thinking and beliefs. This ability is considered necessary for living with integrity and generosity in pluralistic societies.[36]

Although emotional and cognitive empathy processes are separate systems with their distinct neuronal substrates but they mostly operate interactively "with each contributing information and modulation to the other".[37]Although each one can become dominant at a certain time depending on the specific situation and other hidden or manifest factors.[38] Thus, interpersonal empathy involves multiple levels of overlapping processes starting from basic unconscious physiological and autonomic, to emotional responses and then deliberate cognitive and conceptual reasoning.

It is after learning to cultivate and develop 'interpersonal' empathy that we can move on to building 'social' empathy. The latter is the ability to understand social groups, situations, cultures, political events, and also people whom we have never met and experiences we have not had.[39] This also gives us an insight into the structural inequalities and disparities existing at various social levels.[40] Cultivation of social empathy is also influenced and affected by how we are taught to think about races, gender, classes, etc. This can override our seeing of the unifying category of 'human being'.[41] But this can also change because biases are learned and can be unlearned. Similarly, perceptions can

34. Elizabeth A. Segal, "Social Empathy: Using Interpersonal Skills to Effect Change," Knowledge Bank, Ohio State University, 2013 https://kb.osu.edu/bitstream/handle/1811/54666/NSDRSW_25_key_segal_pre
35. sentation.pdf?sequence=2&isAllowed=y
Lesley University, "The Psychology of Emotional and Cognitive Empathy," https://lesley.edu/article/the-psychology-of-emotional-and-cognitive-empath
36. Michael Jinkins, "Intellectual Empathy," HUFFPOST, September 17, 2012 https://www.huffpost.com/entry/intellectual-empathy_b_1681212
37. Christov-Moore, "Empathy," 13
38. Christov-Moore, "Empathy,"
39. Segal, "The Case for Empathy"
40. Segal, "Social Empathy"
41. Segal, "The Case for Empathy"
42. Joyce Shaffer, "Neuroplasticity and Clinical Practice: Building Brain Power for Health," National Center for Biotechnology Information, July 26, 2016 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4960264/pdf/fpsyg-07-01118.pdf

also change. And this can happen at the neuronal level, through neuroplasticity [42] in which neural paths can be physically altered, and also at the mental level where emotional, feeling, and idea patterns and programmes can also be modified. Social empathy can, in turn, influence and modify interpersonal empathy. Hence interpersonal and social empathy processes are essentially intertwined and continuously interactive.

The composite mental process of empathy, explained above, has been undergoing both growth and regression during the period of civilization. At certain times and in some places it has been seriously cultivated through individual and social efforts and cultural means and methods. The Montessori Method and model of education developed in the early 1900s is one such example of cultivating empathy and other important traits in young children, initially in Italy and then in many other parts of the world. Similarly, the highly nuanced and developed renaissance art is another large scale evidence of the complex empathy process (rich combination of affective, cognitive, intellectual and social empathy) that developed in numerous individuals[43] during the period (14th to the 16th or 17th century) of the European Renaissance.

However, we also know that the application of empathy has largely been selective (preferred people, issues, etc.) and constrained due to various factors like biases, assumptions, emotive and mental habits, ideas, social environment, which evolved and formed during the various phases of our mental and social evolution. Let us take the issue of empathy towards physical abuse and exploitation. Our excavations into our primitive and medieval past tell us that physical abuse, exploitation and violence against both women and men were a commonly existing reality at that time. In fact, a recent assessment by the renowned Psychologist Steven Pinker suggests that the magnitude of violence in our prehistoric tribal and medieval periods was far higher than what we find in recent times.[44] So at that time empathic feelings towards physical violence and pain were far less than today. And according to Pinker our perception, endorsement and tolerance of physical violence was more at that time.[45] In our view the reason for this state of normal acceptance of physical violence and lack of empathy for it was the evolutionary stage of the individual human mind in those periods and the specifics of its social existence; the cultural norms, etc.

Today, however, the inner and outer reality of both men and women is quite different. Physical abuse and exploitation are there but as mentioned above they have declined[46] over time but emotional abuse has become quite dominant and also very complex and subtle, with hundreds of shades. And this emotional abuse is a two-way street, carried out by both men and women, in their own crude and sophisticated ways to achieve their respective highly developed and complicated purposes and agendas. And sometimes it is due to various mental disorders from which the abusers are suffering. According to one study in 2002 the prevalence of psychological Intimate Partner Violence was 12.1% for women and 17.3% for men.[47] Thus men and women are both equal participants in carrying out this mental form of abuse

43. They were mostly Italian and some French and Spanish artists. Some of the famous names include Italian masters like Michelangelo, Da Vinci, Raphael, the Spanish painter Pedro Berruguete, and the prominent French painter Jean Fouquet.
44. Aschwin De Wolf, "Make Money, Not War Steven Pinker's The Better Angels of Our Nature: Why Violence Has Declined," Independent Institute, Summer 2012 http://www.independent.org/pdf/tir/tir_17_01_10_dewolf.pdf
45. Ibid.
46. A graphical depiction of this decline can be viewed through the following link: https://slides.ourworldindata.org/war-and-violence/#/title-slide
47. Günnur Karakurt and Kristin E. Silver, "Emotional abuse in intimate relationships: The role of gender and age," National Center for Biotechnology Information, 2013 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3876290/pdf/nihms419073.pdf

and violence and both are victims also. Hence today the issue of empathy for the mental and psychological abuse and exploitation needs to be highlighted and addressed in addition to physical abuse.

Similarly, the nature, strength and quality of empathic feelings towards the pain of an individual woman or man, would have formed and existed very differently in the minds and mind-sets of any primitive man or woman of a hunter gatherer community in the Paleolithic or Neolithic period compared to the minds of contemporary people. The reasons being the respective differences in their conceptions of pain, objective means to address pain, other areas and issues of concern, external environment, emotive, cognitive and mental development, individual needs, priorities and agendas, components of character, level of self-awareness, and sense of identity and personality.

In the case of pre-language primitive man/woman emotional (nonverbal) empathy and elementary cognitive empathy would be the only processes of sensing and connecting with the feelings of other people. As there could be no intervention of developed social and intellectual empathy at that time which is a post-language mental process requiring a developed process of abstraction for sensing complex feelings and generating, assimilating, organizing and communicating innumerable ideas about oneself, other human beings and life in general.

Correspondingly, if we observe the existence of social and intellectual empathy in individuals living in the initial phase of civilization and the state of empathic feelings and ideas in contemporary individuals then we will again find many differences. With the growth and evolution of our mental processes; emotions, feelings, sensitivities, imagination, ideas, reasoning capability, and other mental functions the capability of empathy has also become more multifaceted and the areas of its reach and applications have also increased. If we carefully observe the quantity and quality of our present empathic feelings and ideas about humanity in general, our planet/ Nature and a range of micro and macro issues and problems confronting human beings then we will find them to be far more complex than what they were in the earlier stages of civilization. In addition, the absence, existence, magnitude, and the content of empathic feelings and ideas also varies in the people of different regions due to distinct cultural factors, practices and social norms.

In our view the process of empathy can play a vital role in connecting with and grasping the issue (and its numerous aspects) and process of gender inequality and parity from a human-centered perspective. Let us see how?
Developed emotional empathy can take us beyond the ‘man’ or ‘woman’ experience to the essentially ‘human’ experience of inequality, discrimination, violence, etc. That is, an emotional experience which no longer remains completely subjective or self-centric but also acquires a larger dimension. It arises from those emotions and feelings which connect to human beings in general and not some particular gender, and to Nature as a whole and not just its parts. It enables us to see the physical crimes, discrimination and other violations against women as a subset of the crimes, violations and problems confronted by human beings in general. Cognitive and intellectual empathy allow us to employ our reasoning and intellectual resources to experience the human core of every

individual and put that on as a lens to logically look at and understand the problems of inequality at various levels including gender. When interpersonal empathy (emotional and cognitive/ intellectual) gets aligned with social empathy then that can make us see things more clearly and from a broader perspective.

We can observe the larger network of connections between various factors and levels (micro and macro) and their interactive dynamic. The issues of gender inequality and parity thereby acquire another dimension and we become better equipped to identify with and connect to those issues from a higher (more capable and efficient) plane of understanding and doing. Then it is not only a matter of just feeling or surface understanding of another person's plight but an active desire to go deeper and connect with its mental causes in terms of the presence/ absence and quantity/quality of certain mental functions, which are in turn a product of human mental and social evolution. And to respond in terms of those acts which are not just reactive, impulsive and short-term but intelligent, creative and in terms of consistent steps to address this issue for the long haul.

Interestingly, we also find sex differences in the existence and development of empathy in human beings, starting from their neonatal stage, which also add to broadening our perspective and adding more objectivity to our analysis of gender inequality and parity. Human female neonatals, compared to males, are believed to cry for longer when hearing other infants cry. They make more eye contact and orient more to faces and voices. Compared to male infants they are more capable of imitating finger movements. A three to four months old female baby can discriminate and understand facial expressions better than male babies.[48] We find the differences in empathic feelings and understanding between females and males also extending to older children. For instance, "A study of 5- to 13-year-old children's reactions to an infant crying found that females were better than males at both guessing causes of the infant's distress (indicating better perspective-taking) and thinking of ways to comfort the infant..."[49] Similarly, in adolescence and then adulthood these sex differences again remain stable. Incidentally, these sex differences are a carryover from our animal past so they have also been studied in the animal kingdom. Thus, overall we find females exhibiting higher levels of empathy compared to males and this difference is not just a result of postnatal experiences but is present from birth, hence implying moderate heritability.[50]

But heritability is not a fixed or given condition. We can see its fluidity when we are confronted with phenomena like women in power positions engaging in highly insensitive and atrocious acts. For instance, how would we explain women in power positions engaging in child trafficking or ordering mass killings, etc. Where have the genetically endowed mental traits of interpersonal and social empathy gone in these women and why? And if these traits were active and healthily operating within these women then would they be engaging in such horrendous acts? This tells us that presence and absence of empathy in both men and women depends on many factors and not one.

Given the above findings, we should be able to logically understand the lack of empathy demonstrated by many men, especially when it comes to the issue of gender inequality. Of course this does

48. Christov-Moore, "Empathy,"
49. Ibid.,19
50. Christov-Moore, "Empathy"

not mean that they cannot change their genetic disposition and have to continue with some of their innate behaviors and thinking patterns. In fact, in contemporary individuals we find many men overcoming their naturally and socially inculcated patterns of domination and discrimination and becoming sensitive to gender inequality. And also becoming proactive towards its reduction. As a result, we find an increase in empathetic and feminist minds in men. Similarly, women can also build upon their natural endowment of empathic capabilities (mentioned earlier) and cultivate them further to become more 'human' focused and less reactive (vis-à-vis men). And we find that happening in contemporary girls and women working in professions related to Sciences, Technology and serious 'human' and social development which require a 'human' focused approach and advanced gender neutral mental labor and capabilities.

The human centered approach suggests intelligent cultivation of dynamic empathy

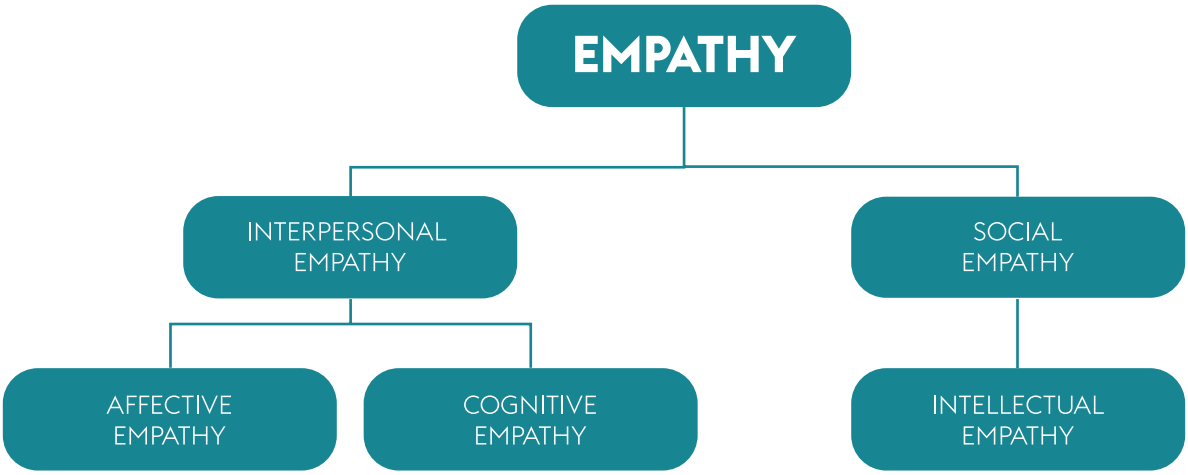


Figure. 2. Components of Empathy by Sadia Tariq, 2019

in both men and women towards each other, their social interactions and obligations and the process of Nature, of which they are an integral part. This is how they can work together for collective human progress and harmony. Without a proactive action plan to target the development of this crucial mental process a serious long-term reduction in gender inequality and a reversal of its consequences will be difficult to achieve.

B. Personal Space

Personal Space of an individual is the second pillar of our approach. This pillar has an integral connection with empathy. Personal Space of an individual is made up of two parts; mental space which contains his/her emotions, thoughts, feelings, motivations, ideas, etc., and physical space which is a kind of boundary around his/her physical self which is also considered a part of personal space. Any subjectively assessed transgression of the latter is also seen as an encroachment of personal space. Generally speaking, personal space is divided into four levels or zones; intimate, personal, public, and social.[51] And these have been given an objective measure in terms of quantitative distances or boundaries of each level. The intimate space (existing between very close relationships) boundary is up to 46cm. The personal space (of interaction with friends) is between 46 and 122 cm. The social space (of more formal relationships) is between

51. C. Shamasundar, "Understanding Empathy and Related Phenomena," Psychiatry Online, April 30, 2018, https://psychotherapy.psychiatryonline.org/doi/pdf/10.1176/appi.psychotherapy.1999.53.2.232

122 and 210 cm. And the public space (of interaction with larger audiences, most of whom are unknown) is above 210 cm.[52] These are dynamic and permeable lines between an individual's inner and outer environments. There are numerous factors which influence and allow this permeability.

Some of the salient factors affecting interpersonal preferences and their shifting boundaries include personal liking and attitude towards another person, age, gender, diverse cultural norms, environment (physical and virtual), social inequality and other mental and social factors. The nature of our bond and connection with another person and the corresponding feelings it generates determine what level of personal space we would prefer to keep in our interaction with that person. Thus the level of personal space varies with whether the relationship is very close or just friendship, formal acquaintance, or completely impersonal with no individual connection, whether there is a strong mutual liking or not, and so on.

Some studies have revealed that women and younger people like to keep closer interpersonal distances compared to men and older people.[53] Male-Male pairs have been maintaining larger distances compared to female-female pairs. While some studies have shown male-female pairs interacting more closely than female-female pairs.[54] And this would vary in different cultures depending on how the man-woman and same gender relationships are perceived in any particular society. A further influencing factor observed here is the varying body height of men and women having considerable impact on interpersonal distance and its violation. "The taller person has been found more likely to invade the shorter person's personal space."[55] All these studies show the fluid state of personal space demarcations influenced and affected by factors like individual perceptions, likes and dislikes, cultural norms and biases, physical characteristics and so on. And both women and men subscribe to these personal space boundaries, adjust them in specific situations and in accordance with various factors, adapt to them and are concerned with their violations.

The differing norms and customs of the people of different countries also determine interpersonal behavior and preferences. What is intimate space in one culture might be social or personal space in another culture.[56] This means there is a blurring of the personal space lines due to differing norms, customs, and practices. Due to varied cultural norms there has even been a classification of 'contact' and 'noncontact' cultures.[57] Where this classification is made on the basis of factors like the physical environment in terms of climate/temperatures and then socio-psychological factors like what is the collectivism or individualism levels in a particular culture, or the wealth of a society. For instance, it is proposed that hotter climate affects emotional intensity which, in turn, is likely related to intense and closer interpersonal contacts. But this gets influenced by another factor of increased danger of catching infectious diseases in warmer climates so that can in fact increase interpersonal distances.[58]

In the same way individuals in collectivist cultures rely more on intragroup relationships hence they prefer closer interpersonal connections while people belonging to more individualistic cultures are more independent and autonomous and therefore maintain greater interpersonal distances. Social inequality is another factor influencing interpersonal distances. It has been suggested that "...

52. Agnieszka Sorokowska et al, "Preferred Interpersonal Distances: A Global Comparison," Croatian Scientific Bibliography, 2017, 579, https://bib.irb.hr/datoteka/873645.sorokowska_et_al_2017.pdf
53. Sorokowska, "Preferred Interpersonal Distances"
54. Heiko Hecht et al, "The Shape of Personal Space," Birkbeck University of London, 2019 http://www.bbk.ac.uk/psychology/bodylab/docs/hechtEtal-acta-2019.pdf
55. Hecht, "The Shape of Personal Space," 121
56. Sorokowska, "Preferred Interpersonal Distances"
57. Ibid.
58. Ibid.

in countries characterized with higher social inequality (i.e., lower HDI), the preferred distances might be greater".[59] The Digital Age and its products like virtual images are also distancing people from acquiring direct information about their physical world and reducing their communication and closer interaction with their families and other relations.[60] But there is a parallel argument which proposes that social media platforms are in fact reducing the distances in all zones of personal space and facilitating closer interpersonal connections and participation.[61]

To sum up, we find a plethora of factors and realities; physical, environmental, socio-cultural and mental, which affect an individual's own sense and idea of personal space, the criteria of its violation and his/her interpersonal interactions and behavior with other individuals.

According to Psychotherapist C. Shamasundar, "The processes involved in the empathic transfer of information and the interactions of the personal spaces or fields are the same."[62] This implies that when we are connecting with and feeling or understanding the emotions, ideas, feelings, etc., of other individuals then our personal space fields are actually interpenetrating and getting enmeshed. This results in an inevitable unconscious (and sometimes conscious as in the case of cognitive and intellectual empathy) exchange of information (physical, sensory, emotional, cognitive, etc.) which is embodied in our experience and understanding of each other's emotions, feelings, ideas, motivations, etc.

Logically the strength of empathic experience has to have an inverse relationship with the different zones/ levels of personal space. This means that feelings and experience of empathy will be stronger in intimate space connections and keep reducing in strength as we move away from intimate space to personal, public and then social spaces. Of course this is the normal direction of progression in individuals generally but there can be variations in this in the case of individuals in whose life the impersonal or social dimension is more dominant compared to their personal or intimate lives. So here the feelings of empathy might be stronger for human beings in general who are a part of our public and social spaces.

Gender discrimination, inequality and violence is a reality we experience at all levels of our personal space, whether we are a man, woman or any other gender. As mentioned before, violations of personal space are dependent on individual perceptions and other mental specifics in combination with external environmental specifics. And these are confronted by both men and women. For instance, rape which is a very aggressive violation of personal space is experienced by both women and men, girls and boys. So where we painfully see individual and gang rapes of women, systematic massive rape of women in war zones and then marital rape, at the same time we witness major church sexual abuse scandals surfacing in many countries and then sexual abuse of male university students. Thus violation of personal space is a phenomenon experienced by both men and women. Of course, it is also true that given the present specific stage of human individual (mental) and social (political, economic and cultural) evolution, females of all ages and in all parts of the world are presently the larger section confronting these personal space violations. And here we must not forget the mental personal space violations apart from physical space violations. Violations of mental personal space

59. Ibid., 581
60. Robert Sommer, "Personal Space in a Digital Age," Collaborative Systems Laboratory, University of Waterloo, 2002 https://csl.uwaterloo.ca/documents/whitepapers/sommerpersonalspaceinadigitalagepdf#content-head
61. Sommer, "Personal Space in a Digital Age"
62. Shamasundar, "Understanding Empathy," 236

in the form of emotional abuse, manipulation, domination and also sophisticated intellectual domination and exploitation are also experienced and practiced by both men and women.

Thus cultivation of empathic feelings and understanding in both men and women towards gender inequality in all arenas, and acknowledgment, acceptance and tolerance of individual personal space are critically needed today. As individuals and societies we need to work towards facilitating and inculcating these feelings and

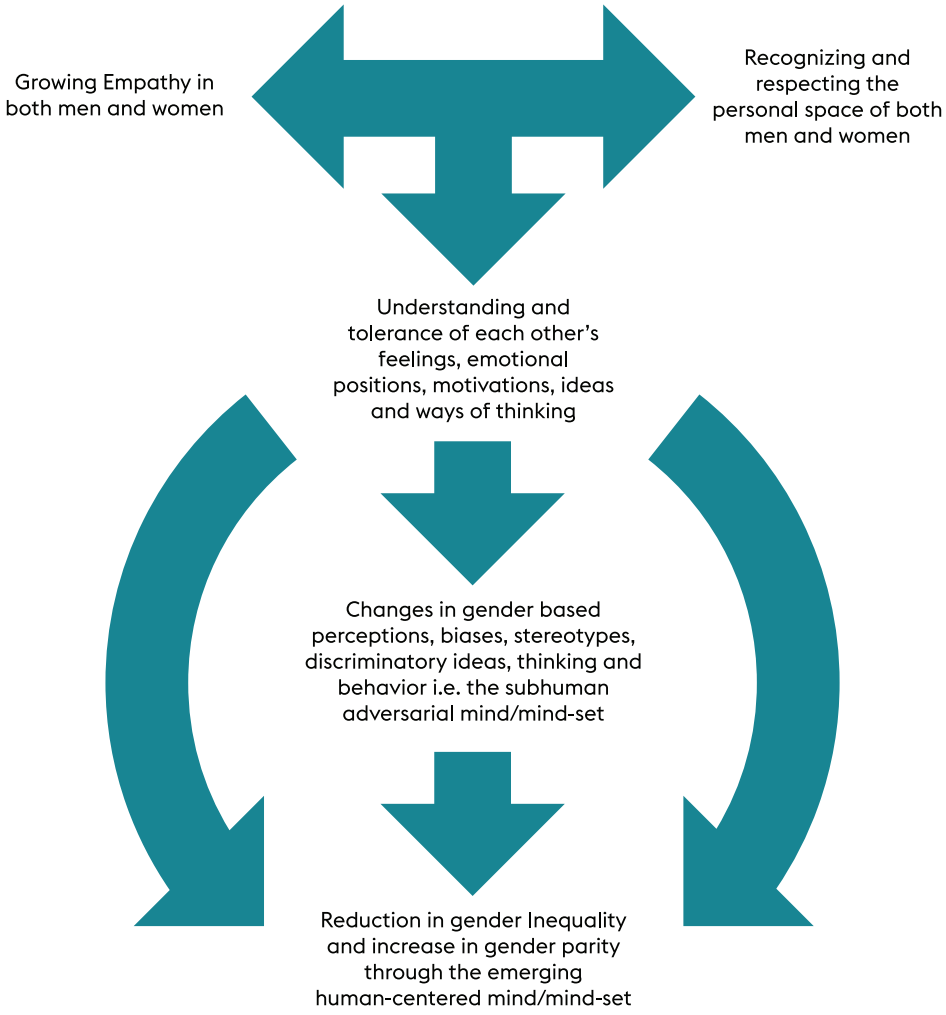


Figure. 2. The Human-Centered Approach by Sadia Tariq, 2019

understanding within human beings in general, irrespective of their gender, social status, and other individual and social specifics.

C. Implications of developing empathy and personal space for gender inequality and parity

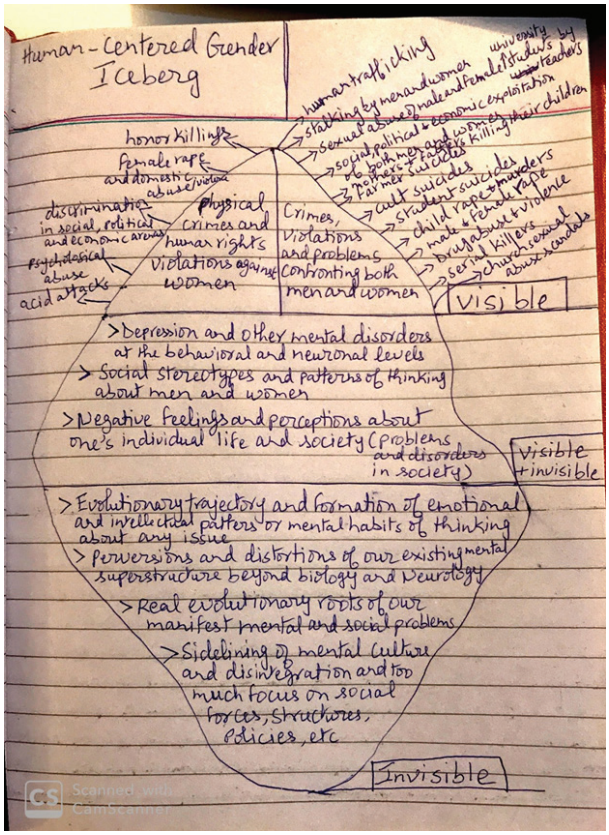
Contemporary humans need a new lens and mind-set which can intelligently and deeply grasp the essence of the mental capacities of empathy and personal space and work towards the individual and social development of these critical capacities in both men and women. It is this new way of looking and its actual practice which

can inculcate within men and women understanding and tolerance for each other's feelings, emotions, ideas, motivations, personal space, and ways of thinking. And this can in the long run seriously bridge the gender divide and thereby produce general human well-being and happiness and a minimization of the conflicts, contradictions and problems which have accumulated as a result of this divide.

The physical and social environment in which present human beings live is collectively generated and shared by the minds and mind-sets of both men and women; its innumerable problems and issues and their growing new and perverse forms are also shared. But then its potential and opportunities are also shared. We suggest that the current explosion in knowledge fund, its level of complexity and the tools, methodologies and applications of this unending knowledge acumen requires a reduction and eventual eradication of gender inequality. Gender divide is contraindicated for the present and future progress of human society and its growing knowledge acumen and applications.

The individual and social use of this growing knowledge fund to create new, more efficient and productive applications requires the cultivation of highly developed mental faculties and processes of both men and women and their equal participation in this process. Hence the case for eventual elimination of gender inequality in today's post-Sci-Tech world. The shared stability and harmony, hope, collective productivity and stable future, critically needed today by all human beings in all dimensions and arenas of their lives are not practically possible without equal opportunity, participation and autonomy of both men and women. And that, in turn, requires us to empathetically connect with and holistically understand each other's feelings and ideas and to respect and understand our personal spaces. Doing this can change our attitudes, behaviors, ideas and different mental biases which promote gender inequality and prevent us from concretizing our collective future based on equality of participation, opportunity and access.

The above is the essence of the 'human' centered approach that we propose for understanding the concerns around gender inequality and parity specific to Pakistan.



II.Pakistan specific data analysis of gender parity

A. State Laws and Policies on women and gender parity

A trend analysis of state laws, policy in relation to women since 1947 will reveal marginal representation of women in

the State machinery for the larger part of our history and then a recent, post-2002, growth in women representation at all levels; local government, provincial and national levels. But this growth has remained slow and there have been no major strides forward. Their proactive participation in legislation making and tabling the various laws, acts, bills and amendments in existing laws began from 2002 onward and has been increasing with time. To take one example, in the period of the 14th National assembly (2013-18), women lawmakers asked 57% of the questions while men asked only 43%.[63] This shows their active participation. The first women's parliamentary caucus was formed in 2008 and it included women from all political parties. This initiative was supported by a project funded by USAID.[64] Provincial caucuses were formed subsequently in the years 2009, and then between 2014-16.[65] During this period some important legislation in the form of acts, bills, ordinances and amendments in them have been collectively produced, actively pursued by women parliamentarians and then enacted by the senate and assemblies but the real problem of ensuring their implementation remains to this day.

The small quantum of female representation is a major factor in effectively creating, pursuing, mustering support from a male dominated assembly, and implementing pro-women legislation. On a parallel level, there is an inadequate number of female judges existing at all levels of the Judicial system, who can ensure implementation of the provisions made in the legislation to protect women's rights. According to a 2017 UNDP Pakistan Case Study "The percentage of women judges in high courts is 5.3 percent only and 15 percent in session courts. The Supreme Court does not have a single female judge out of the 16 judges on the panel and a woman has never been appointed to the Supreme Court. This fact applies to the provincial high courts, as well. To date, there have been only 14 women ever appointed in High Courts".[66] So the social reality of gender inequality in this arena is a major factor which prevents implementation of pro-women legislation.

However, in our view, the present complex nature of the problem of implementation takes us not only to the social reality (socio-political and economic structures and relationships) on the ground and its innumerable facets and interactive layers but also the area of mental biases, perceptions and doing. And then the problem of social and political intentions, motivations and Will. We would like to assign this area as the root causation out of which all other causes emanate. Of course, we understand and accept that factors like available means, resources, tools and capacity are also critical in implementation. Up to now, partial, unsatisfactory and insignificant implementation and at times failure to implement has been the story of pro-women legislation in Pakistan. Apart from the numerous reasons cited in the normal discourse on gender parity we would like to introduce the area of mental processes as an important cause of gender inequality, discrimination and violence because that is where the gender perceptions, biases and social construction of gender takes place. An informed awareness of this area and its targeting is critical if we want to seriously reduce the gap between pro-women/ pro- gender parity policies/laws and their implementation.

63. Free And Fair Election Network. "Performance of 14th National Assembly of Pakistan 2013-2018," Free and Fair Election Network, 2018, 1 http://fafen.org/wp-content/uploads/2018/06/FAFEN-14th-National-Assembly-of-Pakistan-Performance-Report-2013-2018.pdf
64. National Commission on the Status of Women, "Gender Review of Political Framework for Women Political Participation," May 3, 2010, 25
65. Ayesha Khan and Sana Naqvi, "Women in Politics: Gaining Ground for Progressive Outcomes in Pakistan," Institute of Development Studies, 2018 https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/14155/Wp519_Online.pdf?sequence=1&isAllowed=y
66. UNDP Pakistan and UN Women, "Gender Equality in Public Administration: Pakistan Case Study," UNDP, 2017, 15 https://www.undp.org/content/dam/pakistan/docs/Democratic%20Governance/GEPA%20Report%202017.pdf

Given the current state of women under representation and participation in State policy making and legislative process and the problems of implementing pro-women legislation the next IO years will not see any radical changes in the current status quo regarding gender inequality and parity. Many more Bills and Acts will be ratified by our National and Provincial Assemblies and Senate but their successful implementation will remain a spoke in the wheel. A catalyst for change in this situation, which seriously shakes the status quo, can only come from seriously modified mental and social formations. Until we evolve these new mental and social designs and structures we will remain entangled and engaged in repetitive patterns of feeling, thinking and doing in relation to gender inequality and parity. This means instead of real progress there will be a continuation of superficial insignificant progress while the core roots of gender inequality remain intact, strong and operative without facing any serious resistance.

B. Political process, practice and gender parity

The gender inequality in participation, access, and decision making in politics has been discussed at length in the hitherto discourse on gender parity carried out in social and political spaces. Some of the causes of gender inequality in politics include financial dependency, lawlessness, insecurity, men prohibiting women of their families due to patriarchal mind-set, present environment of political parties, women not capable of exhibiting and handling prevalent rowdiness and hooliganism in politics, lack of women's interest in politics, lack of education and political experience, stereotypes which portray women being better in certain fields like education, health, social welfare and unfit for politics. These are all valid reasons and have been argued in detail but we would classify them as super-structural causes. And instead of regurgitating them we would like to focus on a more fundamental cause which has not as yet been seriously dissected; the Subhuman adversarial mind/mind-set which produces gender inequality, discrimination, manipulation, exploitation and violence, generally and especially, in the political process.

Although the present mind-set of individuals is confronted at every tier of political space beginning from grassroots, local level to the highest echelons of decision making we sideline it in favor of other more tangible causes, that we assume can fix the issues women face in politics. There is a mistaken equation and assumption in our minds that if women are politically empowered through their increased quantitative participation at various political tiers, then that will eventually give birth to 'gender parity'. Here the complex and many-sided interconnections of women political empowerment with all other critical factors, especially the sensitization of men in terms of restructuring and cultivation of their minds in relation to gender inequality and parity are ignored. How gender inequality is constructed and operates within the minds of both men and women is sidelined. It is not viewed as a critical factor in achieving gender parity. And it is due to the sidelining of this factor that our present and future efforts in this area will not bear serious fruit.

Due to the above assumptions, unintelligence and lack of knowledge about the Subhuman adversarial mind-set we find no indigenously generated creative programs put forth by our mainstream political actors and stakeholders (apart from some generated

by international donors, governments in collaboration with some of our local NGOs) which can work with both men and women to sensitize them to the obsolescence and contraindication of gender inequality in their field, especially in today's post-Sci-Tech period of human history. And to work towards a deeper understanding of their existing mind-sets; their origins, evolution and functioning, how they can modify and change them and cultivate new mind-sets.

In this regard, as a first step in acquiring intelligence about the Subhuman adversarial mind/mind-set we would like to juxtapose it with a Human-centered mind/mind-set. The Subhuman adversarial mind/mind-set is generated by two processes; the individual (or subjective self) centric mental formation (mind) and the process of social enculturation and construction. The latter becomes the ground for the former to grow, develop and operate its 'unique' individual identity and personality with its layers of emotional, intellectual and doing superstructures developed during the individual lifespan, which in fact reinforce and strengthen the core individual centric mind. So when we modify the social enculturation and construction then we are actually modifying the super-structural emotional and idea layers, which is a kind of lip service. This change can also lead to 'superficial' gender parity with under-layers of conflict, tussles, disharmony, adversarial and manipulative behavior.

The reason why it is superficial is because the core individual centric mind remains intact and is not displaced. Hence in many instances, we find it coming back with a vengeance, in another form and through another route, which means the process of contradiction and conflicts continues unabated. This is the reason we find that the more we get better at understanding and dealing with all kinds of external; social, physical and material, causes of gender disparity, the goal of achieving gender parity gets further away from us and becomes a distant dream because unknown to us its bastion is still intact and has in fact grown stronger. This state starts generating disillusionment and cynicism within us although our exterior is fully engaged and motivated to get rid of gender inequality. So in reality we keep getting further from our goal and vision.

The logical and seriously workable solution to this contemporary Subhuman adversarial mind-set is the cultivation of the human-centered mind-set. This is a new identity, personality and mind. It is produced through two different processes. One, the intellect-based Human aka Nature centered mental formation (mind) based on cultivating new processes of feeling, thinking and doing, Two, a new social construction and enculturation process, which will be consciously and intelligently created by the emerging intellect-based human aka Nature-centered mind. We find the intuitive (semi-intelligent) instances of this process in individuals like prophets, poets, philosophers, mystics, etc., whose minds are able to revolt against and discard existing social enculturation within which they are born and grow up. And then they create their own social culture and environment which does not inhibit their process and also imparts stability, harmony and happiness to other people and the rest of Nature. Once these two processes become a reality then we can hope to achieve real and stable gender parity in politics and all other arenas, whose roots would exist in the human and Nature centric mind of both men and women.

It is only the above explained human-centered mind/mind-set as opposed to the Subhuman adversarial mind/mind-set which can steer through the complex and advanced landscape and issues of present politics and governance. A recent global analysis proposes that governments of today need to be more 'intuitive' and 'integrated' in order to effectively respond to the needs of their citizens, new technology opportunities and social challenges in this world of constant flux.[67] In fact it is suggested and which is logical that "transformation will require uprooting outdated systems and practices and replacing them with new models better suited to the age of artificial intelligence (AI)."[68] In our view, the existing Subhuman adversarial mind/mind-set is the author and embodiment of these outdated systems and practices. Hence uprooting these must include the uprooting of this mind-set and replacing it with a better, more stable and harmony producing 'human' mind-set, which is able to adapt, and optimally and creatively use its capabilities in today's world of AI, IT and transforming political systems.

C. Economic landscape and gender parity

We know today that 'human capital' has a critical and decisive role in the economic growth and development of any society. Gender inequality and discrimination ensure that a large part of existing and potential human capital, in the form of economically empowered and enabled women, remains underutilized and untapped. There are many indicators which can tell us the present situation of women as human capital compared to men. Some of these include: female labor force participation, pay/wage gap between men and women, estimated earned income, access to assets, economic leadership; percentages of female managers, owners, entrepreneurs, R&D personnel, professional and technical workers.

In Pakistan the present economic participation of women; their access to formal financial services and work opportunities in financial services industries, their ownership and leadership of businesses and enterprises and role in decision making, is far below what is needed for a balanced, consistent and long-term economic growth of any society. Today the equation between gender equality, parity and increased economic progress and development is generally acknowledged and established. According to McKinsey Global Institute's 2018 Report "From an economic perspective, trying to grow without enabling the full potential of women is like fighting with one hand tied behind one's back." It also goes on to predict that "Advancing women's equality in the countries of Asia Pacific could add $4.5 trillion to their collective GDP annually in 2025, a 12 percent increase over a business-as-usual GDP trajectory."[69] And their prediction for Pakistan is an addition of US$ 30 billion to its GDP annually, which is a 7.1% increase over a business-as-usual GDP.[70] Of course what women's equality does to the GDP is one part of the story; the economic inclusion and empowerment of women has many social implications and fallouts which are well-known today.

In order to actualize the economic potential of women and make them equal partners in our economic and social progress we need to again come back to the critical obstacle in the way of this process which is highlighted and elaborated in this study; the Subhuman adversarial mind/mind-set.

Whether it is the economically exploited

67. The Deloitte Center For Government Insights, "Government Trends 2020: What are the most transformational trends in government today?" Deloitte, 2019, 3 https://www2.deloitte.com/content/dam/insights/us/articles/government-trends-2020/DI_Government-Trends-2020.pdf
68. Ibid.
69. Jonathan Woetzel et al., "The power of parity: Advancing women's equality in Asia Pacific," McKinsey & Company, April 2018, 1 https://www.mckinsey.com/featured-insights/gender-equality/the-power-of-parity-advancing-womens-equality-in-asia-pacific
70. Jonathan Woetzel et al., "The power of parity," 2

rural women on farms, female factory workers in urban areas, domestic workers or more educated women working in the financial services workspaces like banks, etc., they all confront the Subhuman adversarial mind-set in one form or another and in various degrees. And that obstructs their economic inclusion and participation in the economy and also the growth of their economic mind and capabilities. What they can bring to the economic landscape in terms of new ideas and innovations remains unrealized. But where this mind-set is effectively challenged and either suppressed or modified to some extent then in those societies women come to the forefront in the form of successful owners of businesses and enterprises, and highly valued employees of financial institutions. For example, according to a 2019 global survey women's control of investible wealth worldwide is projected to increase to $72 trillion dollars by 2020. Which means "Women's influence as investors in global financial markets—and, by extension, national economies—has grown substantially, and will continue to do so."[71] This is an indicator that in societies where this biased mind-set is being reigned in and modified the economic participation of women is contributing immensely to both National and the Global Economy. Pakistan is still very far from this state.

We find that the most-deep rooted and critical obstacle to women inclusion, participation and access to economic opportunities is this strongly and deeply entrenched Subhuman mind-set. This is presently preventing our women to make the transition to becoming serious quality of human capital, which is the core asset of any economy, apart from its material and technological resources.

A new more inclusive and equality based social culture which allows and facilitates the holistic and full development of women as human capital can only come about when the old mental formations and mind-sets are replaced by new ones. Hence the need for the human-centered approach and its adoption by both men and women of today.

The various external factors hampering women participation and access in Pakistan are being addressed through various measures, policies, laws which are being implemented by institutions and the government at various levels of the economic arena; the economic work places, etc. These include measures to address and prevent sexual harassment in work places, gender sensitization staff trainings, women quotas in financial institutions, Boards, Executive Committees, and use of Information Technology by women which is enhancing their participation in the economic workspace.

We can see how over the years and more recently the economic participation of women, whether though the opening of more bank accounts, use of technological and IT tools, working in banks and other offices, or starting their own businesses, has grown and is continuing to grow, albeit, at a slow pace. The increased participation of women in our digital entrepreneurship ecosystem is being seen and promoted. This is providing women the space to fulfill both their traditional responsibilities and also become economically productive. Of course this hitherto growth is not consistent across all socio-economic classes and is not taking place uniformly in all four provinces but it is slowly progressing. And if we start to more rigorously and strictly apply the various measures and policies then there will be more rapid progress. So we do

71. Martina Cheung et al., "The (Financial) Future Is Female," S&P Global Inc., 2019, https://www.spglobal.com/_division_assets/images/womens-paper/241755-global_womens_investor_survey_paper_8.5x11_digital_final.pdf

not doubt or undermine the beneficial effects of removing external barriers to the economic participation of women.

However, the internal area of the mind should also not be undermined and neglected and instead be seriously worked upon. So the gender parity sensitization trainings that various workplaces have started conducting for their employees are an important first step for triggering the modification of the mind-set and they must be supplemented by incorporating the human-centered approach which can give new ideas and tools to individuals (both men and women) to work on the entrenched and reflexively operative biases of their mind-sets. This will enable them to remove the internal obstacles which manifest externally in behaviors that obstruct equal economic participation of women. This includes lack of confidence and motivation that women experience when they enter and start operating in the male-dominated economic workspace.

Addressing the mind-set will be necessary if we are serious about actualizing Pakistan's Vision 2025 which proposes "Practices based on gender discriminatory cultural patterns will be discouraged. To increase women's participation in decision making, affirmative action will be taken in all public spheres. Women will be protected from harassment at work through strict enforcement of the legislation. Economic empowerment of women through ensuring access to education and enterprise shall be promoted. Day-cares will be provided at offices to facilitate women and enable them to work even after marriage."[72]

The 'human' vision of enabling increased economic participation of women alongside men, their acquiring economic autonomy like men and increased capability in the economic arena with unhampered access to finances and opportunities, can become a seriously doable and stable practical reality when the new human-centered mind-set starts to take root in both the contemporary human mind and society.

D. Education, health and gender parity

According to the Global Gender Gap Report, Pakistan in the year 2018 ranked 139 (out of 149 countries) with a score of 0.810 on the road to gender parity in educational attainment. This is an improvement from 2006 when the rank and score were 110 and 0.706. In health and survival, Pakistan ranked 145 with a score of 0.946. In 2006 the rank was 112 but the score was almost the same, 0.951.[73]

While female enrolment and literacy rates are a serious problem and need to be consistently pursued as critical goals, we would like to suggest that monitoring and raising the quality of education is equally important, if not more.

Addressing other external constraints to female education like lack of facilities, security, poverty, parent's reluctance to send girls to schools due to preference for sons, school location, and other cultural/customary practices, is very important and is being done by both the State institutions and civil society. But issues like substance and quality of education and the problem of the Subhuman adversarial mind-set which hinders female access to education also need to be highlighted and seriously addressed.

The issue of highly unsatisfactory quality of substance, teaching and learning affects not just females but both males and females. Addressing this requires the making of a new mental and social culture in which the substance and

72. Ministry of Planning, Development & Reform, Government of Pakistan, "Pakistan 2025: One Nation-One Vision," Planning Commission, 2014, 38 https://www.pc.gov.pk/uploads/vision2025/Pakistan-Vision-2025.pdf
73. World Economic Forum, "The Global Gender Gap," 215

quality of teaching are the main priority and goal. For making the new mental and social culture we again need to go back to understanding, monitoring and modifying the Subhuman adversarial mind and mind-set. Hence the need to introduce the human-centered approach based on cultivating the mental processes of empathy and personal space as a vital contribution to dislodging the existing mind-set and laying out the criteria and steps for making the new human-centered mind-set which then drives our thinking, feeling, ideas, motivations, and actions. The positive input of this human (not male or female) approach can play an important role in reducing inequality and disparity in the area of education.
The available health statistics point to issues of access, trust, proper facilities, availability, competence and work ethic of skilled health providers and the need for prevention through better education, and health awareness. But the above statistical figures in the various components constituting health and well-being of both men and women do not reveal any serious gender disparity and discrimination.

In our view, any gender bias or disparity found in the micro aspects and interactions in this area is more a product of our Subhuman adversarial mind and its dominant reflexive patterns of functioning which prevents us from becoming fair/equitable, harmony producing, and 'human' focused instead of male or female focused. The complex and highly stress producing circumstances in which the bodies and minds of male and female children, adults and older people live and operate, health issues of all kinds are logical, and they afflict all of us and are cause of concern to all of us, both individually and collectively.

The deteriorating and disintegrating health of our bodies and most importantly minds cuts across gender, race, wealth, economic, political and social supremacy, rural/urban, geographical and administrative boundaries. It is integrally connected to all other areas of human existence and must not be treated in isolation. In varying degrees and at various levels it engulfs each one of us, whether a man or a woman. Disease, sickness, injury, are experienced by all of us, even animals. The disparity and lopsidedness that the human mind creates in all areas of its existence due to its social history and evolutionary trajectory can only be seriously addressed by focusing on intelligently understanding and modifying our minds. This is what will enable our 'human' identity to take shape and replace the dominant biology based adversarial identity of our minds, which is the real cause of ill-health in our bodies and minds. Both men and women have to tap into the nonverbal processes of their bodies and minds and discover (both with and without external facilitation) how to keep them integrated and healthy.

The human-centered approach using our mental processes of empathy and personal space can enable and empower individuals to dig deeper and identify how our physical and mental systems work interactively and how they produce disease and disparity in both our bodies and our social minds and environment. We can discover and learn through our new 'human-centered' identity how to cure ourselves and become more equitable, capable, productive and healthy as individuals and as a society.

E. Gender inequality and parity in the period of ICTs and knowledge society

Two very important pillars of contemporary knowledge society are human and social capital. The knowledge society "emphasizes people

— especially their skills and capacities —communication and learning with an emphasis on the predominance of information, communication and knowledge in society as well as in the economy."[74] Moreover, "a socially inclusive knowledge society empowers all members of society to create, receive, share and use information and knowledge for their economic, social, cultural and political development."[75] But at present it is also acknowledged that "The Universalist ambition of knowledge societies seems to come up against the reality of the aggravation of gender inequalities" (UNESCO 2005, 167)".[76]

The extent of exclusion and inclusion of Pakistani women in mainstream knowledge society that we are transitioning towards and need to become in the 21st century is a critical area that we need to highlight and think about.

While our present social relations, institutions and culture are still languishing in and clinging on to the status quo which continuously generates and perpetuates gender disparity what we need to produce is an equitable, gender balanced, dynamic, healthy and stable knowledge economy and society which can benefit from the creative productivity of all its population. Gender equality and parity is a fundamental requirement of our time and future. Women achieving educational access alongside economic connectivity and visibility in the digital economy through the use of mobile internet and social media has increased their social participation plus financial inclusion in the digital economy and knowledge society. Which means a clear positive step in the direction of gender equality. But whereas some countries of the world have achieved this to a large extent and some have rapidly started moving in this direction, Pakistan is still trudging very slowly in this direction with many hurdles along the way.

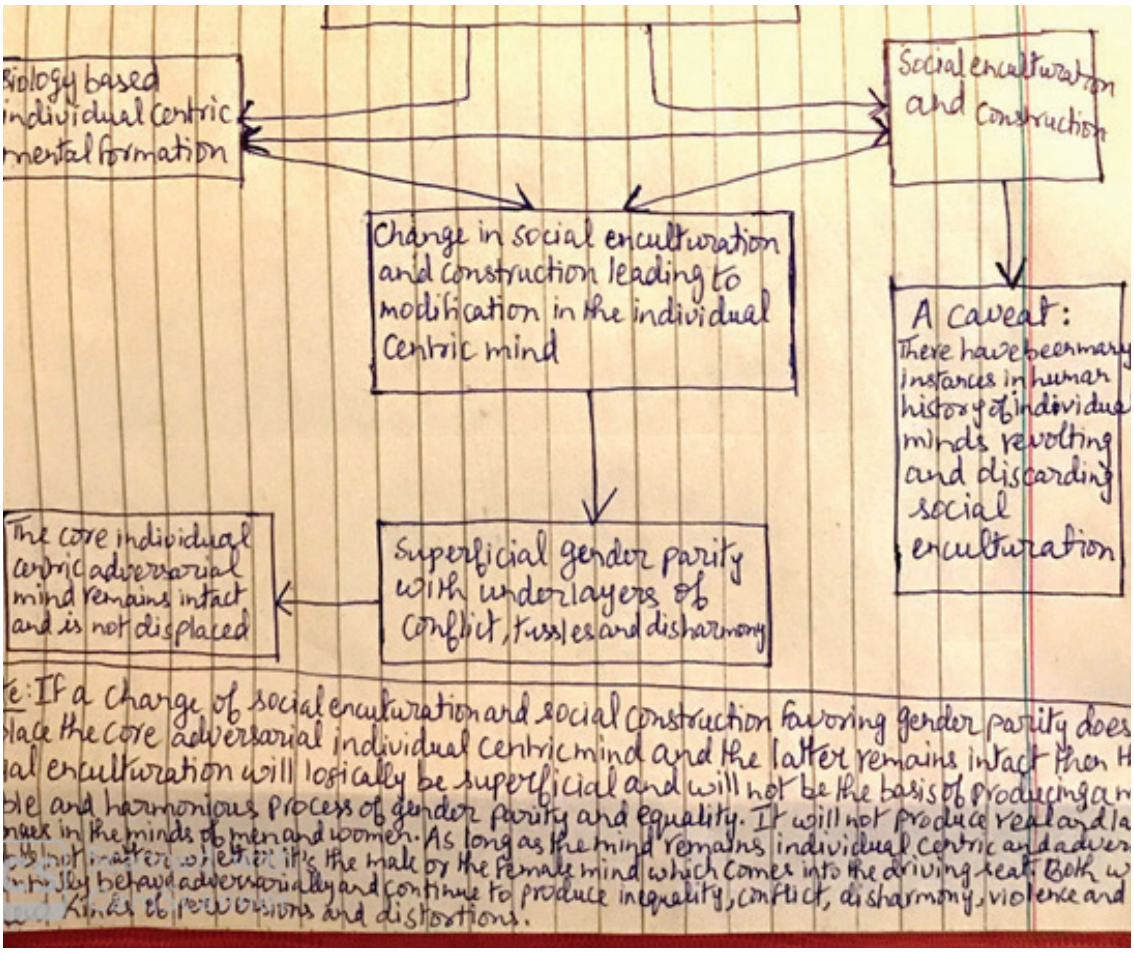
There are macro problems like our reducing GERD, and the fact that we have not yet been able to produce and develop the culture nor the skills, capability, infrastructure and systems for enabling high end and high valued added technology creation and innovation processes. The social and cultural barriers that are normally cited essentially stem from entrenched gender biased micro patterns of thinking and behaving. In our view this positively hinders the access of girls/women to the basic requirements for equal participation in the knowledge economy and society. These include literacy and basic skills, internet access through PC and mobile, pursuing, sustaining and excelling in professional careers in science and technology, acquiring leadership/managerial positions in universities and other Sci-Tech, Engineering, and IT organizations, Boards, etc., and getting opportunities to carry out serious creative and innovative research work in different fields of Sci-Tech and Engineering.

Some specific proposed and practiced measures for improving female access and inclusion in science and technology include governmental interventions like keeping 30% quota for young interns in IT sector and 'ICT for Girls' program,[77] specific quotas for decision-making positions in higher educational institutions and the boards of various Sci-Tech organizations. Specialized trainings of female staff in various IT and Sci-Tech organizations is another measure which is in practice but needs to be put on a fast track. Focusing especially on girls/women in the one million freelancers Digital Skills Program.[78] Enabling access to life-long learning through distance learning and adult educations programs

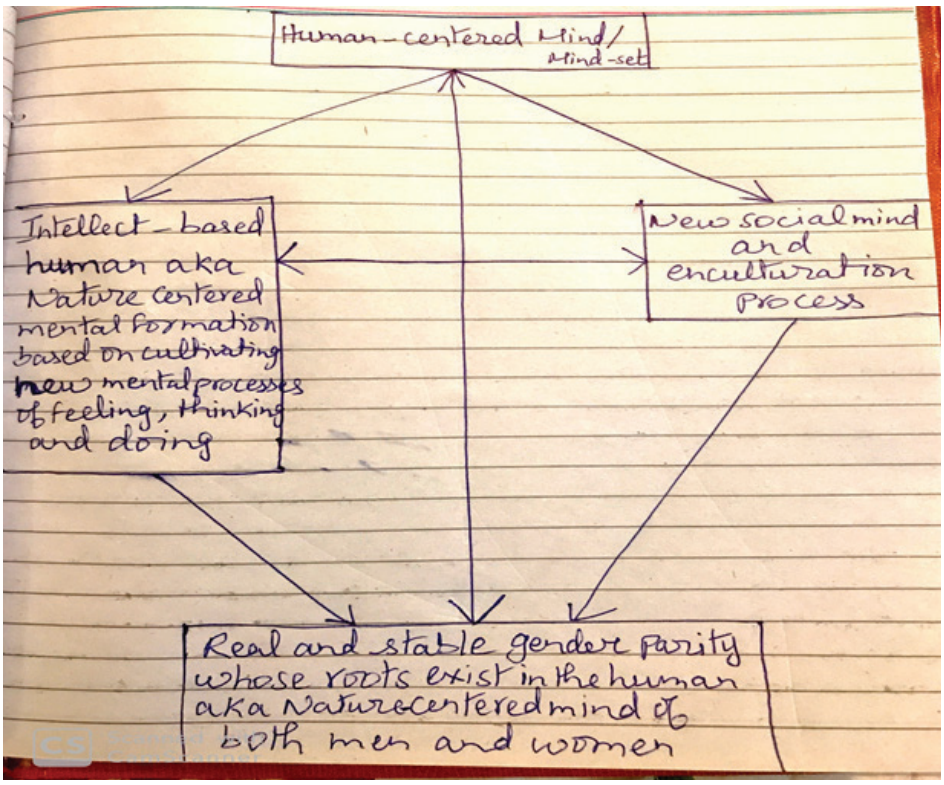
74. Sophia Huyer and Nancy Hafkin, "Engendering the Knowledge Society: Measuring Women's Participation," Orbicom and NRC Press Canada Institute for Scientific and Technical Information, 2007, 1 https://orbicom.ca/wp-content/uploads/2017/06/Engendering-the-Knowledge-Society.pdf
75. Huyer and Hafkin, "Engendering the Knowledge Society," 4
76. Ibid., 11
77. ITU News, "How Pakistan is promoting women and girls in ICT," ITU News, March 7, 2018, https://news.itu.int/how-pakistan-is-promoting-women-and-girls-in-ict/
78. Ibid

and introducing means and methods of influencing change in the social behavior and attitudes of boys and men are also critical measures which can increase female participation and contribution in Sci-Tech based knowledge society.
We propose that the gender divide in this area can be reduced if we are able to become intelligent about the Subhuman adversarial mind/mind-set and also modify its reflexive operative patterns which dominate our thinking and doing and thereby prevent us from supporting and enabling women alongside men to participate productively in the knowledge economy and society.

The inherent nature of science and technology is gender neutral and human focused. In human history scientific questioning, exploration, thinking and experimenting has been undertaken by both men and women. They have worked side by side to invent, create and innovate. Of course men have been dominating this area for the larger part of our history but the nature of modern science and technology, especially after the inception of ICTs, is clearly showing us that women can engage, create and produce much more and on an equal level as men. If the Subhuman mind/ mind-set is dislodged, then women like men can produce highly sophisticated and creative scientific and engineering works. So our aim should be to focus on and work towards creating a new mind-set and culture here so that Pakistan can produce a developed and efficient knowledge economy and society. Hence we need to encourage thinking like the human-centered approach which is attempting to focus on understanding and dismantling the Subhuman mind/ mind-set and producing a more autonomous and capable human-centered mind/mindset for serious, stable and long-term human progress.



Subhuman adversarial mind/mind-set



Human-centered mind/mind-set

F. Pakistani Men and gender inequality, discrimination and parity

Men are a critical stakeholder and essential participant in any thinking, understanding and doing related to reducing gender inequality and moving towards gender parity in Pakistan. The formation of their mind-sets and its products; ideas, feeling, biases, motivations, agendas, thinking, etc., play a vital role in how gender inequality and discrimination actually unfolds and operates in our society. Their culturally and religiously shaped attitudes, emotional positions, ideas, thinking and corresponding behavior are a major determinant of whether we can actually reduce gender inequality and disparity or not and whether gender equality and parity can actually take root in our minds and social structures or not. It is therefore imperative that we acquire a sufficient understanding of the perceptions, attitudes, and thinking of men about gender inequality, discrimination and parity in our society and try to work for changing them.

Given the gender biased attitudes and practices of the majority of men in our society various suggestions have been put forth for engaging men for the purpose of reducing gender inequality, discrimination and violence. These include changing the stereotypes around the concept of masculinity, engaging men to become more gender-sensitive fathers and husbands, promoting equitable gender attitudes through education, media, religious leaders, at all levels of society; in men, women, youth and children, and spreading and enforcing awareness of laws protecting women (and men) from violence.[79] In our view all these recommendations reinforce the need to zero in on the Subhuman adversarial mind/mind-set because any serious change in stereotypes and attitudes will inevitably require us to confront and deal with this mind and its social form that have given birth to these stereotypes and attitudes. Hence the need for introducing the human-centered approach based on empathy and personal space to dig

79. Ibid., 22-24

more deeply into the mental space of the problem of gender inequality and discrimination.
It seems the human-centered approach might gain acceptance among young men (and maybe some older ones also) in whom the feelings of empathy and personal space for women are in a healthy state and have not been damaged by social specifics and circumstances, and trends of social construction.

III. Challenges and Obstacles in introducing and implementing the 'human' centered approach

- The present excessive focus and overemphasis on social construction and social forces determining and controlling the process of gender inequality and parity within the minds of our Intelligentsia, civil society, politicians, educationists, and various progressive and educated people belonging to all walks of life, will be a major challenge and obstacle in the acceptance and implementation of this approach. It ignores the critical and essential role of our core mental formations and processes in generating and exacerbating gender disparity, inequality and discrimination.

- Individual perceptions, biases, emotional positions, reactive and repetitive patterns of feeling, thinking, understanding and doing will be a major challenge for the implementation of this approach, first within the minds of individuals and then in groups and institutions.

- Social entanglement of individuals and groups in existing programs and commitments, both national and international, on gender parity and women empowerment is presently leaving no space for them to explore any nascent and challenging (existing ideas, assumptions and behaviors) approach which has no tangible programs at the moment.

- Mental (emotional and intellectual) dependency is another factor which can obstruct acceptance and implementation of this approach. In 1947, with our so called 'freedom' we did not physically remain dependent but our mental dependency[80] remained intact. An evidence of this is that from 1947 up to now we still rely on other countries to economically and politically run our country. We still want others to take responsibility of both our present and future.

The most intellectual and educated among us rely, both consciously and subconsciously, on international theories, approaches, intellectual work and methodologies, in short, borrowed blueprints of how to think, do, manage and administer[81]. So we still depend predominantly on the western world for everything while overlooking the specifics and history of how they became what they are. Today we need to make a critical and much needed self-assessment by seriously exploring and confronting what our real internal and external reality is; the reality of our minds, i.e., motivations, emotional and intellectual positions, ideas, mental habits, and then our social culture, structures, relationships and interactions.

Interdependence, borrowing and collaboration between two autonomous people or countries is indispensable and

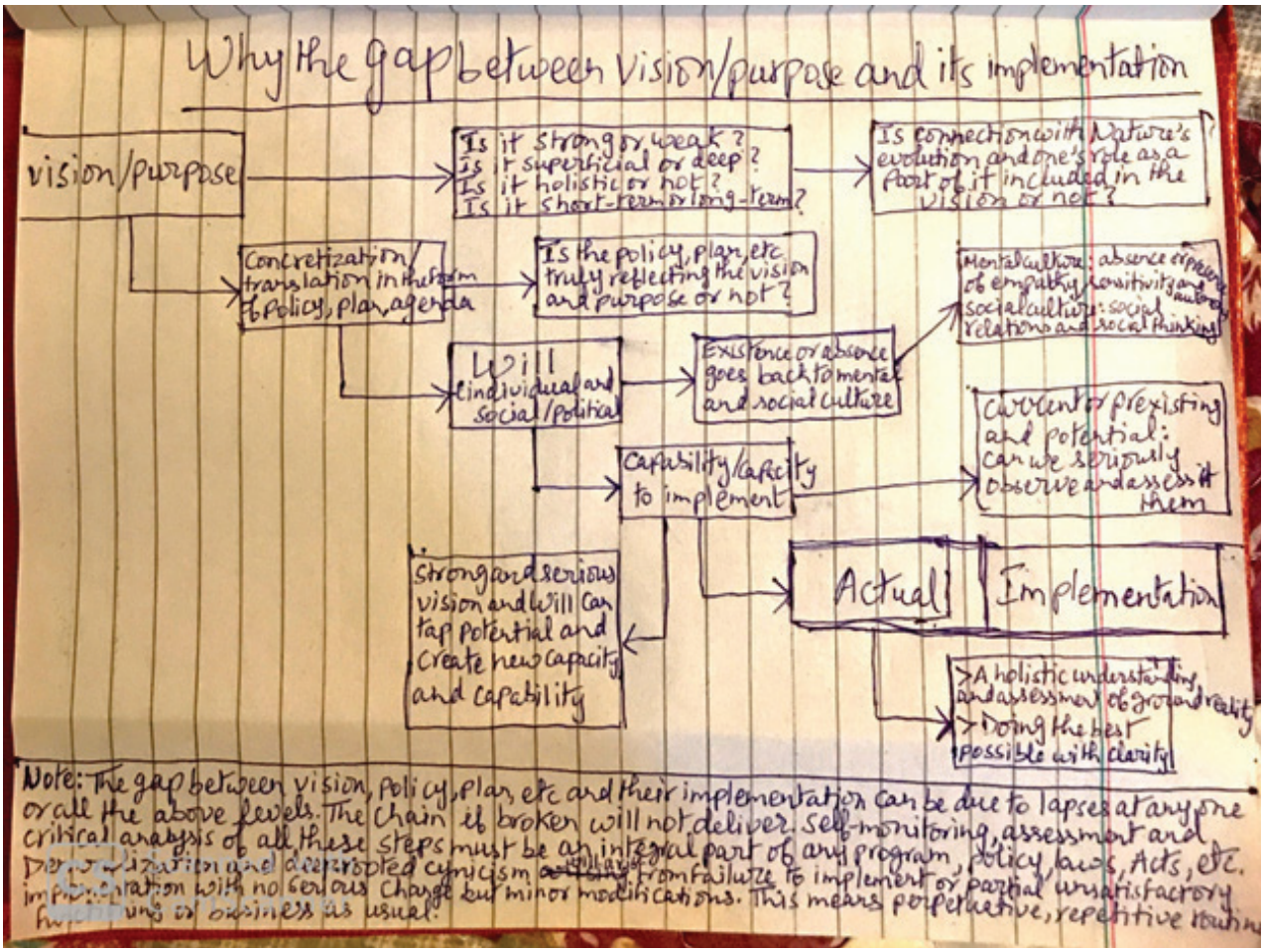
80. On the surface we appear to be highly mentally dynamic and intellectually independent. But that is our surface and superficial reality. It is not the truth of our core mental layers and the mold which the period of colonialism produced, which we have not yet broken and become free of. Our intellects are not really free because their operation remains well within the ambit of our core colonized mental design and framework. Another evidence of this is that our intellects generate all kinds of novel and lofty ideas but when it comes to their implementation we come up against all kinds of obstacles and resistance, most of which, in fact, are internal. But we come up with all kinds of justifications in the form of external factors being the main determinant and dictator and we being helpless spectators. We can observe this within us when we repetitively and most of the time blame external things and other people for our individual and social condition and sideline and overlook our own mind-sets, temperaments, habits, worldviews, etc.

81. We are not saying here that borrowing in itself is wrong and must not be undertaken. Borrowing between autonomous people whose minds are already on their own specific paths of questioning and intellectual inquiry is necessary because new knowledge is generated out of pre-existing knowledge and through collaboration. But in the absence of an autonomously generated framework of questioning and thinking, which is produced through an on-going and intense process of tedious labor and strict emotional and intellectual discipline, borrowing is only a short-cut producing superficial, temporary and sometimes unworkable results leading to more problems than solutions. And that is what we have witnessed in all our social thinking, projects, policies, etc. There have been no real solutions and no serious, stable and long-term social change in our country. While deterioration, erosion, disintegration and dysfunctionality in our individual and social relationships and structures have been growing with time.

much desired given today's complex interconnected state and global nature of our individual and social existence. But the process of globalization in the hands of unintelligent (about their minds) and mentally dependent individuals and societies has produced the present reactive wave of all kinds of perversions, conflicts, etc., which are disintegrating the human spirit and the foundations of our social existence. It is this lopsidedness or disparity within our minds, between our unintelligence and limited knowledge of our mental formation, evolution and functioning, and our sophisticated and exponentially growing intelligence about the outside world, which is contraindicated today and the real progenitor of other disparities and inequalities including gender. Hence the need to introduce the human centered approach to gender disparity which goes deeper into its mental causes along with social causes.

IV. Suggestions for incorporating the 'human' centered approach

- A serious knowledge sharing and teaching of how the human mind and the social mind-set have emerged, evolved and function within the individual and in the social space. Intelligent understanding of mental evolution and functioning in young boys and girls will logically make them human capability and potential focused instead of living out their programmed male and female



roles. This inquiry and understanding must become a mandatory part of educational curriculums. That is how we can move towards reducing and eventually eradicating gender parity, not superficially and behaviorally but at the mental design level. The core mental design of human beings has to change and not just behavior, which is superficial and temporary. Human history is evidence of this behavioral change and its relapses and then destructive consequences.

- There should be a serious focus on introducing programs for comprehensive training of the emotional, motivational and intellectual processes of young girls and boys. They must be introduced to their 'human' identity and the potential of their emotional and intellectual processes where 'human' is integrally connected to the macro process of Nature. Training material using AI and other new social media tools can be developed for this purpose.

- A 'Human-Centered Gender Appraisal' (HCGA) should be carried out by all stakeholders in their respective areas of operation, whether it's a home or some office and organization in any specific arena; hospital, schools, in short, in all institutions and at all levels. What this will entail is assessing, and monitoring the present state of gender inequality, disparity and its consequences both within an individual and in his/her social structures and interactions, from the standpoint of a 'human' lens. This means sensitizing both men and women to the origins, evolution, formation and functioning of their mental biases and other negative and conflicting mental formations, which underlie gender inequality and discrimination and produce the undesirable and damaging consequences we all live today. And then monitoring and inculcating within them the essential mental qualities of empathy, personal space and other healthy and positive mental functions to generate stable, nondiscriminatory, peaceful and harmonious individual and social existence.

V. Concluding comments

The importance and imperativeness of pursuing the conventional approaches, frameworks and specific activist programs for reducing gender inequality and promoting gender parity in all sectors of human society can neither be disputed nor belittled. This study in no way undermines those efforts or opposes them. It views the human-centered approach as the next link in the chain of all these efforts and struggles that many women rights activists and organizations (public and private) have been undertaking since 1947. Its basic goal is in sync with the goal of all hitherto efforts; reduction of gender based inequality, discrimination, violence and increase in gender equality and parity in all areas of human social existence. Its core target is both men and women, more specifically their hopes, aspirations, motivations, emotions, feelings, ideas, thinking and Will. The integrated and harmonious functioning of their minds producing interpersonal and social harmony and happiness is what both men and women need to collaboratively work towards. That is the contemporary task assigned to them by the present and future time to which they belong.

The baseline quantitative data that this study has assimilated and analyzed reveals the extent and nature of present gender inequality and discrimination in our society and points to the need for

focusing on the minds and mind-sets of both men and women alongside external measures, laws, policies, and numerous projects in all areas of our social existence, whether its education, health, economy, politics, Sci-Tech, or any other area. If human-centered approach based on concepts of empathy and personal space gains acceptance and takes root in the minds of young educated men and women and other stakeholders, like progressive Government officials/ Institutions, intelligentsia, activists, academia, and media, then in IO years-time we can expect meaningful and effective changes in the mind-sets and behaviors of people towards women and gender inequality. The foundations of gender inequality and discrimination will start withering away because they essentially reside in the minds of people.

If people are able to emotionally and intellectually grasp the harmful and destructive consequences of gender inequality and gender based discrimination and violence they will realize how and why it is contraindicated in our present and future lives. They will find that the pace and levels at which our lives are proceeding we cannot afford gender biased minds. They will be counter-productive and start retarding and in fact reversing our growth, which today has to be many-sided and many-layered. Serious obstacles will arise in the path of our individual and social growth and progress if we are unable to reduce and eliminate gender inequality and discrimination and become 'human' focused in our minds. Holistic, meaningful and seriously effective future growth of our minds and societies can only be based on inclusivity, equality and a shared (by both men and women) vision and culture of harmony and happiness producing social interactions.

If we as human beings decide to embark on a collective journey of making our individual and social lives more egalitarian, harmonious, prosperous (in all human dimensions) and happy then we will realize the futility of hosting and breeding gender biases and other negative, conflict generating ideas and concepts that have so far marred and damaged human minds and our social interactions.

We are projecting a decrease in negative gender based perceptions, ideas, actual behaviors of discrimination and violence, etc., as the human-centered approach starts penetrating the individual emotional and intellectual processes and their corresponding social lives, and making sense to more and more people.

For the Academia, think tanks, intelligentsia and researchers this work is pointing to a highly contemporary and relevant area of inquiry and exploration which can both supplement their existing work and also encourage revision and rethinking of cherished ideas and core assumptions. We must remember that the process of exploring the new and unknown and revising and modifying the old is the hallmark of a healthy, dynamic and effective emotional and intellectual development. And it is also a necessary mental quality and capability needed in the time of fluid and exponential technological development, the imminent age of abundance and human-AI interface alongside growing deterioration, obsolescence and disintegration of existing mental and social formations, which are obstructing rather than facilitating the transition to a better future.

VI. Glossary of existing and new technical terms

Empathy: The mental process and capability of experiencing, interpreting and understanding how another person feels, thinks, behaves or acts. This term had almost 43 known definitions in 2015. According to some of these definitions it is seen as an ability, a capacity, a

shared emotional experience, emotional response, an act of cognitive and emotional understanding, being aware of or sensitive to another person's feelings, experiences, ideas, thinking and doing.

Gender Parity: This term is about equal representation of men and women in any specific area of social existence like, health, education, politics, economy, science, technology and so on. This is a more micro concept which feeds into the broader and more comprehensive concept of gender equality. It is one of the stepping stones for achieving gender equality.

Gender Equality: It is a broader term which talks about equal rights, responsibilities and opportunities of men and women and boys and girls. It is not a women's but a human rights issue. It takes into account the needs, choices, interests of both men and women while acknowledging the diversity between them. Human centered mind/mindset: The nascent emerging 'human' focused mind, anchored in Nature's evolutionary dynamic and operating through a mature and highly developed intellectual process and a corresponding intelligent sensitivity/emotional process. The core criteria of its functioning are derived from the dynamic evolutionary process of Nature which in human terms translates into the pursuit of and struggle for achieving human harmony, happiness, progress and stability. This 'mindset' will be the socially generated collective form of the specific ways and patterns of feeling, thinking, understanding and doing of the human centered mind.

Patriarchal mind-set: The gender biased, male dominated socially generated mental formation which is operative in both men and women. It generates its own world-view based on distorted and lopsided way of feeling, thinking and doing, and a corresponding social culture.

Personal Space: It is a compound concept made up of 'mental space' containing a person's emotions, thoughts, feelings, motivations, ideas, etc., and 'physical space' which is like a boundary around a person's physical self and mentally experienced as a part of personal space.

Subhuman adversarial mind/mindset: The dominant combative individual centric mind which is yet to become 'human' (see 'human-centered mind/mind-set' above) on the evolutionary scale. It operates in terms of mental biases and reflexive mental patterns of feeling, thinking and doing arising out of socially constructed roles (gender, status, class, race, etc.). Its roots lie in our biological/genetic system. Its 'mind-set' is the socially generated collective form of particular ways and patterns of feeling, thinking, understanding and acting. It is a reflection of the reigning social culture in any society. This mind-set derives its strength from its social roots but it concretely operates within and through the individual mind or mental complex made up of layers of mental processes, functions and products like emotional and motivational processes, desires, needs, ideas, thinking, intelligence, intellect, Will, and so on. Patriarchal mind-set is a subset of the Subhuman adversarial mind/mind-set.

Acknowledgments

This study was supported by S&P Global, an American company gathering and providing credible intelligence to companies, governments and individuals all over the world. We would like to thank Pakistani women activists and gender experts for their insightful comments on the core substance and ideas of the new approach discussed in this report. The responses of the male participants of a survey conducted to gather men's perspective on this approach have been very valuable for this work.

HISHAM SAJID

Abstract

Karachi is big. It covers a land area of 3,530 square kilometers and is expected to have a population of 27.5 million by 2020. The debate around Karachi, its countless problems and how they should be handled is not new. There is extensive literature around the city which goes in great depth to understand the problems that plague the city and discuss possible solutions to them. However, when people try to grapple with Karachi's problems their views are limited by their own experiences, socio-economic position, academic background or political inclination. This has given rise to the need of understanding Karachi in a more holistic way, looking at it from an exhaustive list of data points and metrics; a need to look at Karachi through the data lens.

After a detailed study of the literature on Karachi, primary research in the form of a focus group with participants across the STEEP (Social, Technological, Economic, Environmental, Political) verticals, and an expert panel, we have collated a list of 130 data points and metrics that we believe help measure Karachi. The idea is that, if we have historical data for the metrics on our wish list, we should be able to tell where Karachi was 10 years ago, where it stands today, and where it can possibly be 10 years from now. We have highlighted methods to find out which of these metrics are more important for the city, using either Realtime Delphi (RTD) or Dimensionality Reduction. We have identified the sources and methods for obtaining and measuring the data points which are a part of our metrics wish list, via government silos, local/international organizations, and most promising of all, technology.

Keeping in line with Karachi Future's long-term goal of building a Karachi State of Future Index (KHI-SOFI), this is the first step in looking at the city in a more quantitative way; looking at it as one big dataset.

Karachi Futures, the Road so Far

Understanding the significance of Karachi as a metropolitan city, AGAHI realized that the future of Pakistan is closely tied to the future of Karachi. Under this context, the first Karachi Futures meeting was held at Dadabhoy Institute of Higher Education on Oct 26th and 27th 2017. This workshop was based on the one central question i.e. in spite of Karachi's numerous problems, like congestion, inter-ethnic violence, persistent pollution, and lack of clean water, is there a possibility that Karachi can be different by 2030?

Participants of the two-day workshop used methods and tools of Futures studies to explore alternative futures for Karachi outside of the current trajectory. Of the many methods explored during the workshop, one method focused on the drivers and barriers to change. Some of the drivers identified were advancement in technology like IoT, AI, increased power and usage of smartphones and internet penetration. The barriers being corruption and governmental silos to name a few.

The differing opinions of the future was aggregated using Causal Layered Analysis (CLA). A method which tends to minimize the noise of information in daily newspapers and TV media to studying the underlying causes, worldview causation and finally the deep metaphor. CLA opens up space for the articulation of constitutive discourses, which can then be shaped as scenarios. [345]

356. Slaughter. Rick, "Developing and Applying Strategic Foresight," The ABN Report Vol. 5, No. 10 (1997): 7-15.

As a result of the ensuing discourse, four alternatives scenarios were imagined for Karachi:

City of Fright: Continued violence between groups, water shortages, pollution, with serious disease outbreaks.

The Oceanarium: Karachi becomes the emerald of the ocean. Success in using renewables, plus cleaning up the ocean and city - banning plastic bags - developing tourism, creating new Meta level skill sets to deal with inter-ethnic/class violence. Karachi creates a new relationship with the sea as the key. Recycling plus innovation in sanitation.

The Global City Alliance: Karachi helps create an alliance of Asian mega-cities focusing on similar challenges: climate change, massive population growth, need for social and technological innovation plus sharing economies.

The Leap - Karachi 4.O: Given that the present is fraught with the density of corruption and systems that make life difficult, Karachi changes most systems to leapfrog agricultural and industrial eras - innovation in building design, smart homes, fast connectivity change create a pivot in direction. The home not the highway changes the daily life for many. The old crumbles as the new emerges.

A follow-up meeting was held on April 6th, 2019 at Dadabhoy Institute of Higher Education where academics from the Institute of Business Administration (IBA) and Dadabhoy Institute, along with a total of 10 experts from various domains attended. Taimur Talpur, a leading political figure and provincial minister for Information Science & Technology also participated at the meeting. The participants included: journalists Sohaib Jamali and Mahim Maher; Academicians Dr. Saad Ahmed Khan, Dr. Arsalan Khan, Mr. Ahmed Zaheer and Dr. Adil Nakhoda; Muhammad Aamir Sheikh; Entrepreneurs Muhammad Lakhani and Honorary Guest Arif Hassan.

The discussion revolved around two themes:

Human Capital: There was consensus amongst all the participants that human experience and identifying drivers of change which builds the readiness of the people of Karachi would be winning factor. Dr. Saad Khan emphasized Karachi is a hotbed of internal immigration of people from areas within Pakistan, which makes identity and ownership (with respect to responsibility) an important narrative to focus on.

Governance: According to Taimur Talpur there is an issue of governance but we as a society are also not serious and we have a system of responsibilities as Pakistani. In this perspective, the minor thing we can do is to stop littering. Dr. Adil Nakhoda suggested that the growing population and lack of well-planned and thought through infrastructure is a grave challenge.

It was decided that the cohort would reconvene to analyze the parameters and the datasets to help improve our collective understanding of Karachi.

Karachi Futures - III (How to look at Karachi)

On the 24th of August 2019, AGAHI along with other stakeholders organized the third round of Karachi Futures, hosted by the Institute of Business Administration in Karachi. 23 experts from various disciplines participated in this round. The aim of this discussion was to identify and discuss metrics through which one should look at a city as complex as Karachi and objectively envision its future. This focus group discussion was a follow-up from its second round held on April 6, 2019. A theme that emerged from the previ-

ous session was about making sense of Karachi and how would the data help in the process that would improve the collective understanding of where Karachi is today.

The participants included Puruesh Chaudhary Founder and President of AGAHI, Dr. Farrukh Iqbal Dean and Director of IBA, Senator Musadik Malik, Faraz Khan CEO Seed Ventures, Dr. Adil Nakhoda Assistant Professor at IBA, Nimra Qazi CEO Timeline Designs, Umar Bin Ajmal reporter at The Quint, Altamish Jiwa sports reporter at Pakistan Television Corporation Limited, Hussain Mehmood Director Data & Founder of Marketlytics, Sohaib Jamali Research Editor at Business Recorder, Zehra H. Zaidi Director at Karachi Citizen's Lab, Dr. Saad A. Khan Director of Dadabhoy Institute of Higher Education, Hina Saleem Head of Literacy at The Citizens Foundation, Hassan Bakshi Chairman ABAD, Khalid Feroze, Samar Ali Khan, Fahim Zaman Siddiqui, Seemi Hasan Architect/Urban Planner, Hisham Sajid Project Lead Karachi Futures, Barrister Rufruf Chaudhary, Pakistan Tehreek-i-Insaf MPA Bilal Ghafoor, Adnan Qureshi, Tassaduq Ghouri.

Hisham Sajid, Projects Lead of Karachi Futures III, presented a list of over sixty metrics to contextualize the discussion, the participants were further instructed to think of and note down more metrics to understand Karachi. Puruesh Chaudhary initiated the discussion by putting forward the question of how to look at Karachi as a city and as a project. Adding onto this, Sohaib Jamali said that the idea is to start a conversation and figure out how we may imagine the future of a city like Karachi. For example, it is not sufficient to say that there should be housing and education. We must define what education and housing should look like. While it is for us alone to define the future of Karachi, there is a need to have such exercises across all levels of society. He further pointed to the need of contextualizing the future of Karachi within the overall future of the world as Karachi is the sixth largest city in the world, a reality which cannot be overlooked. The discussion which followed focused on metrics relating to ownership, governance and information dissemination. These included but are not limited to traffic congestion, number of vehicles on the road, the number of vehicles being registered per day, pollution, employment, crime, number of transport buses on the road, number of parks and sports grounds, water quality, contamination level, population density, people living in poverty, percentage of water requirements met, total taxes paid by residents, right to information requests filed, budget allocated to Karachi, industrial output and Karachi GDP.

Lack of ownership of Karachi, whether stemming from those at the helm of decisionmaking, i.e. political leaders, or the masses owing to the riddle of problems plaguing the city, was identified as a major concern. Khalid Feroze elaborated by saying that political leaders are unaware of the issues faced by the citizens of Karachi as they have not lived in Karachi all their lives. He believes we have left our future in the hands of people whose commitment to this city is questionable. Citing the example of Malaysia, Dr Saad A. Khan suggested mobilizing the youth to rally support for a united Karachi. This will require governments to work with think-tanks. Using social media as an agent of change, a strong sense of ownership, belonging and civic sense can be inculcated among the youth.

Stemming from lack of ownership is the issue of governance. Steering the conversation in this direction, Fahim Zaman Siddiqui said, “Problem is we have divided Karachi into many vested interests. Now we talk about how to fix Karachi? We cannot fix Karachi until we start

talking about Karachi as one city. Karachi's problem has to do with governance and politics. If we focus on transport and health, we will keep going in circles." Samar Ali Khan cited the example of Karachi Water Board which currently does not have meters to manage wastage and is also overstaffed resulting in majority of development expenditure being spent on salaries. "We need to attack the political setup. Your stakeholders should sit together and develop a vision of where Karachi should go."

Shifting the focus of the conversation away from the political landscape of Karachi, the architects took the lead in discussing the role of proper planning and dissemination of information. Seemi Hasan put forward the example of MIT Senseable City Lab which uses digital technology to learn about cities and urban problems and uses research to provide practical steps that empower citizens to make choices for a better livable urban experience. She mentioned other similar projects such as the Urban Heat Effect which maps the density of trees and relates it to heat in those areas and ones tracking trash flows. "In the West there is a culture of putting information out there." Zehra H. Zaidi pointed out that there are social innovation labs and NGOs working in Karachi, but these efforts will exist in silos until there is decisive action from the government. "We cannot romanticize the idea that our city is philanthropic. People have the right to information. A taxpayer can ask questions and needs accountability." Faraz Khan used the example of smart cities, such as London, Singapore and Dubai, to explain how planning is done based on a socio-economic identifying the needs of today and two hundred years from today which is what Karachi also needs.

Dr. Farrukh Iqbal, Executive Director Institute of Business Administration said that 'Karachi is half the Province of Sindh. Traffic congestions, urbanization and the inability to build infrastructure with a long view hamper the city's overall potential and productivity. The promise of this city seems to be vanishing, and no one seems to get anything done.' The participants agreed that there is a need to look at reliable data to assess the current situation of Karachi and make long term decision. Unfortunately, such either not available or not made available to the public. Senator Musadik Malik in his views expressed that a city as big as Karachi needs some organizing principles and values which should ideally lead it to improving the city's revenue structure; today, the demand function is quite weak and therefore it requires some serious thinking to consider any form of future.

It is evident that the discourse around Karachi is very much scattered. When people look at the problems of Karachi, their views are limited by their own experiences, socio-economic position, academic background, etc. Viewing these issues in silos results in people presenting only those facts which support their views or their version of the truth. This gives rise to the need for a holistic view of Karachi, looking it at it from an exhaustive list of data points and metrics.

There is a need to look at Karachi from a data lens. It will reduce the effects of cognitive bias and make the discourse around the city more objective.

Metrics Wish list

Secondary Research

The first set of metrics, as mentioned in the last section, were obtained through secondary research. We went to various documents about Karachi pertaining to land, housing, water, transportation, governance and education. The methodology that was followed to extract these metrics was simple; we went through the material asking the question 'what is the underlying data being used to support the argument in this paper'. TABLE I lists these metrics, along with a basic description of what we mean by them, and the source from which we inferred the metric.

These metrics are further classified into Social, Technological, Economic, Environmental, Political and Cultural (STEEP-C) verticals, the reader can get a better understanding of the issues being faced by Karachi bifurcated under these verticals in the appendix under the heading 'Karachi: Recognizing the problems. In order the historical significance of Karachi as city, the reader can read the section titled 'Karachi: a Journey through Time'.

TABLE I

Metrics	Description	Source	Category
Migrants, documented and undocumented	Number of migrants or 'aliens' present in the city and the number being added every month or year. We need to track documented and undocumented separately.	Housing, marginalisation and mobility in Pakistan: residential security vs social protection by Haris Gazdar & Hussian Bux Mallah	Social, Economic
High, low, middle-income households	Number of households in Karachi which are in the high, middle or low-income thresholds as per the Household Integrated Income Economic Survey definition.	Housing, marginalisation and mobility in Pakistan: residential security vs social protection by Haris Gazdar & Hussian Bux Mallah	Economic
Irregular settlements	Katchi Abadis inside the Karachi District limits.	Housing, marginalisation and mobility in Pakistan: residential security vs social protection by Haris Gazdar & Hussian Bux Mallah	Social, Economic
Geospatial data; related to housing	Geolocated housing and property data like pricing, ownership, number of floors etc.	Towards a GIS-based approach: Measures for Transparency in Private Housing Schemes by Dr Atif Butt (2013)	Economic, Technological
Population of Karachi as percentage of total population of Pakistan	Signifies the growth of Karachi relative to the growth of Pakistan.	Housing security and related issues the case of Karachi by Arif Hasan (2008)	Social, Economic
Cargo being handled by KPT	Number of containers being handled daily at ports by Karachi Port Trust.	Housing security and related issues the case of Karachi by Arif Hasan (2008)	Economic
Number of shops and houses being demolished	Establishments or houses being demolished on account of them being illegal or in the name of progress.	Housing security and related issues the case of Karachi by Arif Hasan (2008)	Social, Political
Road accidents	Number road accidents, distributed by severity, and the number of deaths and injuries via these accidents.	Housing security and related issues the case of Karachi by Arif Hasan (2008)	Social
Number of vehicles on the road	Number of vehicles on the road.	Housing security and related issues the case of Karachi by Arif Hasan (2008)	Economic, Environmental

Number of vehicles being registered per day	Number of new vehicles being registered.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Social, Economic
Average commute time	Average amount of time it take for a citizen to go to work and come back.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Economic
Noise levels	Measure of noise pollution in the city.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Environmental
Pollution related diseases	Number of patients coming in for pollution related diseases.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Environmental
Employment	Employment numbers split by age and sector.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Social, Economic, Political
Inflation	Inflation can be defined as 'a general increase in prices and fall in the purchasing value of money'. National inflation numbers along with city level inflation, if feasible, needs to be tracked.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Economic
Crime	Theft, murder and other crimes.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Social, Political
Literacy	A person who can read or write is defined as 'literate', we need measure literacy numbers across age groups and genders.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Social
Gender-wise split of university students	Number of students in universities, and their gender-wise split. Number of women in universities can be a good measure for women empowerment.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Social, Economic
Percentage nuclear families	A nuclear family is defined as 'a couple and their dependent children', as opposed to joint family where a couple along with their children reside with parents and siblings.	Housing security and related issues the case of Karachi by Arif Hasan (2OO8)	Social
Trips taken per day/month/year	Trips taken, split by trips taken on foot, public transport and private transport can be a good measure for finding demand for transport.	Karachi Strategic Development Plan 2O2O CDGK, 2OO7	Economic
Number of public transport busses on the road	Number of public and privately-owned buses on the road available mass transit.	Karachi Strategic Development Plan 2O2O CDGK, 2OO7	Economic
Accident severity index	Defined as the number of people killed per IOO accidents, can be a good measure for road safety.	Karachi Strategic Development Plan 2O2O CDGK, 2OO7	Social, Economic
Length of all roads	Length of all roads in kilometers, can be a good measure for transport infrastructure	Karachi Strategic Development Plan 2O2O CDGK, 2OO7	Economic
Air Quality Index	A metric used by government agencies to tell how polluted the air is how polluted it is forecasted to become.	Karachi Strategic Development Plan 2O2O CDGK, 2OO7	Environmental
Lead and other dangerous chemicals in the air	Lead pollution is a measure of air quality; Lead is a heavy metal that can adversely affect the nervous system, kidneys and the immune system.	Karachi Strategic Development Plan 2O2O CDGK, 2OO7	Environmental

CO2 levels	Carbon Dioxide is a measure of air quality and air pollution.	Karachi Strategic Development Plan 2020 CDGK, 2007	Environmental
Water quality Index	A metrics used by government agencies for consistent reporting of how polluted the air is.	Karachi Strategic Development Plan 2020 CDGK, 2007	Environmental
Contamination level of key rivers (Malir and Lyari)	Water quality index of Malir and Lyari rivers; important as a lot of local agriculture is dependent on these rivers.	Karachi Strategic Development Plan 2020 CDGK, 2007	Environmental
Pollution levels for Karachi's coastline	Water quality index of Karachi's coastline; important as the output of the fishing industry, and fishing communities along the coastline depends on the health of the coastline	Karachi Strategic Development Plan 2020 CDGK, 2007	Environmental
Agricultural output	Agricultural produce from Malir and Gadap river valleys.	Karachi Strategic Development Plan 2020 CDGK, 2007	Economic, Environmental
Number of people paying water bill to KWSB	Number of households or residents paying water utility bill, percentage of households paying said bill.	Citiscope special: Can text messaging solve Karachi's incredible unpaid water bill problem? - Mahim Maher, 2014	Social, Economic
People living in poverty	Percentage and quantum of people or households living below the poverty line. A person with PPP (purchase power parity) below $1.90 per day is said to be below the poverty line.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group – 2018	Social, Economic
Global Livability index	The Economist Intelligence Unit (EIU) publishes an annual Global Livability Ranking, which ranks 140 cities for their urban quality of life based on assessments of stability, healthcare, culture and environment, education and infrastructure.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Social, Economic, Political
Population density	Number of people per square kilometer of land.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Urban green spaces	Number or land are coverage of parks, shaded areas or protected forest areas in the city.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Social, Environmental
Number of vehicles being added to the road	Number of new vehicles being registered in Karachi every day.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Environmental, Economic
Traffic congestion	Traffic congestion can be defined as an increase in commute time, characterized by long lines of vehicles moving at an extremely slow speed. It is a function of increasing vehicles on the road and infrastructure not keeping pace.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group – 2018	Environmental, Economic

Passenger to seat ratio	Number of citizens competing for one bus seat. A metric globally used to gauge the availability of public transport in a city.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Environmental, Economic
Percentage water requirements met	Difference between water being supplied by Karachi Water and Sewerage Board and the demand for water.	Water woes: Karachi goes thirsty as its water goes to waste - Syed Ashraf Ali - Express Tribune, July 2019	Environmental, Political
Percentage non-revenue water	Amount of water supplied by KWSB for which no bill is collected.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic, Political
Sick in public hospitals	Number of sick people in public hospitals, both out-patient and people admitted into hospitals.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Social, Economic
Sick related to water pollution diseases	Number of sick both out-patient and people admitted due to water pollution related diseases.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Environmental
Sick related to air pollution disease	Number of sick both out-patient and people admitted due to air pollution related diseases.	Some 20,000 premature deaths linked to air pollution - Sehrish Wasif - Express Tribune July 2018	Environmental
Cost of sick related to water pollution disease to public health	Amount of money being spent by the government in treating sick related to water pollution related diseases at public hospital.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Cost of sick related to air pollution disease to public health	Amount of money being spent by the government in treating sick related to air pollution related diseases at public hospital.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Property tax being paid	Amount of property tax being paid out by property owners in the city, both commercial and residential.	How much tax do you have to pay on property? - Farooq Baloch, SAMAA Digital July 2019	Economic, Political
Total tax paid by residents	Total tax paid out by residents. This includes property tax, income tax, tax on utilities etc.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic, Political
Karachi GDP	Gross Domestic Product (GDP) is a measure of the monetary value of all final goods and services produced in a specific. GDPs are usually calculated at country level but also at the city level.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Karachi GDP by sector	Distribution of GDP by different sectors like manufacturing, trade, services etc.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group – 2018	Economic
Karachi GDP as a percentage of country's GDP	Karachi's contribution to the national GDP.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic

Location quotients specific to Industries	A measure of how concentrated a particular industry is in a particular area compared to the national average.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Women in the workforce	Percentage and number of women working in the formal economy.	No country for working women - Iftikhar Ahmad Express Tribune, March 10, 2018	Social, Economic
Corruption Perceptions Index (CPI)	Amount of money being spent by the government in treating sick related to air pollution related diseases at public hospital.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Political
Investment to GDP ratio	Higher investment relative to GDP is a sign of a healthy economy.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Dwell time at port for containers	Number of days a container stays at the port and time it takes to clear customs and complete processing at the port.	Customs working to reduce container dwell time at ports - Mubarak Zeb Khan DAWN, 2019	Economic
Tonnage being moved through Karachi ports	Amount of cargo being moved through Karachi ports in tones.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Economic
Mercer Quality of living survey	The Mercer Quality of Living Ranking is an annual report, now in its 21st edition. It evaluates local living conditions in more than 450 cities worldwide according to factors that are important to expats.	Transforming Karachi into a Livable and Competitive Megacity - A city diagnostic and transformation strategy, World Bank Group - 2018	Social, Economic, Environmental, Political

The above list of metrics was further validated by the participants of the Karachi Futures - III focus group. Dr. Adil Nakhoda, upon closing the discussion emphasized on the importance of the metrics presented and encouraged participants to write down what metrics they felt were important.

At the start of the focus group discussion, each participant was handed out two pieces of paper. One of which had the above list of metrics, while the second had an empty table for the participants to add metrics which they felt were important for the city. The participants were further instructed to add metrics as the conversation progressed. After the focus group, the metrics were compiled, and the duplicates were removed. We were able to extract a total of 20 metrics, as listed below.

TABLE 2

METRIC	DESCRIPTION	CATEGORY
Household savings	Household savings can be defined as the difference between a household's disposable income and consumption	Economic
Homeless in Karachi	Number or percentage of homeless people. A homeless person can be defined as someone without a temporary or a permanent place of residence, someone who lives on the streets	Social, Economic
Number of schools and colleges	Number of primary, secondary and higher secondary schools and colleges in the city. This number includes both public and private	Social
Freedom of information	Freedom of information refers to a citizen's right to access of information held by the state. It can be quantified by Press Freedom Index (published annually by Reporters Without Borders), amongst other indices	Social, Technological

Transfer of revenue per capita to KMC	Money being received by Karachi Municipal Corporation from provincial government	Economic
Mental health indicators	Mental health can be defined as a person's condition with regard to their physical and emotional wellbeing. For Karachi, we could get estimates how many people have been diagnosed with mental illness, or how many cases have been registered in hospitals.	Social
Right to Information Requests filed	The Constitution of Pakistan provides in its article I9-A that every citizen shall have the right to have access to information in all matters of public importance, subject to regulation and reasonable restrictions imposed by law. Number of RTIs filed out of Karachi, and the number of such requests entertained and fulfilled can be a good measure of freedom of information	Social
Total budget given to Karachi	Total budget for Karachi, which includes budgets for City District Government Karachi (CDGK), Karachi Municipal Corporation (KMC), 6 District Municipal Corporation (DMCs) and other bodies in charge of development and operation and maintenance of Karachi	Economic
Parks	Total number of public parks in the city, can be a good metric for determining quality of life	Social
Sports grounds	Total number of sports grounds in the city, can be a good metric for determining the quality of life	Social, Environmental
Number of work hours lost in commute	Ratio of average work hours and average commute time, to give a sense of how much time is wasted on average in commutes	Economic
Industrial output	The industrial production index (IPI) is a monthly economic indicator measuring real output in the manufacturing, mining, electric and gas industries, relative to a base year.	Economic
Contribution of non-household head to household income	Household head is defined as the key decision maker and bread earner of the household. Non-household head contribution to household income is important to track changing family dynamics	Social, Economic
Overall productivity	Productivity in economic terms is a measure of how effectively inputs like labor and capital are being used to produce a given level of output	Economic
Employment by education level	Employment in the formal sector distributed by levels of education; primary, secondary, higher secondary, graduate, postgraduate, etc.	Social, Economic
Transaction cost	A measure of the extra effort required to get basic stuff done. This extra effort may be in terms of bribes or unjust fees, or the time required to get things through the government machinery.	Social
Walkability metrics	Some measure of how easy it is to walk from point A to point B in the city	Environmental
Urban heat island effect	An urban heat island is an urban area or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities. The temperature difference is usually larger at night than during the day, and is most apparent when winds are weak. UHI is most noticeable during the summer and winter.	Environmental
Provincial seats for Karachi	Number of seats in Sindh Provincial Assembly for constituencies based out of Karachi. Represents political representation of the city at the provincial level	Political
National seats for Karachi	Number of seats in Pakistan National Assembly for constituencies based out of Karachi. Represents political representation of the city at the national level	Political
Twitter sentiment	Using Tweets you can quantitatively figure out the sentiment around Karachi and different issues which are faced by the city	Social
Internet Penetration	Number of internet users in the city and internet users as a percentage of total population, a good indicator for the rate of digitization	Technological

The core team for Karachi Futures come from diverse backgrounds. The members include Dr. Saad A Khan; Director of Health Sciences at Dadabhoy Institute, Mahim Maher; a seasoned journalist who has covered for 16 years and is currently Editor Digital Properties at SAMAA Digital, Dr. Aadil Nakhoda; a PhD in International Economics and assistant professor at IBA, Sohaib Jamali; founding Research Editor at Business Recorder and a seasoned business journalist, Hisham Sajid; a data science professional doing analytics and digitization at Unilever, Amna Tufail; an education psychology professional currently working in curriculum design at The Citizens Foundation, Puruesh Chaudhry; renowned Futures researcher and founder/president at AGAHI.

The following metrics, in TABLE 3 came forward as a result of formal and informal disasas

TABLE 3

Metric	Description	Why do we want to measure this?	Category
Number of CS graduates	Number of graduates in computer science, software engineering or any IT related field	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Technological, Economic
Number of IT related programs	Number of IT related programs being offered by different universities in Karachi	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Technological
Number of IT grads producing universities	Number of universities that have offer an IT related degree or diploma	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Technological, Economic
Gender Split of IT grads	Gender wise number of number of IT graduates being produced	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Social, Technological
IT companies registering every year	Number of IT companies based out of Karachi registering with P@SHA and PESB every year	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Economic, Technological
Total IT companies	Total number of IT companies registered in Karachi	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Economic, Technological
IT exports	IT exports in dollars of companies based out of Karachi.	The fate of the IT sector is deeply tied to our scenario #4, Karachi 4.O, where Karachi becomes the hub of technology and innovation. Measuring variables that quantify the state of the IT sector in the city is therefore important.	Economic, Technological
Police numbers	Number of Police Personnel in Karachi serving under various outfits	Globally, the ratio of policemen to citizens is used as a measure to gauge the overall effectiveness of the policing force in a city. (Karachi police strength smallest among largest cities' club, says report - Hassan Mansoor, DAWN 2014)	Economic, Political

Rangers numbers	Number of paramilitary rangers personnel deployed in Karachi	Sindh Rangers, although a paramilitary force which is primarily responsible for patrolling the borders, has been used to augment the peace enforcement capacity of the police force.	Economic, Political
Traffic cops	Number of traffic police personnel in Karachi	Just like the policemen to citizen ratio, traffic cops to registered vehicles ratio can be used to judge the adequacy of the traffic police force. This ratio can also be between total road network and number of traffic cops	Economic, Political
Streetlights	Number of streetlights in Karachi	Can be a good proxy variable for measuring the completeness of public infrastructure	Economic
Sewer breakdowns	Number of Sewer breakdowns reported to and fixed by KWSB	A good KPI for measuring the adequacy of the sewage and sanitation system of the city	Environmental, Economic
Schools	Number of schools, both private and public	Number of schools available, along with other metrics like teacher to student ratio are important for measuring the quality of life and availability of basic education	Social
Madrassas	Number of Madrassas or religious seminaries	Madrassas are often seen as low-cost alternatives to schools, finding the geospatial spread of these institutions can be a good proxy variable for determining the socio-economic demographic of that area. At the same time it can be used to the extent to which religion effects the lives of the people living in a locality.	Social
Vocational training	Number of vocational training institutes offering diplomas in vocational training	A good KPI for measuring the availability of skilled labour in the city	Social, Economic
Tuition centres	Number of tuition centers in Karachi augmenting primary, secondary or higher secondary education in Karachi	A good proxy variable for determining the quality of education in the city	Social
Mosques	Number of mosques in Karachi	Can prove to be a good indicator for determining the penetration of religion within the city or within a subsection of the city, It could also be interesting to note the ratio between citizens and mosques in the city, and observe the trend line this creates.	Social
Charged parking	Number of charged Parking spaces and revenue earned through these parking spaces by KMC	A good KPI for estimating revenue generation by the KMC	Economic
Eateries violating food authority rules	Number of cafes, restaurants and other eateries violating rules related to hygiene set by Sindh Food Authority	A good KPI for quality of life and a proxy variable for rule of law	Social, Environmental
Housing units	Number of housing units being built year on year, number of permits issued by Sindh Building Control Authority	A good KPI for measuring the rate of urbanization and population growth in the city.	Social, Economic
Buses	Number of busses, vans available for intra-city travel and commute	A good KPI for measuring the capacity of public transport in the city	Economic
Ubers & Careem's	Number of Ubers running in Karachi and the number of trips completed by these Ubers	A good KPI for measure of the demand for adequate means of mobility, and lack of decent means of transportation	Economic, Technological
Trucks passing through toll plaza	Number of cargo carrying heavy traffic vehicles entering or leaving Karachi	A good KPI for measuring the economic activity in the city	Economic
Intercity buses	Number of inter-city busses, vans and the number of trips which originate and terminate at Karachi	A good KPI for measuring the flux and change of population in the city	Economic
Trains and passengers	Number of trains coming in everyday and the number of passengers they are bringing in, along with the origin of these passengers	A good KPI for measuring the flux and change of population in the city	Economic

Number of flights to and from Karachi	Number of planes coming in and the number of passengers they bring in along with their origin	A good KPI for measuring the flux and change of population in the city	Economic
Billboards	Number of billboards available for advertisement in the city	Can be a KPI for measuring commercial activity in the city	Economic
Cinemas	Total number of cinemas both high-end and others operating in the city, along with the number of people they can accommodate	A good KPI for measuring the access to entertainment options for citizens, an indicator for measuring the overall of quality of life	Social, Economic
Malls	Number of shopping malls in the city, both with and without AC and estimates of footfall received by these shopping malls	A good KPI for measuring commercial and economic activity in the city	Social, Economic
Hospital waste	Amount of hospital waste being produced in tones along with the amount being properly disposed off	A good KPI for gauging the adequacy of the city's waste management infrastructure	Environmental
Recycling units	Number of recycling units and the amount of garbage in tones they process	A good KPI for gauging the adequacy of the city's waste management infrastructure	Environmental
Bottled water sold	Liters of water bottled water sold by various companies like PepsiCo, Nestle etc.	A good proxy variable for assessing the availability of quality drinking water available publicly. The underlying hypothesis being that people will only buy bottled water in large quantity when other sources are deemed contaminated	Economic
Unsafe buildings	Number of buildings declared unsafe for occupation by the Sindh Building Control Authority	A good KPI for measuring the quality of life and assessing the housing situation of Karachi.	Social, Economic
Number of hydrants	A hydrant can be defined as a discharge pipe with a valve which water can be drawn from a water main. Number of water hydrants being operated, both under license by KWSB and without license. MGD of water being pumped and distributed through these hydrants	A good KPI for measuring the adequacy of water infrastructure in the city	Social, Economic
Number of pumping stations	A pumping station can be defined as a machine used to transport water from one place to the other. Number of pumping stations operated by KWSB and their capacity needs to be tracked.	Can be a good proxy variable for measuring the adequacy of Karachi's water supply system.	Economic
Power outages	Number of power outages in the city. This may include blackouts caused by natural events like extreme rainfall, and controlled load shedding.	A good KPI for measuring the availability and transmission of electricity	Economic
Number of strikes	Number of days lost due to a general strike in the city. This may also include strikes caused by different sectors like retail, transport, manufacturing etc.	Can be a good proxy variable for ease of doing business and overall productivity of the city	Social, Economic, Political
Mangrove covered area	Covered area in square kilometer by Mangrove trees	A good KPI for measuring the health of the environmental ecosystem of the city	Environmental
Registered Political Parties	Number of registered political parties operating within Karachi	Can be a good proxy variable for measuring the political inclusion of various ethnic groups within the city	Political
Plastic waste	Amount of plastic waste dumped at trash sites or recycled	A good KPI for measuring consumption levels and commercial activity within the city	Environmental
Jail population	Number of internees at jails within the district limits	A good KPI for quantifying the law and order situation of the city	Social
Big registered businesses	Number of businesses registered in Karachi and the amount revenue they generate, other statistics like employment and tax paid may also be tracked	Number of registered businesses, tax they pay and the number people they employ in the city can be a good variable for quantify the economic and commercial activity in the city	Economic

Online traffic	Number of internet users in the city and the average amount of time they spend on the web. Total internet data in Terabytes consumed by the city	Online traffic or the number of internet users is used globally as a key metric for the rate of digitization of a city (KOTARBA, Marcin. 2017. "MEASURING DIGITALIZATION - KEY METRICS". Foundations Of Management 9.)	Technological
Medical students	Number of medical students studying at public and private universities, this number may not be restricted to MBBS and BDS students not but can be more exhaustive.	Number of medical students can be a good proxy variable for determining the quality medical care available.	Economic
Clinics	Number of clinics in the city with at least one certified doctor	Number of clinics can be a good proxy variable for determining the quality of medical care and generally the quality of life	Economic
Pharmacies	Number of licensed pharmacies in the city	Number of pharmacies can be a good proxy variable for determining the quality of medical care, availability of medicine and generally the quality of life	Economic
Hostels	Number of hostels in the city	A good KPI for determining how student friendly the city is	Social
Restaurants	Number of restaurants, cafes and other food serving establishments in the city	Number of restaurants and eateries in the city be a good proxy variable of consumption levels of a city and the footfall received at these establishments also be correlated with the disposable income of nearby locality	Social, Economic

All in all, 130 metrics are a part of the wish list. We call it a wish-list because this an exhaustive list of data points that ought to be measured for Karachi. Some of them might prove impossible to measure, while for a lot of these we expect to not find any historic data. However, a larger part of this list can be achieved through different means, which will be discussed in the next section of this paper.

How to Acquire these Metrics

We have identified three main sources for collecting metrics

I) Government silos:

A lot of the data from our wish list, ought to be found in government databases or silos, or could be calculated based on data available with different government agencies.

For example, Karachi Water and Sewage Board (KWSB) can be an important source of data relating to Karachi's water and sewerage concerns. KWSB is responsible for the production and transportation of clean water to the citizens of Karachi and management of sewerage system within the city. According to KWSB, nearly three million people in Karachi lack access to piped water and even those connected to a proper water system do not receive a regular, steady supply of water. Over the years, private water tankers have become a major source of water supply for households which can afford to pay for it. KWSB can provide important data regarding metering of domestic customers, tax structure, customers who do pay taxes and those who do not, billing and collection, amount of water collected vs. amount distributed, etc. This will help to track receipts, expenditure and water wastage. Moreover, more than 6 million people in Karachi do not have access to a sewerage system. Many of those with access receive poor quality services. Inadequate sewerage facilities make Karachi susceptible to hotter climate, rising sea levels and flooding. Data from KWSB will be critical in adapting to these risks.[346]

Sindh Building Control Authority (SBCA) is another source of data collection. SBCA ensures that construction of buildings follows the guidelines put down by the Building and Town Planning Regulation as well as overlooks developmental plans such as the Karachi Master Plan. SBCA can provide statistics related to heritage buildings, dangerous buildings, illegal settlements and structures, demolition and licensed professionals such as architects, engineers and town planners. These statistics highlight important information with regards to the landscape of Karachi including construction permit process and records, informal settlements, key urban structures, livability, various land use types in urban and rural areas, etc.[347]

Pakistan Bureau of Statistics (PBS) can contribute the most, if not entirely, towards data from our metric wish list. PBS is responsible for the collection and dissemination of accurate and reliable data, particularly relating to economic and social aspects of the country. It publishes reports and statistics based on primary and secondary sources and administrative records of the government. The Bulletin of Statistics is published by PBS. The Bulletin contains data relating to demographics, agriculture, manufacturing, price and income levels, public finance, education, energy & mining, trade, health, labor, transport and communication, etc. It also provides different types of indices on agriculture, manufacturing, prices, trade and labor productivity. Charts and graphs have also been provided to selected tables to make the data readily intelligible. This data is collected on a monthly, and in some cases annual, basis.[348]

Federal Board of Revenue (FBR) can also

346. Karachi Water and Sewage Board, Environmental Management Framework.
347. "Sindh Building Control Authority," https://sbca.gos.pk/.

prove to be an effective source of data, for example the FBR has record of the shipping manifests of all the ships that dock at Karachi's ports. This can be used to find historical data of number of vessels docking and also the cargo in tons being moved through Karachi's ports.

2) Local/International organizations:
Many organizations have been working on developmental projects in Karachi. Much of the data from our wish list can be found with them or can be extracted from the data compiled by them for the purpose of their projects.

World Bank can provide data on many metrics as it has been working on a diverse range of issues in Karachi. For example, the Karachi Mobility Project aims to access to safe transportation and job opportunities through a Rapid Bus Transit system. In the development phase of the project many indicators were considered including female ridership, number of traffic fatalities, car travel time during peak hours, roads rehabilitated in rural and non-rural areas, number of new professional staff hired and how many of those were female, etc. Many of these are useful for our purpose also. Other projects include metrics such as business environment in Karachi, service delivery, urban management, improved maternal health, early childhood development and managing population growth. [349]

United Nations has many agencies operating in Pakistan, among these are United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations Development Programme (UNDP). In recent times UNDP launched a Youth Employment project in Karachi which aims to provide specialized training and employment in the garment industry to young men and women. Data studied for this project includes demographics, percentage of youth education, and percentage of youth with vocational skills, garment industry, opportunities for skill development and access to job opportunities.[350] Other UN projects relate to budget allocations, access to social services, marginalized people in terms of housing and social services, small and medium sized business development, women participation in business, food security, etc. [351]

Shehri-Citizens for a Better Environment is a local organization formed in 1988 for the purpose of giving concerned citizens the space needed to voice their concerned and contribute towards a healthy and clean living environment. One of the main objectives of Shehri is to research and gather information regarding the physical and social environment of Karachi, laws governing the same and disseminate this information to create public awareness. They conducted extensive research in an attempt to preserve parks in Karachi. Parks and Amenity Spaces of Karachi is a three volume book published by Shehri. It uses data to map out the location and types of recreational facilities, such as parks, playgrounds and amenity plots, in all areas of Karachi as well as highlight the laws governing the usage of these facilities. Information is provided in the format of KDA/CDGK lay out maps.[352]

3) Technology:
The most promising way of getting the required data is through technology. With recent advancement in open source technologies and ever-increasing digitization of Pakistan, this method will prove to be increasingly effective in the days to come. A lot of city level data can be extracted through technology, a paper by the MIT Senseable City Lab explores how you can get socioeconomic data about a city using restaurant data, pulled from online forums like Foodpanda. The researchers were able to predict neighborhood level attributes like number of firms,

348. "Pakistan Bureau of Statistics," http://www.pbs.gov.pk/.
349. "The World Bank in Pakistan," World Bank. https://www.worldbank.org/en/country/pakistan.
350. United National Development Programme, "UNDP Forging New Partnerships in Karachi to Boost Youth Employment - United National Development Programme."
351. "United Nations Pakistan," https://www.un.org.pk/
352. Shehri, "Parks and Amenity Spaces of Karachi," https://www.shehri.org/publications.html

nighttime population, daytime population and consumption.[353]

Using the Google Maps Platform is another source for obtaining city level data. You can use the Google Directions API to find the time required to travel from point A to point B, data which if collected historically over a period of time can be a good indicator for traffic congestion. Expanding the routes travelled to major commute route across the city, we will be able to get the average commute time in the city.[354] Google Places API, we can find data about different restaurants, cafes, offices, hospitals, schools, gas stations, universities etc. The number of reviews and ratings of a place can further be indicators of the footfall in that area.[355] Using data for places of interests from Google Maps, and combining with points of interest (POI) data from the open-source Open Street Maps, we can divide urban areas into different functional areas like educational and health, finance and insurance, traditional manufacturing etc. with a very high level of granularity.[356]

Other than using the Google Maps Platform, the feature rich Bing Maps platform by Microsoft can also be used for finding useful data. We can use the Bing Maps Isochrone API to determine a travel-time or travel-distance polygon for the area that you can reach, using time-specific or distance-specific isolines. For example, you could hypothetically figure out all the petrol pumps that are say, within a 10 minutes' drive.[357]

Satellite images can also be used as a source of city-level data. Nighttime light intensity is increasingly become a source of determining rate of urbanization and urban sprawl and is a strong proxy for economic prosperity.[358] Satellite Imagery can also be used for finding urban green spaces within a city. Berliner Morgenpost, a German language newspaper, with the help of Google NewsLab and Google Earth Engine analyzed 185 Landsat satellite images and used a measure called NDVI (Normalized Differenced Vegetation Index) to figure out which city is the greenest in Germany. The index shows how much plant green (chlorophyll) is present in one place.[359]

How do we find what is important

130 metrics are lot of data, if we get these data points the next step would be figuring out how many metrics are actually important of the city and quantifying their impact. The Pakistan State of Futures Index (PK-SOFI), is a weighted statistical model that uses a 10-year forecast of 30 metrics to quantify what Pakistan future might look like.[360] How do we get from 130 to more or less 30 variables? There are two ways:

I) Realtime Delphi:

The Realtime Delphi (RTD) is a relatively new and efficient method for collecting and synthesizing expert opinions. Respondents can -- and are encouraged to -- revisit the questionnaire as many times as they want. Each time, they are shown their own responses as well as the updated answers of the others, and they can revise and change their own inputs based on this feedback. RTD is an excellent method for quantifying out 'what is important' and was successfully used by AGAHI and the Foresight Lab in assigning weights to the 30 variables in PK-SOFI. An expert panel, like the one in our focus group can be created and their opinions on the importance of these 130 metrics can be collated and quantified using a custom designed RTD survey. Foresight Lab already has a proprietary RTD tool that can be accessed on paksofi.org which can be used for this.

353. Lei. Dong, Carlo. Ratti and Siqi. Zheng, "Predicting Neighborhoods' Socioeconomic Attributes using Restaurant data," (2019).
354. "Directions API," Google Maps Platform, https://developers.google.com/maps/documentation/directions/intro#DirectionsAdvance.
355. "Places API," Google Maps Platform, https://developers.google.com/places/supported_types#table1.
356. Hu. Yunfeng and Han. Yueqi, "Identification of Urban Functional Areas Based on POI Data: A Case Study of the Guangzhou Economic and Technological Development Zone," (2019).
357. "Isochrone API," Microsoft, https://www.microsoft.com/en-us/maps/isochrone.
358. World Bank Group, Transforming Karachi.
359. "These are Germany's greenest cities," Berlin Morgenpost, https://interaktiv.morgenpost.de/gruenste-staedte-deutschlands/.
360. "Pakistan State of Future Index – Anticipating 2027," AGAHI (2017).

2) Dimensionality Reduction:
Dimensionality reduction is the transformation of high-dimensional data into a meaningful representation of reduced dimensionality. Ideally, the reduced representation should have a dimensionality that corresponds to the intrinsic dimensionality of the data. The intrinsic dimensionality of data is the minimum number of parameters needed to account for the observed properties of the data.[361] Dimensionality reduction algorithms and techniques like Factor Analysis can be used for figuring out quantitatively what data is important for us. However, in order for us to apply dimensionality reduction methodologies, we would first need to collect historical data for our metrics. As opposed not necessarily having all the data with us as is the case with RTD.

Concluding Remarks

Karachi is a huge and incredibly complex city, with its size comes an assortment of problems which have been thoroughly highlighted in this paper. Part of the problem is the scattered debate around the city. Through the focus groups and meetings conducted by AGAHI for Karachi Futures, we realized the discourse around Karachi is prone to bias. Bias induced by the socio-economic position, academic background and personal experiences of the person presenting the argument. We identified a need to break away from this 'silo mentality' and looking at Karachi from the 'data lens' to minimize the effects of cognitive bias and make the discourse around the city more objective. After extensive research both primary and secondary, we have identified 130 metrics or data points that ought to be measured, we further highlighted the sources for these data points and finally how to go about finding what is actually important for Karachi. This metrics wish list is by no means exhaustive, we might have missed out on something very important and at the same time there might have been things which could be overemphasized. However, the purpose of this paper is to explore out how to look at Karachi, this paper serves as more of a referencing tool and as a white paper of initiating a quantitative analysis of the city. Not only that, it also highlights new and innovative methods for finding data on Karachi and conducting research in a cost and time efficient way; in doing so help AGAHI and the Karachi Futures actualize a Karachi State of Futures Index sooner than later.

361. Postma. Eric, Herik, Jaap and Maaten. Lauren, "Dimensionality Reduction: A Comparative Review," (2009).

Looking Back in Time through Satellite Images: Finding the Path of the Hakra River Palaeochannel

DR. WAQAS A. QAZI

Satellite imagery and the science of Earth remote sensing (the process of deriving and analyzing information about an Earth surface feature without being in physical contact with it) has witnessed an explosive growth in the last couple of decades. More and more applications of these datasets are cropping up, ranging from agriculture, disaster mitigation and management, ecology, urban expansion, water quality, river morphology, and the list is endless. The availability of multi-year and multi-scale satellite datasets can now allow us to analyze and solve challenged on the global scale.

Imaging satellites observe the Earth through two basic mechanisms: either they could be "passive" satellites which record the reflection of sunlight from the Earth's surface, or they could be "active" satellite which send their own radar signals and measure the reflection. Active satellites have the advantage of weather and time-of-day independence, however they are more complex to process and analyze. In Pakistan, overall, we have many trained human resources to process and analyze passive optical imagery, but the understanding and interpretation of active radar imagery required specific skillsets, which are not yet in full use within the local satellite image analysis and remote sensing community.

A few years ago, we conducted a collaborative research using both passive optical and active radar data to tackle a challenging problem in geophysics: finding the path of a dead river channel. This research was based on an interesting property of active radar imagery, in that in very dry soil conditions, the satellite signal can penetrate inside the soil, and the resulting imagery can show us features from the sub-surface. With this unique capability in mind, we set out to trace the path of the dried-up river (called as "palaeochannel" in the technical parlance of geophysics and geology) Hakra in the Cholistan desert in Punjab. The Hakra Palaoechannel is of immense significance in this area, not only because of its capacity for possible groundwater storage and canalization, but also in terms of archaeology and heritage. For the Hakra palaeochannel identification, satellite imagery was acquired for the area of interest from USGS (United States Geological Survey) and ESA (European Space Agency), and the specific remote sensing data processing procedures were implemented. After the satellite data were processed, a specific kind of "data fusion" technique was implemented, which combines the data into one image, bringing out the best features from both datasets. From this fused image, we were able to interpret and identify the location of the Hakra palaeochannel.

Any scientific study required validation of the results, and in this case we validated our results with the field-measured survey datasets of water quality, as well as cross-validating with the location of dried wells in this area. It is interesting to note from the archaeological point of view as well that the forts in this area are aligned with the axis of the discovered river channel.

ASIA REIMAGINED

SOHAIL INAYATULLAH

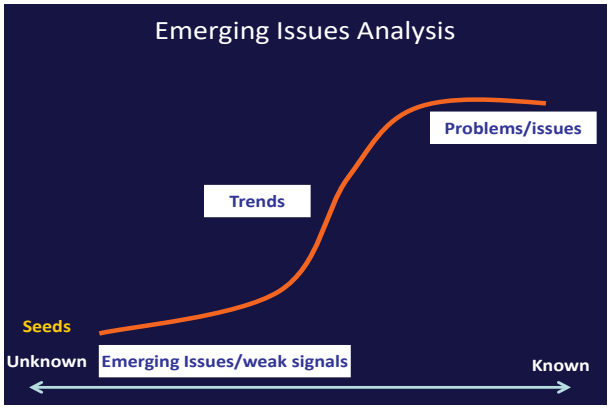
This piece is both methodological - how to do futures - and also content based: what might the future look like? A few years back, I was asked by a futures team from the Office of the Prime Minister of a North American nation to provide a report on the futures of Asia specifically focused on social emerging issues. This report eventually became a book titled, Asia 2038: ten disruptions that will change everything.

While we touched on scenarios for the futures of Asia, we saw this as an opportunity not just to explore alternatives but to help shape the future, to be active participants even while we did our best to objectively present the emerging issues we identified. I thus began the report with my own narrative, my experience in growing up in Asia. Most salient was a story from high school when I was playing a basketball match in Singapore. After the game, we were offered a range of narcotics - which we refused - and during the match spectators sitting in the viewing stands routinely took younger students to the toilet where they would flush their heads. This would be unimaginable in Singapore and much of Asia today. Using this narrative to create a sense of how the last forty years had changed, we then focused on the next twenty.

Asia, it is worth noting, is both a region and it is imagined. While our focus has been East Asia, Southeast Asia, and South Asia our concern is the changing imagination of Asia, from being constructed as the site of exotic and the irrational by the West to an enhanced and heightened sense of agency. This is the shift from catching up to becoming the site of change and disruption, from the programmed future to the created future.

EMERGING ISSUES ANALYSIS

To structure disruption and creation, we used Graham Molitor's emerging issues analysis - weak signal that could develop into strong trends and eventually public policy issues. Our goal, and as requested by the government in question, was to help them see the future, to have a radar with which to spot the changing future.



The Molitor S-curve

CAUSAL LAYERED ANALYSIS

Once we identified our emerging issues, we used Causal layered analysis to describe and deconstruct the issues. But why this particular method? This national government already had considerable experience in scenarios and economic data. We thus wanted to add value by linking the litany - emerging issues - with the systemic changes that these issues would impact, and the deeper cultural/worldview shift in Asia, and most significantly, the likely change in the core metaphors that define what it means to be Asian. We thus wished to link data with story - to articulate disruptive issues and how they would change how Asia would be defined.

LAYERS OF CLA

Thus, our methodological goal was to provide a sense of the changing horizons and ensure epistemological depth, not just a litany of "facts" about the changing world or a only number of uncertainties used to develop scenarios.

We focused on the disruptive nature of the issues and the narrative shift that would result. Given our bias to imagine and create a positive future for Asia, we also explored how challenges could lead to institutional shifts that would benefit the region.

THE DISRUPTIONS

We articulated ten core disruptions, five of which we explore in depth.

1. CLIMATE CHANGE CREATING INSTITUTIONAL FORESIGHT

One of our core disruptions was climate change. While we know that this would likely lead to over 32 trillion dollars in financial losses, not to mention the end of the Asian dream, we also saw that this could potentially create a new foresight culture throughout Asia. Sea-level rise - the possibility of sinking cities - could create a network of foresight capacities throughout Asia. While currently, Singapore, Malaysia, South Korea have all developed foresight programs, and Taiwan, Thailand, Pakistan, Brunei have emerging programs, we imagined a future where there would be an Asian-wide foresight network, using real time information not only for early warning systems, but also for sharing data to create new social and financial opportunities: risk mitigation, to begin with, and financial and social wealth creation in conclusion. The choice is very clear: "drown or swim together." We summarize this emerging issue in the following CLA table.

2. THE EXTENDED ASIAN FAMILY

Climate Change and the Future		
LITANY	Single bottom line eventually leading to system collapse	Triple bottom line
SYSTEM	Nature as externality	Smart, inclusive and green city planning
WORLDVIEW	Industrial profit based development Presentism	Sustainable development Foresight
METAPHOR	The dirty coal mine	Clean, green Asia From the ancestirs to future generations

A second core disruption, we saw, was the shift in the Asian family. We saw this in stages. First was the rise of Asian women - more wealth, more equity, more political power, and most significantly, definitional power. Second, was an extension of the extended Asian family to include LGBT rights. We understand there would be pendulum shifts back and forth, but generally we saw the resilience of Asian culture overcoming conservative patriarchy. The final extension to the Asian family was the including of robots. They would move from pets to partners. We of course already noted that a few individuals had married their robot, their hologram, and so forth.

Putting this together as a CLA of before and after, we framed it as such:

The New Family		
	TODAY	**2038**
LITANY	The nuclear plus extended family	New Types of family
SYSTEM	Causes include nation building, traditional models of heirarchy based on agricultural and industrial economies	Causes include economic growth, robotics, artificial intelligence, the rise of digital natives and the LGBT and feminist movements
WORLDVIEW	The tradition of the text	Diversity and choice
METAPHOR	The arranged marriage One size fits all	The love marriage Finding the perfecct fit

We saw the Asian family as thus continuing as the backbone of the cultural economy well into 2038 but with far more flexibility (given that all will be engaged in wellness practice such as yoga and Pilates)

3. CASTLE TO PLAYGROUND

A third core disruption, we saw, was the shift from industrial modes of pedagogy - the castle with surrounding wolves (unhappy stakeholders) or the cog in the factory - to the ecological playground. The factory model has been useful in the copy-paste phase of production, but in a world economy valuing difference, uniqueness, it would be critical thinking, creative abilities, and an ability to simultaneously in and out of the box that would be crucial. Thus, while the significance of education would not disappear, its institutionalization in the Ministry would be dislodged. Virtual gaming, holograms, workshops, facilitation, whole of body-mind-spirit learning would likely become paramount by 2038.

New types of learning		
	TODAY	**2038**
LITANY	The job	The client
SYSTEM	Skills for and industrial economy Theory based Credential	New skills for a knowledge economy Facilitate learning Adaptability
WORLDVIEW	Lecturer-centered	Student-centered
METAPHOR	The cog in the factory	The knowledge navigator in the global playground

4. HEAD TO THE GRINDSTONE TO WANDERING

This would begin to create what Seongwon Park has called the wandering society and what James Dator suggested be called the wondering society. With wealth creation, the rise of the middle class, new information technologies, the rise of women, we imagined a dislodging of the traditional life path of student-work-householder-retirement and death. Throughout and between these phases would be periods of wandering - globally and virtually. Learning thus would not only be directed - job based - but also exploration - "to boldly go where no one has gone before."

The wandering society		
	TODAY	**2038**
LITANY	Low number of outbound travelers Low percentage of society engaged in virtual exploration	High number of Asians engaged in tourism, virtual exploration and wanderiing
SYSTEM	Continued rise of South Asia Beginning fatigue with traditional jobs Challenge to the catch-up economic model	New wealth and the end of the catch-up model New virtual technologies Advanced tourism Desire for post-material values
WORLDVIEW	Information/knowledge economy	Dream society
METAPHOR	Knowledge workers Gold collar workers	The wanderers Digital Shamans

As with all transitions, these would be contested. In one workshop for the government of Malaysia, four scenarios were developed. In the first, the metaphor was "force-feed." Curriculum developed by the Ministry was elite professors and fed to students. Since it was past-based, as the world changed, it was unable to adapt, and thus had become a used future. In contrast, the curriculum from the student perspective was "all you can eat" - i.e, endless choice, global education, learning from many sources. However, for professors this could be exhausting. The future they imagined was a mixture of physical and virtual, a mix and match. However, the Minister of Education (with its numerous stakeholders) was more concerned about junk food. Their preferred future was the "healthy buffet." The buffet has numerous choices, but a education board of the learned ensures that all food groups are presented in the right amount and that the meal leads to enhanced creativity, not sleepy afternoons.

MALAYSIAN HIGHER EDUCATION FUTURES			
LECTURE	LEARNING FROM EVERYWHERE	SMART PEDAGOGY	WISDOM OF CHOICE
EXAM BASED	SELF-DIRECTED	PARTNERSHIPS	DIRECTED PARTNERSHIPS
CONFORMANCE AND CERTIFICATION	DEMOCRATIZATION	BLENDED LEARNING	WHOLESOME
FORCE FEED	EAT ALL YOU CAN	OMNIVORE	NUTRITIOUS BUFFET

Open Skies and Shared Umbrellas: Towards and Asian Confederation

But to continue the cycle of innovation, and not see the return of "snakes and ladders," i.e. the rise and fall of Asia, there would need to be a shift in what it means to be Asian as well as institutional support of cycles of virtue, in creating green equitable futures. This is crucial so as to avoid a return to the history of Empire, of warring states, as fragmentation was all too possible. In our report, while understanding geo-politics, we instead focused on an Asian union as the seed of change that could accelerate innovation and peace.

In workshop discussions, two options were presented. The first soft, the second institutionally strong.

In the first:
Parts of Asia move up in the world ranking. New Asian currency and other financial agreements emerge, and Asian culture softly spreads, but the nature of the world economy does not change dramatically. There are still core and peripheral areas. An Asian Union emerges, but only in terms of the movement of trade and finance, as nation-states remain strong. The regulation of green spaces, water and energy remains haphazard. Wealth does improve equity somewhat and sustainability has moved up the agenda. There are limited victories on issues of refugees and the poor. By and large, collective identity remains important. A headline for this future, for example, as a title for a best-selling book was: “Learn how you and your group can become rich.”
And in the second:

In this future, Asia leads the world in green technological innovation. Instead of a world of have-nots and haves, in this future, equity would dramatically increase over the next 60 years. Learning, in the sense of capacity building, would be a key component in the transformation of Asia. Green cities, green buildings would become the norm, enhancing productivity and reducing illness. Health would emerge from using the best in all medical traditions, western to Chinese to Ayurvedic. An Asian union would emerge and the geopolitical fault lines that currently are the basis for conflict throughout Asia would be smoothed over. Asia would rise to the challenge. A creative elite would spearhead this paradigm change. As an exemplar of this future, the bestselling book in 2060 in Asia would be called, “Through reflective learning, Asia creates the dream.”

This would be the beginnings of a post-capitalist Asia. A CLA on this emerging issue follows.
We saw this as an emerging issue in that numerous Prime Ministers have endorsed this vision. However, the rules have yet to be created. The vision beckons. However, we saw this as realistic in that the gains are astro-

nomically high and creating a confederation would least to disastrous consequences

In our view, the benefits of integration into an Asian confederation would be many: economic, due to the enhanced ability to compete with other integrated regions; environmental, due to the integrated approach in resolving issues such as pollution that already cross national bor-

Asian confederation		
	TODAY	**2038**
LITANY	ASEAN, APEC, SCO	The Asian Economic Union/Confederation
SYSTEM	National leaders restricting movement of labour Lack of regional organizations	Economies of scale, innovation and higher productivity through the movement of persons, ideas and capital Focus on global and regional governance
WORLDVIEW	Modern nation-state system Focus on past wars and injustice	Ecology of nations, cities, communities, corporations and indivisuals Focus on future benifits
METAPHOR	Nation states One restaurant change	A gaia of organizations and institutions The Asian food court

ders; security-related, due to better cooperation in fighting crime; educational, due to keeping the best and brightest in Asia and creating social and technological innovation; political, due to removing cross-country disparities that can lead to conflict; demographic, balancing ageing societies versus overpopulated societies. If, on the other hand, new coordinated governance does not occur, we can anticipate greater conflict, environmental destruction, and economic under-utilization.

Certainly this emerging issue, and indeed vision of Asia, would change Asia and the world, leading to greater wealth, greater equity, and a greater likelihood of a wiser and peaceful society. The weak signal is there, but is there enough of a push and a pull for this to become a trend and an institutional reality?

Indeed, an easy to identify third scenario is possible. This is the descent into dystopian madness. The signs of this scenario are already present there: geo-political battles in Kashmir, Hong Kong, and Taiwan, to mention a few. Rising inequity and catastrophic climate change could derail the optimistic vision. In the downwards spiral, realpolitik leads to a "grab what you can" approach.

Alternatively, and hopefully, the scale of the crisis of leads to emerging wisdom where all are to some extent winners.

Concluding Remarks

Which future will result? This becomes the methodological question. Emerging issues analysis helps us notice and magnify possible realities. Using CLA we create categories to challenge the current and then create alternative futures. That, indeed, is the purpose of futures thinking and the futurist. While we have outlined many possibilities and a number of shared desired visions for Asia 2038, none of these futures will simply emerge. All of them have to, and will be, created. Wherever we put effort, that future is more likely to become our new reality. The task then becomes to imagine and create desired futures, one person at a time. As the South Asian philosopher P.R. Sarkar has written:

The flame of a lamp lights up countless lamps. The touch of a great personality wakes up innumerable sleeping hearts ...That is why I say, the future of the human race is... strikingly resplendent.

REALTIME DELPHI TRAINING SESSIONS FOR THE ACADEMICS

MoU's between AGAHI and Quaid-i-Azam University (QAU), Islamabad, Institute of Space Technology (IST), Islamabad, National University of Modern Languages (NUML) Islamabad, COMSATS Islamabad, University of Lahore (UoL) Lahore, Sanjan Nagar Institute of Philosophy and Arts, Lahore, University of Balochistan (UoB) Quetta, Balochistan University of Information Technology, Engineering and Management Sciences (BUITEMS) Quetta, Institute of Business Administration (IBA) Karachi, Institute of Management Sciences (IMS) Peshawar was signed and apropos to the Memorandum of Understanding, a training session on Realtime Delphi tool for Master Trainers was organized at different Departments of the above mentioned Universities. In house team designed the RTD study for the training purpose; included variables from Pakistan State of Future Index 'Anticipating 2027'. The session was designed to engage the academia to develop some basic level comprehension on the Realtime Delphi Tool - This covered the following areas:

- What is the Foresight Lab platform?
- What is Realtime Delphi (RTD) technique?
- How to use Realtime Delphi (RTD) decision making tool?
- Demonstration of the State of Future Index (SOFI) Variables
- Explanation of the key steps to create and view Realtime Delphi (RTD) study
- Export of data for further analysis

The Training Manual was shared with these Universities, which has complete details of the above. Total 194 Academics have been trained from these universities: The training session held at these esteemed institutions helped us provide an understanding of the preparation, action steps and difficulties that are inherent within the Delphi study and how academia can perform better and improve their knowledge significantly

S. No.	Trainings	Date	Participants
1.	Institute of Space Technology (Islamabad)	22nd March 2019	26
2.	Quaid e Azam University (Islamabad)	10th April 2019	23
3.	COMSATS (Islamabad)	16th April 2019	25
4.	University of Lahore (Lahore)	17th April 2019	22
5.	Institute of Management Sciences (Peshawar)	22nd April 2019	19
6.	Institute of Business Administration (Karachi)	25th April 2019	06
7.	Sanjan Nagar Institute of Arts and Philosophy (Lahore)	16th May 2019	02
8.	BUITEMS (Quetta)	21st June 2019	19
9.	University of Baluchistan (Quetta)	21st June 2019	27
10.	National University of Modern Languages (Islamabad)	29th August 2019	25

within the desired course of action through the use of this tool.

Observations from the Session

- All the participants successfully created their Login Id
- All the participants successfully created their profile
- All the participants were able to connect the relationship with the data in the RTD and its projection in terms of Futures, however the interest inclination was on the low side
- The participants showed their enthusiasm to work on the RTD decision making tool, there were no observations in this regard
- Since all the participants were using RTD decision making tool for the first time; they found it easy to comprehend and its relevance
- The overall impression of the participants was good

Lesson Learned

- Training presentation was shared well in advance which provided a guide line to all the participants and however they were little ready to conduct the exercise during the session.
- Digital copy of Pakistan State of Future Index 'Anticipating 2027' shared to develop some basic level of understanding on how the different variables are linked to a discipline/ department.
- It was appreciated that RTD Training Completion Certificate was distributed among the participants at the end of the session.
- Participants were required to have Laptop or Desk Top for the training session however 9 participants did not bring or had no laptops or desk tops for participation in the ToT - RTD.
- The overall impression indicates that there were less numbers of faculty members as compared to students or graduates of start-ups.

Recommendations

It is recommended that we reorganize a similar training with the faculty to improve the comprehension of the decision making tool and its relevance with their respective domain. The academic:

- Can collaborate with stakeholders anywhere in the world on his/her research idea
- Contribute his/her dataset and allow peers to provide collective insights on the research topic
- Extract insights from the research tool in different formats
- Mentioning the use of this tool in his/ her publication would provide greater weightage with the policymakers in advance economies
- This foresight research tool is free for all our partnering universities across Pakistan
- Connect research directly with the policymaker/the decision maker for more relevance

The training conducted on RTD (real time Delphi) software in different universities brought back multiple feedbacks which caters technical issues faced by the trainers, their learning experience and expectations and the technical understanding of software. Main purpose of RTD software was to provide an understanding of the preparation, action steps and difficulties that are inherent within the Delphi study and how academia can perform better and improve their knowledge significantly through the use of this tool. The technical issues required practical implementation of software as well as a manual to help the beginners understand the situation. Trainers were confused about the connection between RTD and their respective knowledge areas.

From the received feedback, there is a need to improve the connectivity and understanding of RTD in academic institutions.

CONTRIBUTORS

Sadia Tariq

Has been working as a research assistant in the Philosophy department since 1997. She did her MA in Economics from Punjab University in 1994 and MSc. in Social Policy and Planning in developing countries from London School of Economics in 1996. Currently the focus of her research and writing is the area of intelligent restructuring of the existing gene-based mind of human beings through mental tools.

Hisham Sajid

A data science professional currently working in analytics and automation at Unilever Pakistan, where he partners with different functions to deliver excellence through data and technology. Prior to this he worked at SAMAA Digital as data journalist where he worked with the digital media team to create interactive news stories for the web. For his work as a journalist, he was awarded the Best Data Journalism Portfolio (online) award by Media Matters for Democracy. He has done his BS in Computer Science from the Institute of Business Administration, Karachi.

Amna Tufail

Has completed her B.A. Social Sciences and Liberal Arts from the Institute of Business Administration. Having majored in psychology, her research interests primarily lie in studying the role of various social contexts in social, emotional and cognitive development. She is currently revising the Social Studies curriculum at The Citizens Foundation focusing on incorporating 21st century skills and hands on learning opportunities and collaborating with the Sindh Education and Literacy Department to revise General Knowledge books of Sindh Textbook Board.

Dr. Waqas Sajid

Holds a PhD from University of Colorado, Boulder, USA, and has been an Assistant Professor for many years at Dept. of Space Science, Institute of Space Technology (IST), Islamabad, Pakistan, where he initiated the Radar Remote Sensing group, and is one of the founders of the Geospatial Research & Education Lab (GREL). He considers himself as an Earth Scientist or Remote Sensing Scientist, with broader research satellite image processing & analysis, satellite oceanography, forest biomass, Earth system study and modelling, and scientific programming. He is an alumnus of Pakistan National Physics Talent Contest (NPTC), an alumnus of the Lindau Nobel Laureate Meetings, and a Fulbright fellow. From 2013 – 2017, he has been the Pakistan National Point of Contact for Space Generation Advisory Council (SGAC). He was an invited speaker at the TEDx Islamabad event held in Nov., 2014. He also served as a mentor in the NASA International Space Apps Challenge Islamabad events in April 2015 and 2016. He was an invited panelist at the School of Tomorrow event in Karachi, held in Nov., 2018. He is a reviewer for many renowned peer-reviewed journals in the field. He blogs at Earth Enable (http://earthenable.wordpress.com) on topics related to remote sensing, earth observation, scientific programming, and academic publishing.

Dr. Sohail Inayatullah

A political scientist and futurist, Sohail Inayatullah is Professor at Tamkang University in Taipei (Graduate Institute of Futures Studies), Associate at Melbourne Business School (University of Melbourne), and Adjunct Professor at the University of the Sunshine Coast (Faculty of Social Sciences and the Arts). In 2015 he become the first UNESCO Chair in Futures Studies at USIM, Malaysia. He is a researcher at Metafuture.org, an international futures think-tank. He received his doctorate

from the University of Hawaii in 1990 and since 2001 has been the Editor-in-Chief of the Journal of Futures Studies and on the editorial boards of Futures, East West Affairs, World Future Review, and Foresight. He has written more than 350 journal articles, book chapters, encyclopedia entries and magazine editorials. He has also written and co-edited twenty-two books/cdroms. His latest (2018) book is Asia 2038: Ten Disruptions That Change Everything. In 2010, he was awarded the Laurel award for all-time best futurist by the Shaping Tomorrow Foresight Network. In 2011, he was awarded an honorary doctorate by Universiti Sains Malaysia, Penang.

Syeda Hajirah Junaid

Is a freelance Researcher of South Asian History in Pakistan. She is currently doing her MPhil in History from Quaid-e-Azam University and also has an MBA in Marketing from NUST Business School. For the past three years she has been working on the long-term impact of World War II and Partition of British India on the future generations of Pakistan. She has written and published research papers for Oxford University, Warwick University and National University of Singapore. She is also translating A.R.Khatoon's Biography "Adeeba" from Urdu to English (published in 1966).

Kainat Younas

Has done her M.Phil. in Defense & Strategic Studies as well as her M.Sc. from Quaid-e-Azam University Islamabad, Pakistan. She attended the Indo-Pacific Week Conference in Australian National University at Canberra, Australia (2017). She also worked as Master trainer in recent elections with the collaboration of FAFEN & SSDO. She also taught political science and civics at Govt. Degree College Sihal. Kainat has also worked with AGAHI Foundation as a research fellow. She also writes for South Asian Voices initiated by Stimson center Washington D.C. Her research interests include domestic politics, non-traditional Security aspects and Indian Govt policies towards Jammu & Kashmir.

Zaeem Yaqoob Khan

Is an academic, marketer and Higher Education manager with over 16 years of experience in Pakistan serving different roles in the HE sectors. He has a graduate degree in Computer Science from University of Engineering & Technology, Lahore and has recently completed requirements for MS in Development Studies from Information Technology University (ITU) besides earning graduate credentials in Data Economics and Development Policy from Massachusetts Institute of Technology (MIT), USA. Currently, he is working at Beaconhouse National University (BNU) in the capacity of Executive Director of Student Affairs & External Relations. Zaeem is the 2012 Fellow of the International Visitor Leadership Program (IVLP) by the US Department of State and has done advocacy, research and training projects with the World Bank Group, German Corporation for International Cooperation (GIZ), The Danish Centre for Culture and Development (CKU) and United Nations Educational, Scientific and Cultural Organization (UNESCO) in Pakistan.

Dr. Izza Aftab

Is an Assistant Professor and Head of Economics Department at Information Technology University's School of Humanities and Social Sciences. She is the architect of the most cutting edge degrees being offered in Pakistan currently – an MS in Development Studies with a focus on Development, Technology and Policy and a BS in Economics with Data Science. Dr. Aftab is a technical reviewer for a host of local and international journals. She has also

advised provincial governments on economic issues. Dr. Aftab's research interests include firm level innovation, CPEC, structural macroeconomics, economics of innovation, Sustainable Development Goals and child protection. She has published journal articles and book chapters in the aforementioned. Dr. Aftab is the Director of the "SDG Tech Lab" setup in collaboration with UNFPA and UNDP. Her work there focuses on using computer vision and machine learning to detect and predict slums across Pakistan, followed by micro-econometric profiling of households in slums. Dr. Aftab has done her PhD in Economics from The New School of Social Research at The New School University on a Fulbright.

Yusuf Hussain

is a technology enthusiast, entrepreneur and angel investor who previously served as CEO Ignite, where he launched programs like DigiSkills.pk, an online freelancing training platform that enrolled over 780,000 trainees in a year and three months, who will earn an estimated $250 mil by program end. Also under this tenure, Ignite established a nationwide network of incubators, with over 300 incubatees and graduates, in which the private sector invested almost seven rupees for every rupee funded by the Government. A revamped Seed Fund was able to help commercialize or obtaining downstream investment for its funded startups at an unprecedented level in the areas of energy, health, education, retail, education and agriculture.

Previously he was co Founder and CEO of CresSoft, Inc, a boutique B-B e Commerce Startup, with several FORTUNE 500 and GLOBAL 2000 clients in the telecom and chemicals verticals. As Managing Director PSEB, the apex Federal Government body for the promoting of the IT industry, he launched a number of initiatives, which helped the IT industry attain 55% annual export growth. He regularly writes about subjects related to innovation and entrepreneurship and has helped launched chapters of TiE, The Indus Entrepreneur, and Singularity University. He has also been appointed Goodwill Ambassador by the City of Houston, Fellow of the RSA, and received a National Leadership Award by the USA National Republican Congressional Committee.

Trend Impact Analysis – Reviewers

Khalid Banuri, Guldad Khan, Naima Atiq, Fariha Anwar, Amna Sabahat, Naeem Murtaza, Anas Abdullah, Kabir Kamran, Brigadier Aslam Khan, Amir Jahangir, Saud Bangash, Bilal Qureshi, Umer Shahid, Dr. Saad Khan, Hisham Sajid, Dr. Aadil Nakhodka, Muhammad Bilal, Dr. Tariq Ahmed, Sadia Tariq, Asif Iftikhar, Tanzeela Mazhar, Dr. Shagufta Jabeen, Usman Asif, Umer Hussain, Zain Umar, Raheel Sheikh, Muhammad Azhar, Sohail Aman, Mariam Amir, Naeem Khalid Lodhi, Ross Masood Hussian, Rubia Javeed, Maria Khan, Zafar Iqbal Cheema, Sadia Kazmi, Sameha Raheel Qazi, Bakhtawar Mahmood, Munir Goraya, Imrana Jalil, Tahir Dhindsa, Talat Shabbir, Ameer Abbas, Asif Akhtar, Fereeha Idris, Zahoor Buledi

TEAM

Puruesh Chaudhary
Commodore Muhammad Azhar
Humzah Haroon
Mazia Mashkoor
Umer Hussain
Hassan Qazi
Rubia Javeed
Zain Umar
Maria Khan
Hassan Nasir
Saweed Tariq

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