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Manufacturing And Services Sectors As Engines For Economic Growth: A Time Series Econometric Analysis In Pakistan

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Abstract
The study aimed at assessing the impact of Manufacturing in terms of Large Scale Manufacturing (LSM_t) and Small Scale Manufacturing (SSM_t) *and S*ervices Sector in terms of Gas (G_t), Electricity (E_t), Telephone (T_t) as Communication Services and Vehicle (V_t) as Transport services on economic growth of Pakistan **(**GDP_t**)** from 1994-95 to 2020-21. In this regard, Economic analysis was performed by employing econometric techniques and tests i.e Augmented Dickey Fuller (ADF) Test, Ordinary Least Square (OLS) Regression, Autoregressive Distribute Lags (ARDL) Model, Bound Test, Error Correction Mechanism (ECM), Variance Inflation Factor (VIF), Heteroscedasticity Test, Lagrange Multiplier (LM) Test, Normality Test, Granger Causality Test, Impulse Response Function and Wald Test. Findings revealed that respective variables (GDP_t, LSM_t, SSM_t, GAS_t, E_t T_t, V_t) were stationary at level I(0), I(1) and I(2) order of integration in the model. OLS regression followed by ARDL indicated positive and significant impact of SSM, GAS and Vehicles and rest of other variables (i.e LSM and Electricity) impacted negative and significant influence on GDP Economic Growth Rate of Pakistan. F-value of Bound Test (4.0) was greater than upper bound critical value revealing long run relationship established between tested variables in the model. The value of Co-integrating equation was negative, depicting speed of adjustment; hence variables will adjust positively towards their long-run equilibrium. No serial correlation, no severe multicollinearity after treatment and normally distributed sample data was witnessed in the model. Findings revealed uni-directional causal relationship between GDP and LSM ($P<0.10$), between Vehicles and GDP ($P<0.10$), between Telephone and LSM ($P<0.10$), between SSM and GAS ($P<0.05$), between Telephone and Electricity ($P<0.05$) and between Vehicle and Electricity ($P<010$). Impulse Response Analysis indicated negative as well as positive responses; shock to GDP noticed symmetric impact on Large Scale Manufacturing (LSM_t), Small Scale Manufacturing ($SSMt$), Gas (G_t), Electricity (E_t), Telephone (T_t) on economic growth of Pakistan in short as well as in long run. Wald test confirmed the significance of independent variables (LSM_t, SSM_t, G_t, E_t) for a model. The study concludes the implications in terms of selected variables of Manufacturing and Service sectors, which influenced economic growth significantly through infrastructural improvement in installing small and large scale manufacturing units, division of labour force, regular and uniform supply of utility services among all segments of society especially in terms of GAS, Electricity, Good Means of Communication and Transports with an aim to reduce poverty, control inflation and address unemployment in developing economy of Pakistan.

Keywords: GDP, ADF, ARDL, causality, co-integration, economic Growth & Pakistan.

INTRODUCTION

Manufacturing and Services are the major business sectors of Pakistan's GDP. Manufacturing Sector has been considered as a path towards development due to strategic achievements of developed nations over several years for developing national power and wealth. Government must implement appropriate reform policies so as to ensure efficiency in the normal functioning of Manufacturing Sector in Pakistan (Wolok et al., 2023). Manufacturing sector aimed at manufacturing value added products to meet domestic requirements and also to promote exports of surplus manufactured goods so as to generate employments opportunities in the country and also to generate foreign exchange (Ajmair, 2014). Services Sectors help to ensure provision of facilities such as goods means of communication and transport, utility services of gas, electricity, and insurance for conversion of processed or manufactured forms of goods into finished/ consumable goods to the ultimate consumers. Numerous policy reforms including deregulation of service sectors are required to implement so as to make economy more efficient. Acceleration in the growth of service sectors was due to goods means of communication and transport and the past study recommends that there is considerable importance and scope for rapid development in the economy provided consistent continuation in deregulation policy of service sector (Ajmair and Ahmad, 2011). The productive sectors would help in generating revenue, as source of improving balance of payment and trade, which would ultimately improve the social and economic well beings of community (Uddin, 2015, Muzammil, 2020). Pakistan's sectors in

respect of Commodity Producing (i.e Manufacturing) and Service Sectors had been contributing significantly in the development of Pakistan's Economy (Islam et al., 2020). It was felt dire need for government functionaries and policy makers to pay special attention towards manufacturing and service sectors (Ali, et al, 2020). Majority of previous literature consider commodity producing and service sectors as engine of economic growth in the economy. Researcher's findings are based on contradictory conclusions regarding various impact assessment studies of Commodity Producing and Service Sectors (Baig et al., 2020). The significant share of Service Sector towards GDP was increased by the passage of time as compared to Agriculture and Industrial sectors in terms business services, financial services, communication and community services in India, indicating high proportion of labour productivity. Enhanced output usage and income elasticity of demand by other sectors of economy played crucial role in elevating service growth (Lashmi & Kumar, 2012). The present study was aimed at assessing the economic significance of commodity producing sectors alogwith services sectors towards GDP growth rate of Pakistan economy. Service Sector being prominent productive sector significantly contributing towards economic growth and development of economy. Major factors affecting Service Sector in long run are government expenditure, foreign trade, population growth and market size, whereas in short term, Service Sector is influenced mainly by factors such as worker's remittances and foreign trade. In this regard, governmental authorities my pay special attention towards wide spread of quality services so necessary for accelerating the pace of economic growth in the economy (Ajmair, 2014). This study was unique in sense which covers almost prominent business sectors of Pakistan especially taking into account its economic significance towards economic growth of Pakistan. Though each and every business sectors of Pakistan has significant importance and long lasting tangible contribution in the GDP Growth, Exports Promotion, Imports Substitution, Poverty Alleviation, Capital Formation, employment opportunities generation, earning foreign exchange through exports and remittances etc.

RESEARCH METHODOLOGY

Method, Structure of data, Range of data and Sources of data:

Time series data ranges from 1994-95 to 2021-22 from authenticated sources of Pakistan Economic Surveys, Federal Statistical Bureau, World Bank etc were utilized for present research study. (Dickey and Fuller, 1981) was used to employ the econometric tests such as stationarity and OLS regression model. In order to check the time series data set in terms of stationarity or non stationarity levels, most suitable test such as Augmented Dickey-Fuller test has been utilized to test the stationarity status of time series tested variables (Perron, 1990). Moreover, to estimate the long and short run relationships between variables, Auto-Regressive Distributed Lag (ARDL) Model, Bounds Test, Error Correction Mechanism were employed (Pesaram & Shin. 1998), Granger causality as an econometric test also used to verify the usefulness of one variable to forecast another, indicated a bidirectional, unidirectional or no causality moving. Impulse Response Function was also used to check the direction and magnitude of casual relationship, (Pesaran & Shin, 1998, Ahad, 2017). A normality test also applied to determine whether a sample data has been drawn from a normally distributed population. The Wald test as parametric statistical measure was also used to confirm whether a set of independent variables are individually or collectively 'significant' for a model or not. EViews, being relevant statistical package was used for time series econometric analysis throughout research study.

Econometric Model

The econometric equation to assess the Impact of Manufacturing in terms of Large Scale Manufacturing (LSM_t) and Small Scale Manufacturing (SSM_t) *and S*ervices Sector in terms of Gas (G_t), Electricity (E_t), Telephone (T_t) as Communication Services and Vehicle (V_t) as Transport services on economic growth of Pakistan **(**GDP_t**)** is symbolically presented as follows;

$$GDP_t = \alpha_0 + \alpha_1 LSM_t + \alpha_2 SSM_t + \alpha_3 G_t + \alpha_4 E_t + \alpha_6 T_t + \alpha_6 V_t + e_t \text{ ----------i}$$

Where,

GDP_t = GDP Economic Growth Rate of Pakistan in year t.
a_0 = Constant Coefficient.
a_1, a_2, a_3, a_4, a_5 *and* a_6= Slopes Coefficient
LSM_t **=** Large Scale Manufacturing in year t.
SSM_t = Small Scale Manufacturing in year t.
G_t = Gas in year t.
E_t= Electricity in year t.
T_t= Telephone as Communication Services in year t.
V_t= Vehicles as Transport Services in year t.
e_t = Error term in year t.
Application of logarithm on both sides of equation i, hence log-linear form of the model specified becomes;

$$LogGDP_t = \alpha_0 + \alpha_1 LogLSM_t + \alpha_2 LogSSM_t + \alpha_3 LogG_t + \alpha_4 LogE_t + \alpha_5 LogT_t + \alpha_5 LogV_t + e_t \text{ --ii}$$

RESULTS AND DISCUSION

Unit Root Tests for Tested Variables: Augmented Dickey-Fuller (ADF) Test rejected the null hypothesis of non-stationarity of all such variables, when applied 1st difference, which verified that tested variable (GDP_t) is stationary at level I(0) order of integration and respective variable (LSM_t, T_t) at 1st difference I(1) and other variables (SSM_t, G_t, E_t *and* V_t) at 2nd difference I(2) (as reflected in Table-1.

Table-1. Unit Root Test for Variables (*GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t*)

Variables	ADF (Levels)		ADF in 1st/2nd Differences		Sequence of integration through differencing I( )
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	
GDP_t	-3.59	-3.52	-5.11	-4.99	I(0)
LSM_t	-1.66	-1.65	-4.86	-4.75	I(1)
SSM_t	0.25	-2.9	-4.72	-4.58	I(2)
G_t	-1.89	0.84	-7.12	-7.01	I(2)
E_t	2.17	-1.36	-0.99	-7.40	I(2)
T_t	-2.17	-1.94	-3.42	-4.67	I(1)
V_t	2.71	1.76	-3.69	-4.28	I(2)

Note: All variables measured in natural logarithms;
95% Critical values = -2.98 (No intercept and no trend); and
95% Critical values = -3.67 (Presence of intercept and trend)

Table-2. Ordinary Least Square (OLS) for variables (*GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t*)

Dependent Variable: GDP				
Method: Least Squares				
Sample: 1995 2021				
Included observations: 27				
Variable(s)	**Coefficient**	**Standard Error**	**t-Statistics**	**Probability**
LSM	-3.282798	0.737525	-4.451097	0.0002***
SSM	3.203865	0.795810	4.025917	0.0007***
GAS	0.016936	0.004335	3.906670	0.0009***
ELECTRICITY	-1.018297	0.415006	-2.453694	0.0234**
TELEPHONE	0.687144	0.460612	1.491807	0.1514
VEHICLES	0.516506	0.301789	1.711480	0.1025*
C	27.46106	8.315408	3.302431	0.0036
R^2	0.539467			
Adjusted R^2	0.401308			
F-statistics	3.904665			
Prob(F-statistics)	0.009613	Durbin-Watson statistics		2.097150

***Significance level at 1%
**Significance level at 5%
*Significance level at 10%

The estimated econometric equation to assess the Impact of Manufacturing in terms of Large Scale Manufacturing (LSM_t) and Small Scale Manufacturing (SSM_t) and Services Sector in terms of Gas (G_t), Electricity (E_t), Telephone (T_t) as Communication Services and Vehicle (V_t) as Transport services on GDP Growth Rate of Pakistan is presented as follows;

$$\boldsymbol{LGDP_t = \alpha_0} -3.282798\ \boldsymbol{LLSMt} -0.000557\ \boldsymbol{LSSM_t} + 0.016936\ \boldsymbol{LG_t} -1.018297\ \boldsymbol{LE_t} + 0.687144\ \boldsymbol{LT_t} + 0.516506\ \boldsymbol{LV_t + e_t} \text{-------iii}$$

Table-2. indicated positive and significant impact of SSM, GAS and Vehicles and rest of other variables (i.e LSM and Electricity) impacted negative and significant influence on GDP Economic Growth Rate of Pakistan (*GDP_t*) over a period of time 1994-95 to 2020-21. In case of Large Scale Manufacturing, the value of its coefficient is worked out as -3.282798 means by increasing 1 unit by LSS, Dependent Variable as GDP Growth Rate is decreased by 3.28 units and so on. Perusal of Table-2. provides that R^2 value is 0.54 which indicated that independents variable such as *LSM_t, SSM_t, G_t, E_t, T_t, V_t* are predicting 54% variation in Dependent Variable as *GDP_t*. F value is worked out as 3.90 ($P<0.01$) revealing overall combined effects and overall fitness of the Model. The present study is in line with past studies conducted by Charles (2018) & Degu (2019).

Table-3. Auto-Regressive Distributed Lags Model for Variables (*GDP_t, LSM_t, SSM_t G_t, E_t, T_t, V_t*)

Dependent Variable: GDP				
Method: ARDL (2, 1, 1, 0, 0, 2, 2)				
Sample (adjusted): 1997 2021				
Included observations: 25 after adjustments				
Variable(s)	**Coefficient**	**Standard Error**	**t-Statistics**	**Probability**
GDP(-1)	-0.146566	0.096013	-1.526525	0.1579
GDP(-2)	0.265432	0.080837	3.283533	0.0082***
LSM	-3.339822	0.331108	-10.08681	0.0000***
LSM(-1)	-2.006822	0.398499	-5.035951	0.0005***
SSM	3.762351	0.341259	11.02492	0.0000***

SSM(-1)	1.490895	0.463139	3.219112	0.0092***
GAS	0.026964	0.002924	9.222906	0.0000***
ELECTRICITY	-1.700583	0.268323	-6.337817	0.0001***
TELEPHONE	0.840633	0.257362	3.266350	0.0085***
TELEPHONE(-1)	-0.210819	0.324421	-0.649833	0.5304
TELEPHONE(-2)	0.385073	0.250513	1.537137	0.1553
VEHICLES	0.352023	0.156614	2.247712	0.0484**
VEHICLES(-1)	1.074618	0.146362	7.342213	0.0000***
VEHICLES(-2)	-0.459555	0.135012	-3.403808	0.0067***
C	42.27746	4.837617	8.739315	0.0000
R^2	0.972293			
Adjusted R^2	0.933504			
F-statistics	25.06582			
Prob(F-statistics)	0.000007	Durbin-Watson statistics		3.187733

*Note: p-values and any subsequent tests do not account for model selection
***Significance level at 1%
**Significance level at

Perusal of Table-3 provides the application of Auto-Regressive Distribute Lags Model (ARDL) a standard least square regression that includes lags of dependent and independent variables as regressors. Since both order of integration at level I(0) and at 1st difference I(1) conditions presents in Table-1, after application of ARDL approach, the results findings of Table-3 revealed that LSM(P<0.01), Electricity (P<0.01) and Telephone (P<0.01) impacted negative but positive influence, whereas SSM(P<0.01), Gas (P<0.01) and Vehicles (P<0.01) impacted positive and significant influence on GDP Growth Rate of Pakistan. Hence, ARDL examined co-integrating relationships between tested variables **(***LSM_t, SSM_t, G_t, E_t, T_t, V_t)* in the model. The perusal of Table-3 provides that R^2 value is 0.97 which indicated that independents variable such as LSM_t, SSM_t, G_t, E_t, T_t, V_t are predicting 97% variation in Dependent Variable as GDP_t. F value is worked out as 25 (P<0.01) revealing overall combined effects and overall fitness of the Model. The present study is on the analogy of previous studies ducted by Mohmand et al. (2017); Baig et al. (2020) and Huseynli (2023).

Table-4. Bound Test for estimating long run relationships of variables (*GDP_t, LSM_t, SSM_t G_t, E_t, T_t, V_t)*

ARDL Bounds Test		
Sample: 1997 2021		
Included observations: 25		
Test Statistic	Value	k
F-statistic	4.020046	6
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

HO= No Long Run Relationships between variables
HI = Long Run Relationships between variables

Perusal of Table-4 revealed findings of Bound Test that value of F statistics is worked out 4.0, which is greater than upper bound critical value, hence by rejecting HO hypothesis and accepting HI, long run relationship established between tested variables in the model.

Table-5. Error Correction Mechanism for short run relationships and long run adjustment of variables (*GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t)*

Dependent Variable: D(GDP)				
Method: Least Squares				
Sample (adjusted): 1996 2021				
Included observations: 26 after adjustments				
Variable(s)	**Coefficient**	**Standard Error**	**t-Statistic**	**Probability**
C	-0.310294	0.764147	-0.406066	0.6895
D(LSM)	-2.481397	0.826974	-3.000574	0.0077
D(SSM)	2.538030	0.990154	2.563268	0.0195
D(GAS)	0.014916	0.008454	1.764332	0.0946
D(ELECTRICITY)	-0.501363	0.591949	-0.846971	0.4081
D(TELEPHONE)	0.929257	0.711187	1.306628	0.2078
D(VEHICLES)	0.465035	0.501789	0.926753	0.3663

ECT(-1)	-5.206189	4.741668	-1.097966	0.2867
R^2	0.422737			
Adjusted R^2	0.198246			
F-statistics	1.883091			
Prob(F-statistics)	0.132175	Durbin-Watson stat		2.382403

Perusal of Table-5 indicated the value of Co-integrating equation was negative and insignificant provided speed of adjustment indicating that there was divergence from short run dynamics towards long run equilibrium. A negative value of error correction term indicates that the variables will adjust positively towards their long-run equilibrium.

Table-6. Variance Inflation Factors for checking the presence of Multicollinearity for variables (*GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t)* Part-A

Variance Inflation Factors			
Sample: 1995 2021			
Included observations: 27			
	Coefficient	**Uncentered**	**Centered**
Variable	**Variance**	**VIF**	**VIF**
LSM	0.543944	682.8987	6.413538
SSM	0.633314	37.81346	11.60882
GAS	1.88E-05	301.8874	19.68859
ELECTRICITY	0.172230	928.0974	81.69175
TELEPHONE	0.212163	33.97805	3.278075
VEHICLES	0.091077	180.1544	64.40757
C	69.14602	706.6015	NA

Variance Inflation Factors (VIF) ≥ 10 indicate existence of severe Multicollinearity in the Model. Perusal of Table-6 (A) indicated that Centered VIF values of tested variables (i.e *LSM_t and T_t)* are less than 10, but rest of other tested variables (i.e *SSM_t, GAS_t, E_t and V_t)* are more than 10 revealed severe presence of multicollinearity in the model. Hence after removal of two highly collinear variables i.e *E_t, V_t* containing values of Variance Inflation Factors (VIF) ≥ 10, then applied VIF test again, which is reproduced as;

Part-B

Variance Inflation Factors			
Sample: 1995 2021			
Included observations: 27			
	Coefficient	**Uncentered**	**Centered**
Variable	**Variance**	**VIF**	**VIF**
LSM	0.327644	282.0763	2.649159
SSM	0.660314	27.03587	8.300079
GAS	8.10E-06	89.22000	5.818777
TELEPHONE	0.194937	21.40838	2.065400
C	16.89091	118.3648	NA

After removal of two highly collinear variables i.e *E_t, V_t* in the model, thereafter Centered VIF values of all re-tested variables *(i.e LSM_t, SSM_t,G_t, T_t)* in Table-6 (B) are now found less than 10 revealed no severe presence of multicollinearity in the model.

Table-7. Heteroskedasticity Test for variable (*GDP_t, LSM_t, SSM_t G_t, E_t, T_t, V_t)*

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistics	0.494633	Prob. F(6,20)	0.8048
Obs*R^2	3.488820	Prob. Chi-Square(6)	0.7455
Scaled explained SS	1.712001	Prob. Chi-Square(6)	0.9442

H0: No Heteroskedacticity
HI: Heteroskedacticity

Perusal of Table-7 indicated that probability value of F-Statistics and Chi-square are greater than 5% level of significance, hence Null Hypothesis is accepted revealing presence of homoskedasticity (no heteroskedasticity) in the model.

Table-8. Lagrange Multiplier (LM) Test for checking Serial Correlation/ Autocorrelation of variables (GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t)

Breusch-Godfrey Serial Correlation LM Test:

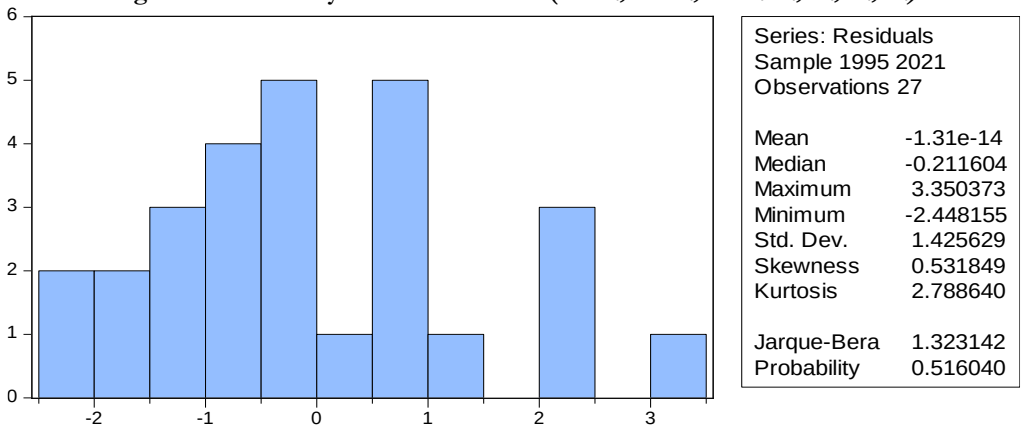
F-statistic	0.108551	Prob. F(2,18)	0.8977
Obs*R-squared	0.321772	Prob. Chi-Square(2)	0.8514

HO: Non existence of serial correlation between variables

H1: Existence of serial correlation between variables

Since the probability values of all tested variables *(i.e LSM_t, SSM_t, S_t, G_t, E_t, T_t, V_t)* are greater than 5% level of significance (P>0.05) as shown in Table-8, hence null hypothesis is accepted, which revealed there is no serial correlation/ no autocorrelation in the model. The current study is associated with past studies conducted by Alnegrish (2023).

Figure-1 Normality Test for variables (GDP_t, LSM_t, SSM_t G_t, E_t, T_t, V_t)



HO: Sample data has been drawn from normally distributed

HI: Sample data has not been drawn from normally distributed

Since the probability value of Normality Test (0.51) is greater than 5% level of significance (P>0.05) depicted in Figure-1, hence null hypothesis is accepted, confirming that sample data has been drawn from normal distributed. Hence relationships among tested variables are normal in the model.

Table-9. Granger Causality Test for variables (GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t)

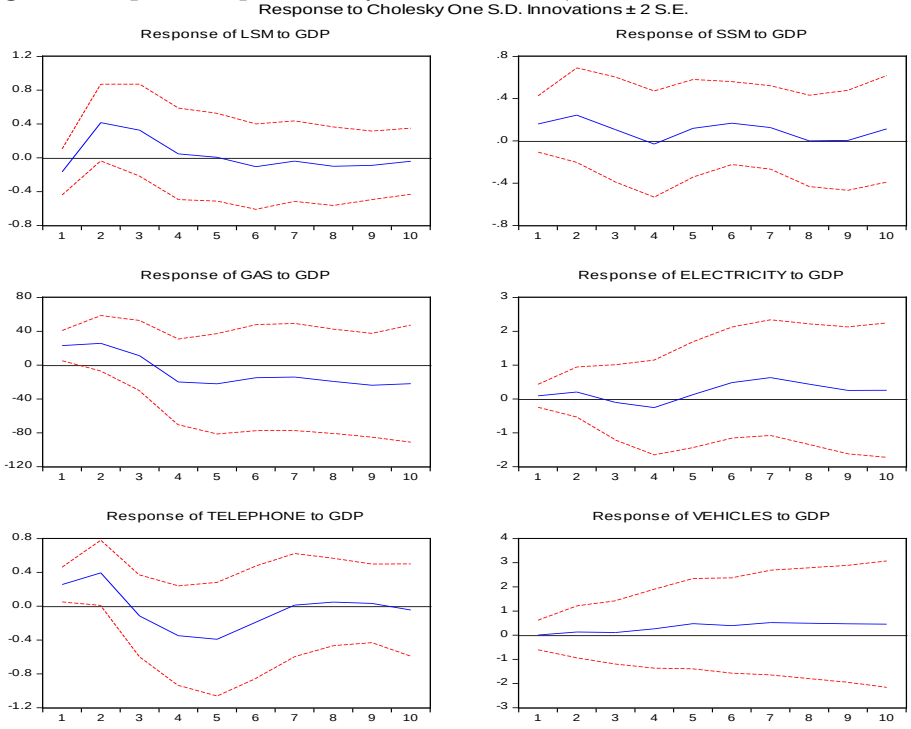
Pairwise Granger Causality Tests			
Sample: 1995 2021			
Lags: 2			
HO:	**Obs**	**F-Statistic**	**Prob.**
LSM not Granger Causing GDP	25	2.22851	0.1337
GDP not Granger Causing LSM		3.39211	0.0539*
SSM not Granger Causing GDP	25	0.95497	0.4017
GDP not Granger Causing SSM		0.00313	0.9969
GAS not Granger Causing GDP	25	0.70505	0.5060
GDP not Granger Causing GAS		1.40213	0.2692
ELECTRICITY not Granger Causing GDP	25	0.04141	0.9595
GDP not Granger Causing ELECTRICITY		0.15052	0.8612
TELEPHONE not Granger Causing GDP	25	0.42077	0.6622
GDP not Granger Causing TELEPHONE		1.97315	0.1652
VEHICLES not Granger Causing Cause GDP	25	2.87619	0.0798*
GDP not Granger Causing VEHICLES		0.32852	0.7238
SSM does not Granger Cause LSM	25	0.92577	0.4126
LSM does not Granger Cause SSM		0.05612	0.9456
GAS not Granger Causing LSM	25	2.28025	0.1282
LSM not Granger Causing GAS		0.70075	0.5080
ELECTRICITY not Granger Causing LSM	25	0.52120	0.6017
LSM not Granger Causing ELECTRICITY		1.15173	0.3362
TELEPHONE not Granger Causing LSM	25	3.46288	0.0511*
LSM not Granger Causing TELEPHONE		0.71625	0.5007
VEHICLES not Granger Causing LSM	25	0.40666	0.6713
LSM not Granger Causing VEHICLES		0.46402	0.6354
GAS not Granger Causing SSM	25	0.56792	0.5756

SSM not Granger Causing GAS		4.87486	0.0189**
ELECTRICITY not Granger Causing SSM	25	0.11726	0.8900
SSM not Granger Causing ELECTRICITY		0.00970	0.9904
TELEPHONE not Granger Causing SSM	25	0.08773	0.9164
SSM not Granger Causing TELEPHONE		0.53763	0.5923
VEHICLES not Granger Causing SSM	25	0.06056	0.9414
SSM not Granger Causing VEHICLES		0.01117	0.9889
ELECTRICITY not Granger Causing GAS	25	0.81983	0.4548
GAS not Granger Causing ELECTRICITY		0.83507	0.4484
TELEPHONE not Granger Causing GAS	25	1.22243	0.3156
GAS not Granger Causing TELEPHONE		2.04827	0.1552
VEHICLES not Granger Causing GAS	25	1.38845	0.2725
GAS not Granger Causing VEHICLES		0.04119	0.9597
TELEPHONE not Granger Causing ELECTRICITY	25	4.20515	0.0299**
ELECTRICITY not Granger Causing TELEPHONE		0.29073	0.7508
VEHICLES not Granger Causing ELECTRICITY	25	2.94541	0.0757*
ELECTRICITY not Granger Causing VEHICLES		0.35129	0.7080
VEHICLES not Granger Causing TELEPHONE	25	0.39079	0.6816
TELEPHONE not Granger Causing VEHICLES		0.36677	0.6975

**Significance level at 5%
*Significance level at 10%

Perusal of Table-9, revealed uni-directional causal relationship between GDP and LSM (P<0.10), between Vehicles and GDP (P<0.10), between Telephone and LSM (P<0.10), between SSM and GAS (P<0.05), between Telephone and Electricity (P<0.05) and between Vehicle and Electricity (P<010), whereas no causality observed in rest of combinations in the model. The present results are in agreement with past study conducted by Singariya and Sinha (2015) revealed uni-directional relationship between GDP and industrial sector in India, Baig et al. (2020) indicated uni-directional causality between economic growth and manufacturing sector in India on the analogy of present study. The previous study on the analogy of present study conducted by Almozaini (2019) obtained long-term relationship in the cointegration test, revealing unidirectional causal relationship running from GDP to Oil services in Japan. The findings of present study in comparison with previous studies showed that the importance of agriculture and manufacturing sector have been shifted to the service sector and significantly contributed to GDP growth of Pakistan's economy.

Figure-2. Impulse Response Analysis for variables (*GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t*)



Perusal of Figure-2 depicted red lines and blue line in all six responses of Large Scale Manufacturing (LSM_t), Small Scale Manufacturing (SSM_t), GAS (G_t), Electricity (E_t), Telephone (T_t) and Vehicle (V_t) to GDP. Red lines referred to 95% confidence interval and blue line referred to Impulse Response Function.

1st Response: In order to explain Response of LSM to GDP, one standard deviation shock or impulse or innovation given to GDP resulted in gradual increase of LSM from period 1st to 2nd in positive state, then sharp declines from 2nd to 4th period becomes negative, then gradual increases from 4th to 5th period becomes positive, then becomes stable from 5th to 7th period, then gradual declines from 7th to 8th period, then becomes stable from 8th to 9th period and thereafter almost become stable from 7th to 10th period.
2nd Response: In case of Response of SSM, one standard deviation shock or impulse or innovation given to GDP resulted in sharp increases of Gas from 1st to 2nd Period in positive state, then sharp declines from 2nd to 3rd period and then gradual declines from 3rd to 10th period.
3rd Response: In case of Response of GAS, one standard deviation shock or impulse or innovation given to GDP resulted in maintaining stability of GAS from 1st to 2nd period in positive state, then gradual increases from 2nd to 4th period becomes negative, then almost becomes stable from 4th to 10th period.
4th Response: In case of Response of Electricity, one standard deviation shock or impulse or innovation given to GDP resulted in maintaining stability of Electricity from 1st to 2nd period, then gradual declines from 2nd to 4th period becomes negative, then gradual increases from 4th to 7th period becomes positive, then gradual declines from 7th to 9th period and then becomes stable from 9th to 10th period.
5th Response: In case of Response of Telephone, one standard deviation shock or impulse or innovation given to GDP resulted in sharp increase of Telephone from 1st to 2nd period in positive state, then sharp decline from 2nd to 4th period becomes negative, then gradual declines from 4th to 5th period, then sharp increase from 4th to 7th period and then becomes stable from 7th to 10th period.
6th Response: In case of Response of Vehicles, one standard deviation shock or impulse or innovation given to GDP resulted in maintaining stability throughout the length from 1st to 10th period.
Hence in all six responses, negative as well as positive responses exist, so shock to GDP will have symmetric impact of LSM, SSM as manufacturing sectors and Gas, Electricity, Telephone and Vehicle as Service Sectors toward GDP of Pakistan in short as well as in long run.

Table-10. Wald Test for variables (*GDP_t, LSM_t, SSM_t, G_t, E_t, T_t, V_t*)

Part-A Wald Test (*LSM_t, SSM_t*)

Test Statistic	Value	df	Probability
F-statistic	10.14834	(2, 20)	0.0009***
Chi-square	20.29667	2	0.0000***

***Significance level at 1%

Null Hypothesis: C(1)=0,C(2)=0		
Null Hypothesis Summary:		
Normalized Restriction (= 0)	Value	Std. Err.
C(1)	-3.282798	0.737525
C(2)	3.203865	0.795810

Restrictions are linear in coefficients
HO: The value of independent variable is zero (0)
H1= The value of independent variable is not equal to zero (0)

Part-B Wald Test (GAS, Electricity*)*

Test Statistic	**Value**	**df**	**Probability**
F-statistic	7.805201	(2, 20)	0.0031***
Chi-square	15.61040	2	0.0004***

Null Hypothesis: C(3)=0,C(4)=0		
Null Hypothesis Summary:		
Normalized Restriction (= 0)	**Value**	**Std. Err.**
C(3)	0.016936	0.004335
C(4)	-1.018297	0.415006

Restrictions are linear in coefficients
***Significance level at 1%

Part-C Wald Test (Telephone, Vehicle)

Test Statistic	**Value**	**df**	**Probability**
F-statistic	1.916606	(2, 20)	0.1732
Chi-square	3.833212	2	0.1471

Null Hypothesis: C(5)=0,C(6)=0		
Null Hypothesis Summary:		
Normalized Restriction (= 0)	**Value**	**Std. Err.**

C(5)	0.687144	0.460612
C(6)	0.516506	0.301789

Restrictions are linear in coefficients.

The results of Wald Test as shown in Table-10 (Part A and B) indicated F-Test (P<0.01) and Chi-Square (P<0.01) revealed significant impact of Large Scale Manufacturing, Small Scale Manufacturing, GAS and Electricity towards GDP economic growth. It means Null Hypothesis of assuming the values of independent variables *(i.e LSM_t, SSM_t G_t, E_t)* is zero (0) is rejected, confirming set of independent variables are significant for a model. Whereas, perusal of Table-10 (Part-C) indicated F-Test and Chi-Square revealed insignificant influence of Telephone and Vehicle towards GDP economic growth. The present study recommends policy reforms including consistent continuation in deregulation of service sectors are required to implement so necessary to make economy more effective and efficient. Acceleration in the growth of service sectors was mainly due to goods means of communication and transport and the past study recommends that there is considerable importance and scope for rapid development in the economy provided consistent continuation in deregulation policy of service sector. There is dire need to establish platform to transfer advance technology for commercialization and to promote exports goods. Government must have to ensure consistent flow of gas and electricity to industry without frequent break down of electricity supply. The present study is on the analogy of past studies conducted by Wang (2009); Ajmair and Ahmad (2011); Ajmair (2014); Mohmand et al. (2017); Charles (2018); Oluwafemi et al. (2018); Degu (2019); Rahman and Bakar (2019); Muzammil (2020), Ali et al. (2021) and Huseynli (2023).

CONCLUSION AND RECOMMENDATIONS

The study arrived at conclusion that Large Scale and Small Scale Manufacturing Units alongwith Gas, Electricity, Telephone and Vehicles as utility services significantly influenced economic growth of Pakistan from 1994-95 to 2020-21. Since the performance of Manufacturing and Services sectors of Pakistan is far below target of even under developed countries, hence it is dire need to improve the respective share of such sectors towards GDP through provision of sufficient quantities of quality goods and services. There is need to make sufficient and consistent investments in the provision of facilities i.e machines, gas, electricity, means of communications and transport, market etc so necessary for the development of such productive sectors of Pakistan economy. There is need to utilize human, physical and financial resources in such an organized way to improve the productive share of Manufacturing and Service Sectors in relation with Pakistan's GDP. It is essentially required to promote extension programs for imparting skill oriented training to strengthen manpower in promoting such productive sectors. This is also important to adopt the productive use of appropriate advance technology in relation with suitable environment for promoting such productive sectors in Pakistan. Hence this study provided platforms and avenues for further economic growth and development by utilizing efficient uses of such business sectors, which would results in improving quality of life through provision of infrastructural facilities and ensuring utility status of communities (i.e GAS, Electricity, means of communication and transports) through capital formation and productive use of human resources with a view to reduce widespread of poverty, inflation and unemployment in the country.

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