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RESEARCH PAPER

Examining the Impact of Digital Transformation on Exports of Pakistan

[1]Aamra Kanwal, [2]Ashfaq Ahmad* and [3] Muhammad Ilyas

1. MS Scholar, Department of Economics, GC Women University Sialkot, Punjab, Pakistan
2. Assistant Professor, Department of Economics, GC Women University Sialkot, Punjab, Pakistan
3. Professor, Department of Economics, GC Women University Sialkot, Punjab, Pakistan

***Corresponding Author:** ashfaqahmad146@gmail.com

ABSTRACT

Exports are vital for emerging economies because they offer people and firms many more markets for their goods. In both developed and developing countries, exports as a catalyst for economic growth. This study examines the impact of digital transformation on exports to Pakistan. Global market changes are driven in large part by the digital transformation. By transforming digitally businesses and exports can become more competitive, efficient, and innovative. In this study, digital transformation is measured with individuals using the internet, fixed telephone subscriptions, and mobile cellular subscriptions. Time series data will be used for this study from 1990 to 2020. The stationarity of the variables was checked by Phillips Perron (PP) and Augmented Dicky-Fuller (ADF). In this study, all the variables were stationary at the first difference in the unit-root test. This study employed the Autoregressive Distributed Lag (ARDL) model for long and short-term relationships and short-term causalities among the variables. The findings of this research indicate a positive and significant relationship between digital transformation and exports. This study also provides comprehensive policies for policymakers to boost the nation's exports. The government should act right now to develop more digital technologies to boost domestic output and services export needs. Effective digital policies should be established and novel approaches to digital transformation should be implemented.

KEYWORDS ARDL, Digital Transformation, Exports, Government Effectiveness, Political Instability

Introduction

Exports play a crucial part in the universal financial system and are of great significance to countries worldwide (Hinton et al. 1997; Zhou et al. 2022). It was during the 19th century that globalization and industrialization emerged that the modern system of exports was developed, in which goods and services are systematically moved across international borders (Ridwan Mukaila et al. 2022; Rossanto Dwi Handoyo et al. 2022). In developed countries, exports are a key driver of economic growth, contributing to their competitiveness and sustaining employment (Hao Li et al. 2023). A business might use several strategies to export, including direct sales to international clients, alliances with international businesses, and Internet marketplaces (Vlado Vivodo. 2022; Weixin Yang et al. 2022). Exports from industrialized nations are a major contributor to economic expansion, job creation, and innovation (Lius Camilo Ortigueira et al. 2022; Wei Zhu et al. 2022). The exports can be significantly impacted by exchange rates (Javed Iqbal et al. 2021; Mohsen Bahmani et al. 2020).

Exports are capable of becoming the significant engine of development of the economy in emerging nations (Munir Ahmad et al. 2021; Shapan Chandra Majumder et al. 2022; Ihtisham ul Haq et al. 2022). Exports are very important, and play a crucial part

in the formation and expansion of Pakistan. As a developing nation, Pakistan highly depends on its exports to generate revenue, create employment opportunities, and overcome its trade deficit (Sayed et al. 2012; Kashif Raza Abbasi et al. 2022). The amalgamation of automated technology across all functional zones of a corporation is referred to as digital transformation, and it has the effect of fundamentally altering how firms function and provide value to consumers (Cam Thuy et al. 2023; Vetsika et al. 2023). Businesses that want to be competitive and adaptable in a world that is becoming more and more digital are seen to need to invest in digital transformation today (Carlos Llopis-Albert et al. 2021). Due to the increased adoption of the Internet of Things (IoT), big data analytics, artificial intelligence, and cloud computing during the past ten years, digital transformation has accelerated (Roger Strange et al. 2022). A major role in improving how businesses are executed within companies is played by digital transformation. Digitization is a brand-new, distinctive phenomenon that is still evolving (European Commission, 2019; ISTAT,2020; OECD,2014; Tippins & Sohi, 2003). For certain private ventures, computerized change (DT) assists as the pandemic is a serious emergency (Richard Flanagan et al.,2021). Digital transformation is being implemented in several regions. Businesses situated in southern regions experience venue drawbacks, some of which are an outcome of environmental factors that go later than obvious corporate features (Basile, 2001; de Matteis et al. 2019).

This study deals with the exports of the country affected by digital transformation. Digital Transformation promotes the exports of Pakistan and Digital Transformation can be characterized as how much a firm acquaints and utilizes advanced innovation to enhance its business processes, what's more, this variable demonstrates the progression in existing items or administrations and plans of action in addition, new facilities will be built abilities (Bresciani et al, 2021; Verhoef et al, 2021; Wrede et al, 2020). Digital transformation has recently grown to be a crucial part of international trade and has had a big influence on many nations' exports, including Pakistan's. Pakistan a growing nation, is gradually discovering the value of digital transformation. Pakistani exporters have been able to simplify their operations, save costs, and improve their competitiveness in the global market because of the implementation of digital technology.

The basic purpose is to examine the impact of Digital Transformation on the Exports of Pakistan and to analyze the short and long-run impact of Digital Transformation on exports in Pakistan. The objective of digital transformation in exports is to utilize technology to enhance the process of exports. Digital transformation can help exporters identify new markets, reach new customers, and build stronger relationships with the customers.

Literature Review

Ferran Vendrrel-Herrero et al, 2021 examined how multiple forms of acquired exploitable information, such as prior entrepreneurial experience and export experiences with the current firm, encourage export destinations, which are the number of overseas markets where enterprises sell their products. Elena Pavlova et al, (2021) tested how export elasticities are affected by a complicated value chain. This study tested the panel data set covering the period 1995 to 2009 By using pooled OLS regression. Raffaele Stagliano et al, (2022) examined the diverse early-stage finance and business export volume. They developed a favorable correlation between early-stage funding development and export intensity a risky and knowledge-intensive activity, exporting involves a high level of risk. Daniele Curzi and Martijn Huysmans (2021) examined the protection of EU geographic indications in trade agreements and their effects. This

study's goal was to determine whether geographic indications are protected by external legislation to increase the exports of geographical indications from the European Union, and trade agreements made. Igor Kalinic and Keith, D. Brouthers (2021) developed SME's export performance, choice of export channels, and entrepreneurial mindset. According to this research, a firm's export performance may be considerably impacted by the export channel it uses. They used data from Dutch and Italian SMEs. Junmei Zhang et al, (2022) analyzed if temperature has an impact on business export quality. The main purpose of this study is to examine whether and what impact temperature has on exporters' product quality. They used the data from 2000 to 2016 and used semi parametric regression method to give results.

Mateja Bodlaj and Barbra Cater et al, (2021) examined the effectiveness of SME export ventures, responsive and proactive market orientation is necessary. This study's major goal is to increase knowledge about the relationships between marketing expertise and export venture performance. By utilizing the resource-based approach, they created a conceptual model and put it to the test on a sample of 339 exporting SMEs. Van Anh Voung et al, (2022) examined in five high-tech manufacturing sectors, they examined firm-level investment in R&D and export market exposure. According to this research, R&D investment results in higher innovation rates for products and processes. Alicia Rodriguez et al, (2022) analyzed the connection between companies' export volume and home country governance in transition economies, including examining the regulating function of innovation. Data analysis based on the business panel study on the performance based on the environment and enterprise performance survey (BEEPS). Festus Victor Bekun et al, (2020) examined export growth with a unique spotlight on the outright and interceding effect of monetary strategy vulnerabilities and international dangers. With information spreading over the period from 1980-2018. Laurent G. Apko et al, (2021) examined the impact of COVID-19 on Benin's exporting firms' productivity. The targets of this study are to (1) gauge the impact of Covid-19 on the exhibition of the sending out organizations in Benin, and (2) to survey the elements that make sense of the apparent impact of the Coronavirus pandemic on the presentation of trading organizations in Benin. Atif Jahangir et al, (2021) examined Chinese provincial export commerce and the effects of environmental legislation. This research develops a quantile regression econometric model with panel data from 30 Chinese provinces from 2008 to 2017. This models goal is to evaluate whether China's environmental regulations affect export commerce.

Sareer Ahmad et al, (2022) investigated unequal imports and exports affected by currency rates in Pakistan, Malaysia, Korea, and Japan, four specific Asian nations. IMF and IFS provided quarterly data from 1980I through 2020IV sources. Samma Faiz Rasool et al (2022) examined the connection between consuming renewable energy, CO2 emissions, exports of FDI, and economic expansion from the evidence of BRICS nations. The data were used from 2000 to 2018 to ascertain the long-term correlations between variables. Filomena Pietrovito and Alberto Franco Pozzolo et al (2019) examined the exports and credit restrictions in SMEs in emerging and developing nations. They used a large-scale, diverse examination of small- and medium-sized firm's performance from 2003 to 2014 about 1900 firms from 65 developing and emerging nations. Nguyen Cam Thuy et al, (2023) investigated employing exclusive data from Vietnamese manufacturing companies, digital transformation belongings were examined in this study the decline in exports during COVID-19. They covered 33 provinces in Vietnam from July to August 2020. Faheem Ur Rehman et al, (2020) analyzed, does energy consumption breakdown affects the OECD nations' sophisticated and diverse export market. By using the ARDL technique they found that disaggregate energy consumption encourages the OECD countries to diversify their exports. Touati Karima et al, (2023)

analyzed the ingredients that influence export assortment in Algeria over the short and long terms. The main objective of this study is to examine the factors that contributed to the diversification of exports from 1995 to 2020 by utilizing the ARDL model. Augustine C. Arize et al, (2020) examined fresh data on Thailand's export flows and currency rate volatility. This study investigates long-run elasticities and exposure to short-run fluctuations in foreign economic activity, parallel export prices, and exchange risks using long-run and short-run asymmetries as well as nonlinear crooked cointegration. Muhammad Afzal et al, (2022) evaluated the effect of energy crises on manufactured exports in Pakistan. They used data from 1990 through 2019 by applying using the standard least square approach.

We are motivated by the fact that as far as this research is anxious with the link between exports and digital transformation Pakistan has never been experimentally investigated before. Therefore, this research is undertaken to examine the impact of digital transformation on exports in Pakistan.

Empirical Model and Variables

This study initially offers to look at how the digital transition has affected exports. Second, this study suggests estimating the immediate and long-term effects of digital transformation on Pakistani exports. Time-series data modeling is the method of investigation for this subject. The time-series model is a collection of discrete data points that were computed over a while at regular intervals.

$$Exp = f (DT + DCP + GEPR + PI + REX) \quad (1)$$

The above equation transforms into log form for better results interpretation.

$$LNEXP_t = \alpha_o + \beta_1 IUI + \beta_2 LNFTS + \beta_3 GMCS + \beta_4 DCP + \beta_5 GEPR + \beta_6 PI + \beta_7 REX + e_t \quad (2)$$

LNEXP is used as a dependent variable which signifies by Natural Logarithm of total exports. DT which represents the digital transformation was employed as the main independent variable. DCP which represents the domestic credit to the private sector is also utilized as the independent or control variable. GEPR is employed as an independent variable that represents government effectiveness percentile rank. PI is used as an independent variable that represents political instability. REX represents the real exchange rate employed as a controlled variable. Aside from this, α_o is a constant term while e_t is an error term.

Econometric Methodology

A few preliminary tests were conducted on the data to determine its acceptability and validity for analysis before moving on to methodology and final analysis. To corroborate the stationarity (Pindyck & Rubinfeld, 2008) of the variables, unit root tests will be applied to the data. This study used unit-root tests ADF (Augmented Dicky-Fuller) (1979) and Phillips-Perron (1988) to check the stationarity of the variables. This study used the Autoregressive Distributed Lag (ARDL) methodology was refined by Pesaran et al. (2001) to examine the cointegration between variables. To ascertain the cointegration between variables, this study used the ARDL bound testing approach. For both long-run and short-run connections, the unrestricted error correction strategy is represented as follows:

$$\Delta LNEXP_t = \alpha_0 + \sum_{i=1} \beta_{1i} \Delta LNEXP_{t\_r} + \sum_{i=0} \beta_{2i} \Delta IUI_{t-r} + \sum_{i=0} \beta_{3i} \Delta LNFTS_{t-r} + \sum_{i=0} \beta_{4i} \Delta GMCS_{t-r} + \sum_{i=0} \beta_{5i} \Delta DCP_{t-r} + \sum_{i=0} \beta_{6i} \Delta GEPR_{t-r} + \sum_{i=0} \beta_{7i} \Delta PI_{t-r} + \sum_{i=0} \beta_{8i} \Delta REX_{t-r} + \beta_9 LNEXP + \beta_{10} IUI + \beta_{11} LNFTS + \beta_{12} GMCS + \beta_{13} DCP + \beta_{14} GEPR + \beta_{15} PI + \beta_{16} REX + e_t. \quad (3)$$

This study involves investigating long-run and short-run correlations after verifying cointegration between the variables.

$$LNEXP_t = \alpha_1 + \sum_{i=1} \beta_{1i} LNEXP_{t\_r} + \sum_{i=0} \beta_{2i} IUI_{t-r} + \sum_{i=0} \beta_{3i} LNFTS_{t-r} + \sum_{i=0} \beta_{4i} GMCS_{t-r} + \sum_{i=0} \beta_{5i} DCP_{t-r} + \sum_{i=0} \beta_{6i} GEPR_{t-r} + \sum_{i=0} \beta_{7i} PI_{t-r} + \sum_{i=0} \beta_{8i} REX_{t-r} + e_t. \quad (4)$$

$$\Delta LNEXP_t = \alpha_2 + \sum_{i=1} \beta_{1i} \Delta LNEXP_{t\_r} + \sum_{i=0} \beta_{2i} \Delta IUI_{t-r} + \sum_{i=0} \beta_{3i} \Delta LNFTS_{t-r} + \sum_{i=0} \beta_{4i} \Delta GMCS_{t-r} + \sum_{i=0} \beta_{5i} \Delta DCP_{t-r} + \sum_{i=0} \beta_{6i} \Delta GEPR_{t-r} + \sum_{i=0} \beta_{7i} \Delta PI_{t-r} + \sum_{i=0} \beta_{8i} \Delta REX_{t-r} + \phi ECT_{t-1} + e_t. \quad (5)$$

In this case, the ECT_{t-1} coefficient represents the error correction term calculated as follows:

$$ECT_{t-1} = LNEXP_{t-1} - \alpha_1 - \beta_{2i} IUI_{t-r} - \beta_{3i} LNFTS_{t-r} - \beta_{4i} GMCS_{t-r} - \beta_{5i} DCP_{t-r} - \beta_{6i} GEPR_{t-r} - \beta_{7i} PI_{t-r} - \beta_{8i} REX_{t-r} \quad (6)$$

The second move in ARDL is to explore the error correction term (ECT). ECT is monitored to check the convergence of the model towards the equilibrium. Some diagnostic tests LM, heteroscedasticity, normality and CUSUM are used in this study.

Results Discussions

Descriptive Analysis

Before heading to the time-series econometric examination, a thorough and comprehensive analytical examination is carried out. Annual observations are consisting of 30 from 1991 to 2020.

Table 1
Descriptive Analysis of Selected Variables

	LNEXP	IUI	LNFTS	GMCS	DCP	GEPR	PI	REX
Mean	2.577108	7.421847	15.01598	108.5558	21.30983	31.72536	3.533333	108.0708
Median	2.613411	6.900000	14.97156	107.2793	22.27579	31.95276	7.000000	105.4488
Maximum	2.849013	25.00000	15.66725	123.8572	28.73378	41.95122	8.00000	123.8572
Minimum	2.106766	0.000123	13.92536	96.48924	14.68225	22.59615	-6.00000	96.48924
Std. Dev.	0.217982	6.523131	0.468647	9.082426	4.415537	5.5896603	5.600082	9.269152
Skewness	-0.78450	0.719967	-0.56746	0.225887	-0.13221	-0.098735	-0.93054	0.312697
Kurtosis	2.619958	3.014997	2.727976	1.520461	1.654679	1.871845	2.013134	1.519378
Jarque- Bera	3.257748	2.592040	1.702605	2.991420	2.349760	1.639658	5.546966	3.229200
Probability	0.196150	0.273619	0.426859	0.224089	0.308856	0.440507	0.062444	0.198970
Sum	77.31325	222.6554	450.4794	3256.674	639.2948	951.7609	106.0000	3242.123
Sum Sq. Dev.	1.377970	1233.986	6.369272	2392.223	565.4121	906.0663	909.4667	2491.598
Observations	30	30	30	30	30	30	30	30

The table illustrates the findings of the descriptive analysis conducted on each variable.

Test for Normality of the Residuals

The Jarque-Bera test is functional for checking the normality of the variables in the residuals i.e. if $_t \sim N(0, \delta^2)$. For checking the hypothesis test for model parameters, the necessary assumption must be followed as $\epsilon_t \sim N(0, \delta^2)$. (Brooks, 2014) non-normality of the error may cause a problem regarding the statistical conclusion estimations for the coefficients.

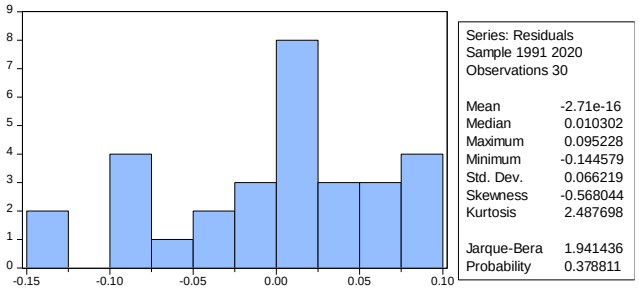

Figure 1: Normality Test

According to the Jarque-Bera tests probability value is obtained at 0.378811, which accepts the claim that the residuals are typical is false which is our favorable condition. The value obtained and the shape of the graph indicate that the residuals are normal.

Optimal Lag Length

Table 2
Lag Selection

Lag	AIC	SC	HQ
0	34.12539	34.50602	34.24175
1	23.56094	26.98660	24.60820
2	16.53304*	23.00374*	18.51120*

Correlation Matrix

This statistical analysis indicates the extent to which two or more variables vary together. The correlation relationship decided by Evans (1996) indicates the R-value in its purest form: value from .00-.19 very weak, from .20-.39 weak, from.40-.59 moderate, from .60-.79 strong and from .80-1.0 very strong relation among the variables.

Table 3
Correlation Matrix

Variables	LNEXP	IUI	LNFTS	GMCS	DCP	GEPR	PI	REX
LNEXP	1.000000							
IUI	-0.924675 -12.85046	1.000000						
LNFTS	-0.281057 -1.549679	0.403724 2.335063	1.000000					
GMCS	0.152971 0.819087	-0.277843 -1.530466	-0.784844 -6.701706	1.000000				
DCP	0.710571 5.343730	-0.703364 -5.235931	-0.108625 -0.578211	-0.056130 -0.297483	1.000000			
GEPR	0.341348 1.921662	-0.437643 -2.575532	-0.243326 -1.327455	0.085792 0.455646	0.562240 3.597566	1.000000		
PI	-0.064457 -0.341784	0.076497 0.405973	-0.411971 -2.392395	0.605019 4.020868	-0.313584 -1.747469	-0.593430 -3.901340	1.000000	
REX	0.236029 1.285264	-0.356559 -2.019464	-0.752423 -6.044587	0.958285 17.74139	0.021881 0.115811	0.079355 0.421234	0.559319 3.570335	1.0000 00

Unit Root Test Results

Table 4
Augmented Dicky-Fuller Test

Variables	Level		First Difference		Decision
	T-statistics	P-value	T-Statistics	P-value	
LNEXP	-0.725868	0.8247	-4.651331	0.0009	I(1)
DT (IUI)	-0.615653	0.8521	-7.486326	0.0000	I(1)

LNFTS	-2.460393	0.1355	-3.109470	0.0373	I(1)
GMCS	-2.215951	0.2052	-4.229010	0.0027	I(1)
FD (DCP)	-0.763055	0.8146	-4.195736	0.0029	I(1)
GEPR	-1.611652	0.4640	-4.177768	0.00031	I(1)
PI	-1.414868	0.5612	-4.655407	0.0009	I(1)
REX	-2.220061	0.2040	-4.061187	0.0041	I(1)

Table 5
Phillips Perron Test

Variables	Level		First Difference		Decision
	T-statistics	P-value	T-statistics	P-value	
LNEXP	-0.560611	0.8646	-5.294879	0.0002	I(1)
DT(IUI)	-0.298393	0.9135	-8.023896	0.0000	I(1)
LNFTS	-2.534582	0.1181	-3.025924	0.0446	I(1)
GMCS	-2.135284	0.2331	-3.821575	0.0073	I(1)
FD(DCP)	-1.062867	0.7165	-4.181506	0.0030	I(1)
GEPR	-1.758128	0.3928	-4.025952	0.0044	I(1)
PI	-1.567389	0.4860	-4.655407	0,0009	I(1)
REX	-1.851207	0.3495	-3.911643	0.0059	I(1)

From the above tables, for the initial differences of all variables, the Augmented Dicky Fuller (ADF) and Phillips Perron (PP) test statistics were used. The aforementioned findings demonstrate that the series data is stationary at the first difference, and as a result, the variables are investigated as integrated under the order I(1) process.

For this study, the Autoregressive Distributed Lag model for cointegration analysis is adopted over the former Johansen cointegration approach because it provides unbiased findings.

Table 6
ARDL Bound Test

F-statistics	15.87199	
Critical values	I(0) bound value	I(1) bound value
10%	2.38	3.45
5%	2.69	3.83
2.5%	2.98	4.16
1%	3.31	4.63

The F-statistics value reported 15.87199, which exceeds the value of the upper bound at all, levels i.e. 10%, 5%, 2.5%, and 1% which means the factors have a long term connection. As a result, we accept the alternative hypothesis and reject the null hypothesis that cointegration does not exist.

Table 7
Results of Long run Analysis

Variables	Coefficient	Std. Error	T- Statistics	Prob.
IUI	0.079658	0.012809	6.219055	0.0000
LNFTS	0.935186	0.120304	7.773535	0.0000
GMCS	0.054786	0.009029	6.067472	0.0000
DCP	-0.006996	0.003650	-1.916563	0.0759
GEPR	-0.011094	0.004377	-2.534445	0.0238
PI	0.002804	0.004732	0.592582	0.5629
REX	-0.039379	0.005405	-7.285632	0.0000

C	-11.43084	1.901554	-6.011306	0.0000
Adj. R sq = 0.959743				
DW statistics = 2.940910				

The above table expresses the variables IUI, LNFTS, GMCS, GEPR, and REX were statistically significant. While the other DCP and PI were not statistically significant. Because some independent variables show a positive and negative connection with the dependent variable. There is a positive and considerable association among the IUI, LNFTS, GMCS, and PI with the dependent variable LNEXP, whereas the DCP, GEPR, and REX have a negative and considerable relation to the dependent variable LNEXP.

Table 8
Results of short run Analysis

Variable	**Coefficient**	**Std. Error**	**T-Statistic**	**Prob.**
C	-11.43082	0.825571	-13.84595	0.0000
TREND	-0.114378	0.008364	-13.67569	0.0000
D(IUI)	0.014572	0.002443	5.964713	0.0000
D(LNFTS)	0.261812	0.044923	5.828068	0.0000
D(GEPR)	-0.005695	0.001732	-3.287887	0.0054
D(PI)	0.009325	0.001809	5.154533	0.0001
D(REX)	-0.050716	0.003496	-14.50555	0.0000
ECT(-1)	-0.991209	0.071822	-13.80087	0.0000
R-square	**0.937404**	**Akaike info criterion**		**-4.379562**
Adj. R-square	**0.916538**	**Schwarz criterion**		**-4.002377**
Durbin-Watson Stat	**2.731892**	**Hannan-Quin criterion**		**-4.261432**
Autocorrelation		F-statistics	1.683029	(0.2268)
Heteroscedasticity		F-statistics	0.484577	(0.9062)

The above table shows that all the variables are showing significant results. Some independent variables show a positive and substantial correlation with the dependent variable, while other shows a negative but significant relationship.

CUSUM and CUSUM Square Test

CUSUM and CUSUM square tests are employed to determine the systematic variations in the coefficients of regression and perceive the unexpected variations from the constancy of coefficients.

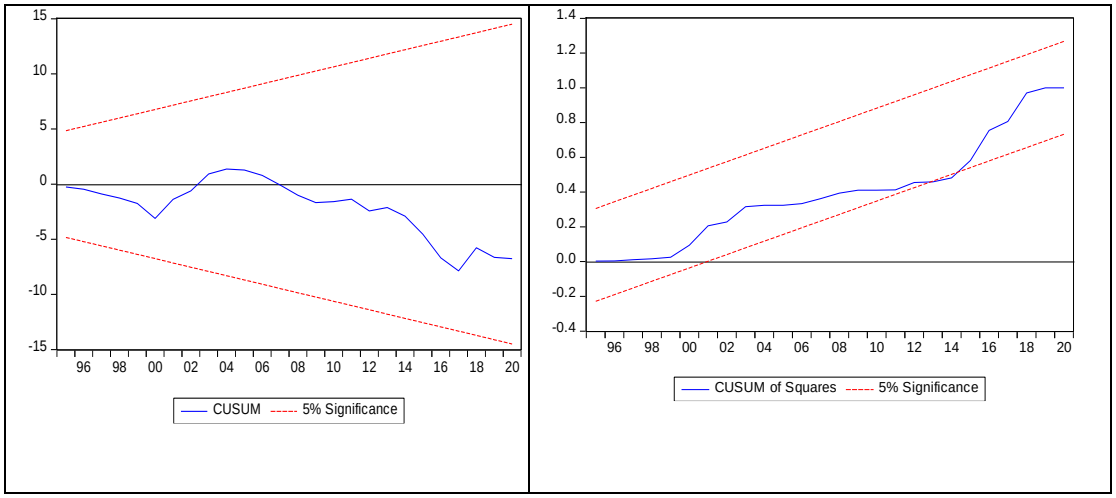

Figure 2: CUSUM and CUSUM Square Test

Conclusion

The most important rationale for the purpose of this study is to evaluate the digital transformation of exports in Pakistan. Their exports of materials and services indicate the value of all items and other market services that are shipped to other nations. This research also identifies the long- and short-term correlations between internet users, fixed and mobile phone subscriptions, mobile cellular subscription (GMCS), political instability, development of financial sector (measured with domestic credit to the private sector), government effectiveness percentile rank, and real exchange rate and exports (LNEXP) for Pakistan throughout the time of 1991 to 2020 by employing the Unit root analysis, Autoregressive Distributed Lag (ARDL) and ECM. This research suggests some policy measures based on the study findings utilizing considerable data of time series taken from the (WDI) World Development Indicators, (WGI) worldwide governance indicators, and ICRG. Digital transformation, IUI (individuals using the internet), LNFTS (fixed telephone subscription), GMCS (mobile cellular subscription), financial development, DCP (domestic credit to the private sector), GEPR (government effectiveness percentile rank), PI (political instability), and REX (real effective exchange rate) are independent variables while the exports is a dependent variable. We checked the Autoregressive Distributed Lag (ARDL) which helped to interpret the short-run and long-run impact of digital transformation and some other control variables on exports as variables a stationary object was found at the first difference so the time series ARDL will be used. The result of these variables is stationary in the long run with a p-value of less than 5%, some variables are not stationary which are DCP (domestic credit to private sector) and PI (political instability). But in the short run, all the variables are stationary because all have p-values less than 0.05. The findings of this study demonstrated that cointegration between variables exists over the long term. The individual using the internet (% of the population) has a considerable and positive impact on exports. The fixed telephone subscriptions have a noteworthy and favorable effect on exports. The mobile cellular subscription exports are positively impacted by this policy. The political instability has a positive and insignificant impact on exports. The domestic credit to the private sector has a negative and insignificant impact on exports. The real effective exchange rate, and government effectiveness percentile rank possess a considerable and unfavorable effect on exports. Lagged ECM's value had statistically significant negative or positive effects. The findings showed that individuals using the internet, fixed telephone subscriptions, and political instability possess a positive impression on exports in the short run. While the exports are affected by government effectiveness percentile rank and real effective exchange rate negatively and significantly in the short run. The major contribution of the study is the positive incidence of digital transformation on exports in Pakistan.

Policy Implications

According to the study, the following policy implications can be motivated:

- This research helps the Pakistan government to expand broad and useful arrangements with regard to expenses on the education for trained labor which improves their efficiency and leads to economic growth. The government of Pakistan and policymakers must invest in digital assets and provide more education facilities to people in Pakistan.

- Pakistani businesses can enhance their direct access to international clients and consumers by using e-commerce platforms and digital marketing.

- A robust and reliable digital infrastructure is essential for successful digital transformation that will help to increase the exports of a nation.

- The government should act right now to develop more digital technologies to boost domestic output and services export needs. Effective digital policies should be established and novel approaches to digital transformation should be implemented.

- It is essential to maintain the exchange rate supplementary to increase the competitiveness of manufactured exports in order for the purpose of attracting foreign demand cost management and pricing modification strategies that can be applied in practice.

- Political stability will lessen societal unrest and attract more investors who will see it as a favorable chance to boost the country's exports.

It is possible to make a greater impact on the global trade landscape by incorporating these policy implications and responses into Pakistan's economic development and growth strategy.

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