AIMS AND SCOPE

Journal of International Economics is devoted to the publication of professional and academic research in all the areas of international economics. It is published in the months of January and July. The journal broadly covers areas such as cross country growth models, population and migration patterns, international trade, trade policy and relations, trade organizations and bodies, foreign investment flows, balance of payments and exchange rate mechanism, multinational corporations and cross border manufacturing, etc.

Indexed in:

• Indian Citation Index (ICI)

• Ebsco

• ProQuest

• Ulrichsweb

• DRJI - The Directory of Research Journal Indexing

• International Institute of Organized Research (I2OR)

• International Services For Impact Factor and Indexing

• Cite Factor

• International Impact Factor Services

• Research Bible

• IJI Factor Indexing

• J-Gate

• InfoBase Index

Contents

From the Editor's Desk...

At the outset it gives me immense pleasure to release the latest edition of Journal of International Economics. As far as international economics is concerned there are many issues in the limelight. In January Federal Reserve confirmed that it is going to end its more than a decade old bond buying program, thus signaling the end of easy monetary policy. Even the Bank of England is tapering its easy monetary policy and has increased interest rates. Economist magazine mentions that markets now are expecting interest rates to increase by four times. The change from dovish to hawkish stance among the central banks of developed economies is a cause of worry for the developing economies, as the end of the easy monetary policy would mean foreign investors would pull out their investments from developing economies. However, Indian economy is much better prepared for this taper than what it was in 2013, when 'Taper Tantrum' made stock markets extremely nervous.

Another important issue is global inflation. The US and the European economies are now going through a bout of inflation. It is reported that inflation in US is at a forty year high hovering around 7 per cent year on year. This is indeed a cause of worry for emerging economies like India which is already experiencing what is being called as 'Imported Inflation'. This doesn't augur well for Indian economy which already is experiencing domestic inflation.

The escalating tensions between Russia and Ukraine, is also worrisome. America's support to Ukraine by this time is well known. America's allies within NATO are also ready to support. If a full scale invasion of Ukraine happens then sanctions are most likely to be imposed on Russia by America and its allies. For economies like India that are dependent on oil imports, this would again mean rise in oil prices. It remains to be seen how things unfold on Ukrainian front.

We wish our readers a happy reading. This issue contains four articles focusing on issues such as volatile investment climate in Asia and Africa, FDI, knowledge management and demand and supply trends in rubber industry in India. We would request our readers to continue to send articles focused on issues which have international ramifications. We also request them to send reviews of books that are focused on issues pertaining to international economics.

Dr Rajesh G

Volatile Investment Climate in Asia and Africa: Do Improved Institutions Help?

Shuchi Goel[*]

Abstract

A critical determinant of growth as well as development of any economy is a sustained level of investment. However, there exists a high degree of variability and fluctuations in the levels of investment within and across countries. This triggers uncertainty and consequently, reduces the growth potentials. Sustained productive investment has backward and forward linkages which is boosted by good governance. In light of these points, the current study aims at examining the effect of economic governance on volatility in total investment. For this purpose, a sample of 20 economies belonging to Asia and Africa has been taken for the period 1985-2013. Pooled mean group (PMG) methodology has been employed to study the objective. The findings suggest an inverse relationship between governance and total investment volatility.

Keywords: Governance, Hodrick-Prescott (HP) Filter, Institutions, Investment Volatility, Pooled Mean Group Panel Data Regression

Introduction

High and prolonged economic growth is a key policy agenda of any economy. Asia witnessed an impressive growth performance during the second half of the last century. However, this experience was not the same for all the Asian economies. East and Southeast Asian countries outperformed the rest of the region during this period (Figure-1).

Figure-1: Annual Average Growth Rate of GDP (1971-2013), Asia
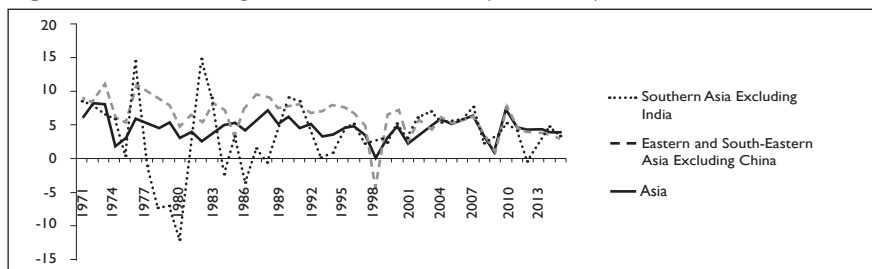
Source: UNCTAD

*   Assistant Professor, Management School, Delhi Metropolitan Education, Noida, Uttar Pradesh and can be reached at goelshuchi7@gmail.com

The growth rate of GDP, at the similar time, was also picking up in the African economies. After a period of high growth during the 1970s averaging about 5 percent, the growth declined thereafter to 1.8 percent during the 1980s. It was only during the 1990s that Africa's growth started picking up again from 2.6 percent to 5.3 percent during the initial ten years of the current century.

Figure-2: Annual Average Growth Rate of GDP (1971-2013), Africa
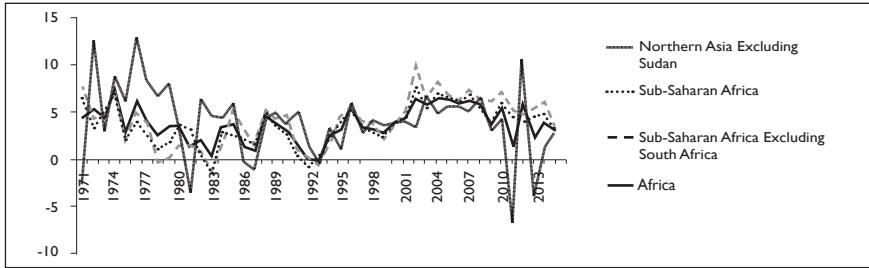
Source: UNCTAD

Despite the improvements over time, the growth pattern has not remained stable. There have been considerable fluctuations in the GDP growth rate experienced by the Asian and the African economies.

Capital Accumulation

Capital accumulation, a key component of economic growth, is regarded as the most unstable component of aggregate demand. Various models of growth, for instance, Neoclassical Growth Model, given by Solow in 1956; Agumented Solow Model, given by Mankiw, Romer and Weil, in 1992 and Mankiw in 1995, have put forward the investment rate as a key driver of an economy's performance. However, different regions of the world have not witnessed the same levels of investment rates. Within Asia, South Asia has experienced comparatively lower levels of investment as compared to East Asia. There has been a decline in the investment rate in Sub-Saharan Africa over time. In addition, significant variability has been observed in the investment rates in Asia and Africa over time, thus indicating its volatility.

Figure-3: Gross Capital Formation (% of GDP) (1971-2013)
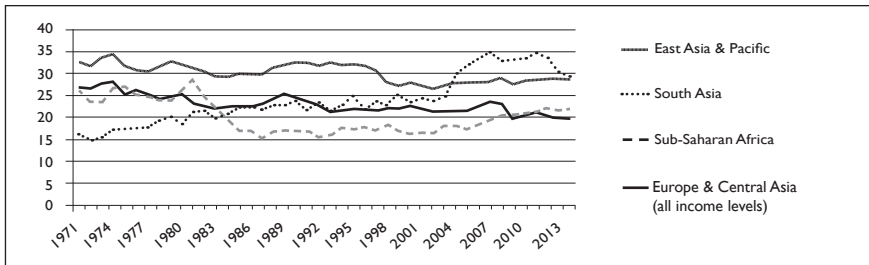
Source: World Development Indicators, World Bank

The investment climate is thought to be affected by an economy's governance quality (Barro, 1991; Dollar et al, 2002; Acemoglu and Johnson, 2005). It was after the First World War that the impetus provided by institutions in an economy's performance garnered attention, in the form of 'Old Institutional Economics'. However, it gathered momentum during the 70's. The birth of 'New Institutional Economics', a term put forth by Oliver Williamson during 1975, is attributed predominantly to Douglass North (North and Thomas 1976; North 1981, 1990 and 2005). It focuses on the expansion of the neo classical economics assimilating the role played by institutions in explaining growth. In short, institutions refer to formal written regulations as well as non-formal unwritten regulations along with the system of their execution. The rules of the game basically talks about the provision of an environment for the smooth interplay of market encompassing: (i) rules pertaining to the private property rights and their allocation; (ii) rules determining the association among different actors involved in the economic activity; (iii) rules explaining the functions of various social institutions like local governments, trade unions, cooperatives, etc., and (iv) rules prohibiting involvement in the economic activity.

Absence of consensus regarding the factors responsible for determining the growth of countries has led to the emergence of governance as a part of the institutional economics. Growth differentials amongst nations has not been clearly explained by any model of economic growth. Although, efforts have been made to explain the differences in economic growth amongst countries, none of the growth models, from the neo classical economics during 1980s (where investment is regarded as the primary determinant of economic growth), followed by Becker's model of the human capital, (which originated in 1962), as well as the endogenous growth models (Grossman and Helpman, 1991, wherein technology as well as the rate of innovation are treated as the most important growth drivers), seemed to offer a clear explanation of growth and an understanding of the situation as to why good growth rate is seen in some nations whereas others lagged behind.

Good governance is recognized to be a significant stimulus to the growth process of an economy. On the international front, donor agencies put an economy's governance structure on top of their aid disbursing agenda as a prerequisite for its successful implementation. Huther and Shah (1998) have associated governance with institutions thereby explaining it as all the features of the use of power for managing a state's resource endowment through the institutions, formal and informal. Formal institutions are defined by North as constitutions, statutes and rules and regulations formulated and enforced by the state. The state is supposed to be the provider of correct

incentives to the different actors to operate in the economy. By informal institutions, he refers to the unspecified rules and regulations like traditions and norms that are enforced through interpersonal ties.

Institutions are meant to mitigate the effect of relative price variations thereby playing the role of a stabilizer. Yet the institutions that are able to ensure stability may not always be the efficient ones. Ensuring stability is only a necessary condition for institutions to be efficient. It is not a sufficient one. Relative price changes as well as changes in preferences are considered to be the two primary causes of change in institutions. This change is brought about by the entrepreneur, political or economic, who acts as an agent. The institutional structure of an economy undergoes a change in response to the activities undertaken by economic and political organizations for profit-making ventures.

With reference to the ideas presented above, this paper's aim is to analyse the impact of institutional quality on total investment volatility for 21 countries in Asia and Africa during the time period of 1985-2013. To carry out the desired objective of the paper, it is organised into four sub-sections: The literature review is presented in the next sub-section. This is followed by data as well as the methodology. The next sub-section includes the result. Finally, the paper is concluded under the last sub-section.

A Review of Literature

The effect of governance on various development outcomes has been the focus of a number of studies. Prior to the 1990s, the literature on economic governance was concentrated mainly on its impact on growth through analysis of case studies of particular economies. The empirical analysis in this area gained momentum during the early 1990s when different indicators, measuring around 150, of economic governance were created (Malik, 2002). The literature largely studies the impact of economic governance on growth, health outcomes as well as FDI.

Economic governance, as indicated by voice and accountability, stability in politics, effectiveness of the government, regulatory burden, corruption and rule of law, is shown to have an adverse effect on infant mortality (Kaufmann et al., 1999 & Kaufman et al., 2004). A pioneering study in this field was introduced by Barro during 1991. He took 'Institutional Quality' as an explanatory variable in determining the relationship between governance and growth. The examination of such relationship revealed a positive association between the two variables. The early 1990s saw the development of two other seminal papers by Knack and Keefer in 1995 and Mauro in 1995. Knack and Keefer find property rights to be a key driver of economic growth. Study by Mauro also confirmed the finding of a positive governance-growth association.

The inter relationship among economic freedom, institutions and economic growth has been examined by Ali and Crain (2002) wherein they find that economic growth is not affected by civil liberties and political administration. It is the economic freedom that has a significant effect on economic growth. In another study undertaken by Grogan and Moers (2001), institutions are found to be an important factor explaining FDI and economic growth.

However, while some studies point to the detrimental impact of poor governance on growth, there also exists another set of studies which find a positive impact. The 'grease the wheels' hypothesis has been supported by Lui (1985). According to this study, corruption is supposed to reduce the time taken to finish administrative procedures. This, in turn, enhances economic growth. The idea of corruption promoting growth has also been put forth by Huntington (1968). Bailey (1966) argues that corruption can improve the quality of bureaucracy by providing the civil servants with additional incentives in situations of less formal wages. Beck and Maher (1986) and Lien (1986) are of the view that corruption activities can act as a replica of a competitive framework in the form of an auction.

Another strand of literature finds no impact of economic governance on growth. Feeny (2005) does not find governance to have any significant role in improving the growth of an economy. This finding is also reflected in another study conducted by Feeny and Mcgillivray (2010).

Poor institutional environment leads to an adverse impact on public investment. Corruption, development and the investment quality appear to be inter-related in the endogenous growth model analysed by Chakraborty and Dabla-Norris (2009). According to the authors, inefficient public investment leads to a decline in private investment and productivity which eventually results in low growth. World Bank (2011) finds corruption in road sector to pose problems, in developing and developed countries alike. Tanzi and Davoodi (1997) find an inverse relationship between institutional quality and the level of public investment. In particular, they find that countries with weak institutional environment have higher public investment levels.

The relationship between governance and volatility of total investment has not been studied much. Weak governance is found to increase the volatility of public investment (Grigoli and Mills, 2014). Volatility has been found to lower the mean growth rate (Ramey and Ramey, 1995). Victor Zarnowitz and Geoffrey Moore (1986) find that in times of lower growth, the volatility of GNP growth as measured by its standard deviation is higher. GNP growth tends to be negatively affected by inflation uncertainty in a study conducted by Zarnowitz and Louis Lambros (1987).

Empirical Analysis

Data

To study the objective, I construct a panel dataset of 20 countries belonging to Asia and Africa for the time period of 1985-2013. It comprises of total investment volatility, institutional quality and a few control variables. I have taken gross capital formation in current US$ from World Development Indicators (WDI) published by the World Bank as a measure for total investment. Gross capital formation is normalized by GDP. All the control variables have also been taken from the World Development Indicator. Data on institutional quality is available from various sources. I have used the indicators available on institutional quality from the International Country Risk Guide (ICRG) database. Referring to Knack and Keefer (2007), I construct this variable as an additive index based on three indicators of governance: corruption, bureaucracy quality as well as the law and order. These indicators are first scaled from 0 to 30 and then added together to arrive at the governance variable. This variable is indicated as 'institutional quality.'

To study how economic governance affects total investment volatility, total investment volatility is defined as the absolute value of the percentage change in the deviation of the ratio of total investment to GDP, x_{it}, from the trend component extrapolated using the Hodrick-Prescott (HP) filter, $\tau_{x,it}$, minus the same deviation at time $t-1$, normalized by the trend at time $t-1$ (Grigoli and Mills, 2014). Another way to estimate total investment volatility is Rolling windows of standard deviation. But since it leads to a loss of observations, it has not been preferred in this study.

$$\text{Total Investment Volatility}_{it}\ (\text{TIV}) = \left| \frac{[(x_{it} - \tau_{x,it}) - (x_{it-1} - \tau_{x,it-1})]}{\tau_{x,it-1}} \times 100 \right|$$

There are other factors as well that have an effect on the volatility of total investment. *Domestic Credit to Private Sector (DCPS)*: Countries which provide better credit access tend to experience less variability in the investment. This translates into a stable growth path. Provision of credit to the private sector ensures smooth flow of resources that can be directed toward productive investment opportunities. According to WDI, it is defined as, 'Domestic credit provided by the financial corporation to the private sector, expressed as a percentage of GDP'.

Trade Openness (TO): Volatility of investment increases with trade openness. An open economy is more susceptible to the adverse effects of global environment. Trade has been taken to be the summation of exports and imports of goods as well as services, expressed as a percentage of GDP.

Overseas Development Assistance (ODA): ODA acts as a medium through which additional resources can be provided to a given country.

These resources can then be employed by the authorities to enhance investment in the economy. ODA here is defined as 'Net ODA received as percentage of GNI'.

Population Growth (PG): Size of an economy tends to have a positive impact on total investment. Highly populated countries, owing to their greater requirement for infrastructure, devote a higher share of GDP towards investment. It is the annual growth rate of population, expressed as a percentage of GDP.

Institutional Quality (IQ): Performance of countries having a strong institutional framework is reflected in strong macro-economic fundamentals. High institutional quality reduces the level of investment volatility. Institutional quality is the additive index of corruption, bureaucracy quality and law and order, taken on a scale of 0 to 30. Higher the value the better is the governance quality in an economy.

Methodology

Panel data analysis has lately been focussed on large time period, T, as well as large number of cross sectional units, N. Such panel dataset differs in characteristics from the one involving many cross sections, N, but few time periods, T. The short panel (containing few time periods) is empirically analysed by the use of methods like fixed effects regression, random effects regression and generalized method of moments (GMM). These methods consider the intercept to vary across cross sectional units while the slope coefficient remains the same.

The long panels, however, have lately been analysed through two new methods, namely, Pooled Mean Group (PMG) method and the Mean Group (MG) method. PMG and MG methodologies have been given by Pesaran et al (1997, 1999). In the MG method, the intercept and slope are different for each cross sectional unit. However, in the PMG model, the variation in intercept and slope holds just in the short run. This variability does not exist in the long run.

The relationship between the dependent variable, Y, and the vector of explanatory variables X in the long run is shown below:

$$Y_{it} = \Theta_0 + \theta' X_{it} + \mu_i + \varepsilon_{it} \qquad ...(1)$$

According to Pesaran et al (1999), Eq (1) can be represented in the form of ARDL $(m, n_1, \ldots \ldots n_k)$ as below:

$$Y_{it} = \sum_{k=0}^{m} \alpha_{ik} Y_{i,t-k} + \sum_{k=0}^{n} \beta'_{ik} X_{i,t-k} + u_i + \varepsilon_{it} \qquad ...(2)$$

Here, i= 1,2……N denotes the cross-sectional units and t=1,2…..T denotes the number of years. The X_{it} is a vector of k*1 that consists of the explanatory variables of the model, β_{ik} represents a vector of k*1 that consists of the coefficients, α_{ik} represents the scalars, μ_i represents the group specific effect and ε_{it} represents the error term.

For cointegration to be present, equation (2) is required to be expressed in error correction form, as given by equation (3) below:

$$\Delta Y_{it} = \varphi_i\left(Y_{i,t-1} - \eta_i' X_{it}\right) + \sum_{k=1}^{m-1} \alpha_{ik}^* \Delta Y_{i,t-1} + \sum_{k=0}^{n-1} \beta_{ik}'^* \Delta X_{i,t-k} + u_i + \varepsilon_{it} \quad ...(3)$$

Where φ_i represents the error correction term (ECT). For the relationship to exist in the long run, the ECT should be negative.

Panel Unit Root Tests

Since panel data involving a large time period can be prone to the issue of non stationarity, this paper has employed stationarity tests for panel data to find out the order of integration of the dependent as well as the explanatory variables employed. Panel data makes use of various stationarity tests for this purpose viz., Levin-Lin-Chu test (LLC), Im, Pesaran and Shin test(IPS), Hadri LM test, Harris-Tzavalis test, etc. We have used the LLC, IPS as well as the Fisher-type tests.

Result

Panel Stationarity Test

We begin with the analysis of unit root for the variables under consideration. Three tests have been used for this purpose – LLC, IPS and Fisher-type test.

The result of these stationarity tests has been shown in the Table-1.

Table-1: Unit Root Test at Levels

Test / Variable	LLC	IPS	Fisher-type
TIV	-9.96979 (0.0000)	-12.1179 (0.0000)	230.142 (0.0000)
IQ	-0.73603 (0.2309)	-2.60028 (0.0047)	20.6771 (0.9951)
ODA	-5.08683 (0.0000)	-6.23505 (0.0000)	97.9498 (0.0000)
DCPS	-0.40706 (0.3420)	-0.03606 (0.4856)	29.0394 (0.9003)
TO	-0.60465 (0.2727)	-1.36359 (0.0863)	62.6073 (0.0127)
PG	-1.80870 (0.0352)	-3.78384 (0.0001)	30.0265 (0.8745)

( ) shows the p-value of respective coefficients.

Source : Author's calculations

The LLC test reveals that the TIV, ODA, TO and PG are stationary at level. IQ as well as DCPS are stationary at first difference.

Table-2: Unit Root Test at First Differences

Test / Variable	LLC Test	IPS	Fisher-type Test
IQ	-11.4623	-9.60624	129.114
	(0.0000)	(0.0000)	(0.0000)
DCPS	-10.0337	-11.0108	219.320
	(0.0000)	(0.0000)	(0.0000)

( ) shows the p-value of respective coefficients.
Source: Author's calculations

The coefficient values of 'IQ' are -11.4623, -9.60624 and 129.114, respectively, according to the LLC, IPS and Fisher-type tests. Looking at the corresponding p-values, the null hypothesis stands rejected at the 1 per cent level of significance. Thus, all the three stationarity tests show IQD to be stationary at first difference. The coefficient values of DCPS are 10.0337, -11.0108 and 219.320, respectively, according to the LLC, IPS and Fisher-type tests. Again, by looking at their respective p-values, the null hypothesis of unit root stands rejected. Hence, DCPS is also stationary at first difference.

Since there exists a mixture of I(0) as well as I(1) variables, PMG / MG methodology will be most appropriate to analyse the objective.

Pooled Mean Group / Mean Group Regression

It examines the effect of IQ on TIV. The control variables including ODA, DCPS, TO and PG are taken as the control variables.

Table-3: Results of Pooled Mean Group / Mean Group Estimation (Dependent Variable: Total Investment Volatility)

Variable	PMG	MG	Joint H-Stat.
Error Correction Coefficient (ϕi)	-.933*	-1.220*	
	(0.0000)	(0.0000)	
Long-run:			
IQ	-.429*	-.151	3.28
	(0.001)	(0.864)	[0.6567]
ODA	.588*	2.915	
	(0.001)	(0.123)	
DCPS	-.036	.309	
	(0.228)	(0.205)	
TO	.077*	.029	
	(0.004)	(0.484)	
PG	1.953*	-6.494	
	(0.001)	(0.469)	
Constant	4.565*	12.623	
	(0.003)	(0.606)	
No. of Countries	20	20	
No. of obs.	538	538	

*, ** and *** represent the coefficient is significant at 1, 5 and 10 percent respectively;
Figures in parenthesis of type ( ) are the p-value of respective coefficient.
Source: Author's Calculations

The Hausman test statistic is statistically significantly equal to zero, as shown in the table above. Thus, we fail to reject the null hypothesis of the pooled mean group estimator. Elaborating the results from the pooled mean group regression, we see that in the long run IQ, ODA and DCPS have a statistically significant and negative impact on TIV at one percent level of significance. If the IQ increases by one unit, the TIV as a percentage of GDP decreases by .429 units, ceteris paribus.

In contrast, ODA,TO and PG have a positive and statistically significant impact on TIV at one percent level of significance. As the amount of ODA increases by one unit, the TIV also increases by. 588 units, ceteris paribus. If TO increases by one percent of GDP, the TIV will increase by .077 units, ceteris paribus. Similarly, if the PG increases by one unit, the TIV will increase by 1.953 units, ceteris paribus. Moreover, the convergence to the long run equilibrium will occur by 93.3 percent.

As the governance framework of an economy improves, the transparency and accountability of public officials also increases. Improvement in the macro-economic framework is reflected in a reduction in the volatility of investment in the economy. In a similar fashion, provision of DCPS increases its resource pool which might be used for purposes of investment. Increase in the funds available for investment leads to a decrease in investment volatility in the economy. In respect of PDA, unpredictability of the aid can lead to a cut in investment by the government. Lastly, as the volume of trade of an economy with the rest of the world increases, its level of integration with the world market increases. It becomes more vulnerable to economic and political shocks globally. This induces some volatility in the investment component of economic growth.

Conclusion

This paper has aimed at studying the impact of institutional quality on the total investment volatility. For this purpose, a sample size of 20 Asian and African countries over the time period 1985-2011 has been taken. To study the impact, unit root analysis has been conducted. The unit root results reveal TIV, IQ, ODA and PG to be stationary at level. TO and DCPS, however, are stationary at the first difference. Since none of the variables are integrated of order I(2), panel pooled mean group (PMG) is the most appropriate methodology to be employed. The short run results of PMG regression indicates convergence to long run path by 93.32 per cent. The long run results tell us that IQ negatively affects TIV. However, ODA, TO and PG have a positive effect on TIV. This study, however, suffers from a limitation as only three indicators, corruption, bureaucracy quality and law and order, have been used to construct the governance variable. This has occurred since data on other indicators is not available for the period used in the analysis.

To conclude, our analysis clearly points to a policy framework whereby consistent efforts to improve the institutional framework by countries are required such that they achieve stability in their investment climate and thereby the growth in long run.

References

Acemoglu, D., & Johnson, S. (2005). Unbundling Institutions. *Journal of Political Economy,* 113**,** 949-995.

Ali, A.M., & Crain, W.M. (2002). Institutional Distortions, Economics Freedom, and Growth. *Cato Journal, 21*.

Bailey, D.H. (1966). The effects of corruption in a developing nation. *Western Political Quarterly,* 19, 719-732.

Barro, R.J. (1991). Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics,* 106, 407-44.

Becker, G.S. (1962). Investment in Human Capital: A Theoretical Analysis. *Journal of Political Economy, LXX,* 9-49.

Beck, P.J., & Maher, M.W. (1986). A comparison of bribery and bidding in thin markets. *Economics Letters,* 20*,* 1-5.

Dixit, A. (2001). On modes of economic governance. *CESifo Working Paper Series,* 589.

Dollar, D., Iarossi, G., & Mengistae, T. (2002). Investment Climate and Economic Performance: Some Firm Level Evidence from India. *Stanford University Centre for Research on Economic Development and Policy Reform Working Paper,* 143.

Grigoli, F., & Mills, Z. (2014). Institutions and public investment: An empirical analysis. *Econ Gov,* 15*,* 131-153.

Grogan, L., & Moers, L. (2001). Growth and empirics with institutional measures for transition countries. *Economic Systems,* 25, 323-344.

Grossman, G.M., & Helpman, E. (1991). Quality Ladders in the Theory of Growth. *The Review of Economic Studies,* 58, 43-61.

Huntington, S.P. (1968). Political order in changing societies. *Yale University Press.*

Huther, J., & Shah, A. (1996). A Simple Measure of Good Governance and its Application to the Debate on the Appropriate Level of Fiscal Decentralization. *World Bank Policy Research Paper Series*.

Kaufmann, D., Kraay, A., & Zoido-Lobaton, P. (1999). Governance matters. *World Bank, Development Economics Research Group, Washington, D.C.*

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2004). Governance matters III: governance indicators for 1996, 1998, 2000, and 2002. *World Bank Economic Review,* 18, 253-87.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: Cross-country tests using alternative institutional indicators. *Economics and Politics,*7.

Knack, S., & Keefer, P. (2007). Boondoggles, rent-seeking and political checks and balances: Public investment under unaccountable governments. *Rev Econ Stat*, 89, 566-572.

Lein, D.H.D. (1986). A note on competitive bribery games. *Economics Letters,* 22, 337-341.

Lui, F.T. (1985). An equilibrium queuing model of bribery. *Journal of Political Economy,* 93, 760-781.

Malik, A. (2002). State of the art in governance indicators. *United Nations Development Programme, Background paper*.

Mankiw, N.G. (1995). The Growth of Nations. *Brookings Papers on Economic Activity,* 1, 275-326.

Mankiw, N. Gregory., Romer, D., & Weil, D.N.(1992). Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics,*107, 407-37.

North, D.C., & Thomas, R.P. (1976).The Rise of the Western World: A New Economic History. *Cambridge University Press*.

North, D.C. (1981). Structure and Change in Economic History. *Cambridge University Press.*

North, D. (1990). Institutions, Institutional Change and Economic Performance. *Cambridge University Press.*

North, D. (2005). Understanding the Process of Economic Change. *Princeton University Press.*

Pesaran, M. H., Shin, Y., & Smith, R.J. (1997). Estimating long-run relationships in dynamic heterogeneous panels. *DAE Working Papers Amalgamated Series 1721.*

Pesaran, M. H., Shin, Y., & Smith, R.J. (1999). Bounds Testing Approaches to the Analysis of Long-run Relationships. *Cambridge Working Papers in Economics*.

Ramey, G., & Ramey, V.A. (1995). Cross-Country Evidence on the Link Between Volatility and Growth. *The American Economic Review,* 85, 1138-1151.

Solow, R.M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics,*70, 65-94

Williamson, O.E. (1975). Markets and hierarchies: Analysis and antitrust implications. *New York: Free Press.*

Zarnowitz, V., & Lambros, L. (1987). Consensus and Uncertainty in Economic Prediction. *Journal of Political Economy,* 95, 591-621.

Zarnowitz, V., & Moore, G. (1986). Major Changes in Cyclical Behavior. *The American Business Cycle: Continuity and Change*, 519-72.

International Trade and Foreign Direct Investment as Determinants of Economic Growth: Evidence from Spain

Adolfo Maza[*]

Abstract

The effects of globalization, exemplified by the continuous increase in trade and foreign direct investment flows, on economic growth have been addressed in the literature from very different perspectives. In this paper, using the case of Spain at the regional level as a sort of laboratory, this issue is analyzed through different methodologies that allow, on the one hand, to test the robustness of the results and, on the other hand, to differentiate between short- and long-term effects. The findings indicate that both variables, but especially the increase in trade, boosted economic growth in the Spanish regions during the period prior to the economic crisis unleashed in 2008.

Keywords: Economic Growth, Foreign Direct Investment, Spain, Trade

Introduction

While it is true that in times of crisis, such as those that have recently shaken the world economy, there is a clear tendency to magnify the impact of economic fluctuations, it is no less true that they lose importance when a broad, long-term time perspective is adopted. In this context, in which economic cycles are somewhat relegated to the background, achieving economic growth becomes the almost exclusive concern of citizens, economic and social agents and, of course, governments.

For this reason, ever since economics began to emerge as a branch of scientific knowledge in its own right (back in the second half of the 19th century by virtue of the pioneering work of the Scottish economist and philosopher Adam Smith), the analysis of economic growth has been one of the topics that has most captured and captivated the attention of

---
[*]   Professor, Universidad de Cantabria, Spain and can be reached at:adolfo.maza@unican.es

economists. The ultimate reason is that the phenomenon of economic growth (apart from the scientific challenge of trying to explain a fact of great importance for humankind) is, when sustained, the main determinant of the standard of living or welfare of the population. Moreover, as a very elementary calculation exercise shows, it happens that "small differences in the growth rate, sustained over long periods of time, generate enormous differences in per capita income levels" (Sala-i-Martin, 1994). Numerous real examples illustrate that this is the case. For information purposes only, we believe it is useful to include here two examples provided by Birch-Sorensen and Whita-Jacobsen (2005) in their well-known Handbook on Economic Growth. The first example refers to two underdeveloped countries, Botswana and Nigeria, which in 1960 had similar levels of GDP per capita. Forty years later, and as a result of the former growing at an average of 6% per year and the latter experiencing, on average, a rate of -1.2%, Botswana's per capita GDP was more than twelve times higher than Nigeria's. The second example refers to Venezuela and Italy. In 1960, Venezuela had a GDP per capita of about 83% of that of the US, while Italy's was only 55%. By the year 2000, and as a result of Italy experiencing an average annual growth of 2.9% while Venezuela experienced a cumulative annual decline of 0.9%, Italy enjoyed a per capita GDP of approximately 85% of that of the US, while Venezuela's was sinking to only 28%.

As can be understood from the above examples, and although this is a debatable decision (Villaverde and Maza, 2013), the term economic growth is linked to the increase in income, whether expressed in aggregate levels or in per capita values. Thus, the economic indicators usually employed to quantify economic growth are essentially two: per capita GDP and GDP; the former as a magnitude that reflects what is conventionally understood as standard of living, level of welfare or level of development, while the latter is used to capture the total value of an economy's production.

In view of the above, this paper, taking Spain at the regional level as a case study, aims to analyze the role that two of the key variables of the international economy, namely trade and foreign direct investment, play in the processes of economic growth. With this objective in mind, we would like to emphasize that the period analyzed runs from 1995, the first year for which we have completely homogeneous information, to 2008, the year in which the world economic crisis (known as the 'subprime mortgage crisis' and later as the Great Recession) broke out. We have preferred to end the analysis in 2008 because our objective is to draw conclusions from a period that can be described as 'ordinary', and the inclusion of such an extraordinary period as the one that began in 2008 would invalidate our aim. Thus, and following the general trend in the use of per capita income as a study variable, Table-1 and Figure-1 allow the reader to grasp

a not very precise, but sufficient, idea of our case study. Two are the most significant features:

- Firstly, the process of per capita GDP growth has been generalized (Table-1), although with notable discrepancies by region. In particular, it is noteworthy that, on a national average of 2.29% cumulative annual growth, Asturias, with an average growth of 3.65%, was the region with the best performance, while Murcia, with a year-on-year increase of 1.51%, was the one registering the lowest growth.

- Secondly, as a result of the disparities noted in the per capita GDP growth rate, regional differences have decreased, albeit not very sharply, between 1995 and 2008 (Figure-1). To be precise, the value of the coefficient of variation was 0.212 in the initial year and 0.197 in the final year, which implies a 7% drop in inequality during the period examined.

Be that as it may, and in line with what has already been pointed out, it should be noted that the per capita GDP growth rates do not accurately reflect the true income dynamism of the Spanish regions, since they also indirectly reflect demographic evolution. In this sense, the last two columns of Table-1 show, respectively, the GDP and population growth rates, revealing that the most dynamic region (i.e., with the greatest increase in GDP) was now the Balearic Islands, with a growth rate of 4.41%. The least forceful was Extremadura, with an increase in output of 'just' 2.94% annual cumulative, so that only its stagnation in terms of population allowed it to reduce its differences in per capita GDP with the national average.

Table-1: Economic growth in the Spanish regions (1995-2008)

Region	GDPpc 1995=100		GDPpc Spain=100		Growth rate		
	1995	2008	1995	2008	GDPpc	GDP	Population
Andalucía	100.0	134.8	75.2	75.0	2.30	3.30	1.01
Aragón	100.0	140.2	104.3	104.1	2.60	3.28	0.68
Asturias	100.0	160.8	80.9	81.2	3.65	3.49	-0.17
Baleares	100.0	125.3	123.4	122.0	1.74	4.41	2.67
Canarias	100.0	122.0	97.4	96.8	1.53	3.68	2.15
Cantabria	100.0	151.6	90.6	91.0	3.20	3.82	0.63
Castilla y León	100.0	149.7	88.3	88.3	3.10	3.09	-0.02
Castilla-La Mancha	100.0	126.4	80.0	79.1	1.80	3.07	1.27
Cataluña	100.0	133.1	120.3	120.9	2.20	3.54	1.33
Valencia	100.0	124.2	97.5	97.9	1.67	3.48	1.81
Extremadura	100.0	144.4	63.3	63.1	2.83	2.94	0.12
Galicia	100.0	154.5	75.3	75.6	3.35	3.41	0.06
Madrid	100.0	124.7	138.3	137.8	1.70	3.34	1.64
Murcia	100.0	121.7	86.9	85.9	1.51	3.58	2.07
Navarra	100.0	131.6	130.1	129.9	2.11	3.16	1.05
País Vasco	100.0	152.2	119.3	120.1	3.23	3.44	0.21
Rioja (La)	100.0	127.3	113.8	112.8	1.86	3.20	1.35
Spain	100.0	134.6	100.0	100.0	2.29	3.41	1.13

Source: Spanish Statistics Institute and own elaboration

Figure-1: Differences in per Capita Income Among Spanish regions (Coefficient of Variation)
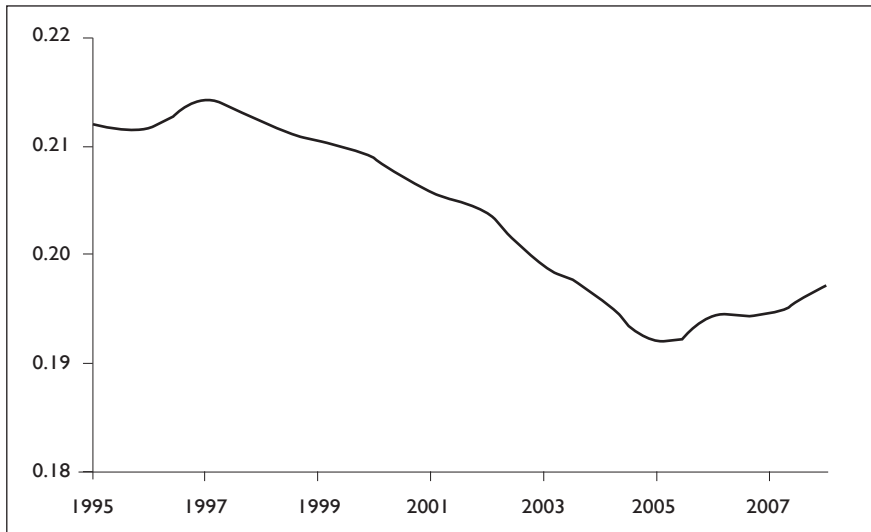
Source: Spanish Statistics Institute and own elaboration

Having characterized, very briefly, the economic growth of the Spanish regions, the rest of the paper focuses on the study of the role played by trade and foreign direct investment in this process. Thus, this paper is structured as follows. The next section offers, from an informal perspective (for an exhaustive analysis see, for example, Barro and Sala-i-Martin, 2003), a succinct review of the theory of economic growth, identifying some of its potential determinants. The third section provides an empirical analysis of the importance of foreign trade and FDI in the intense growth process that took place in Spain at the regional level. The last section summarizes the main conclusions.

International Trade, Foreign Direct Investment and Economic Growth: A Brief Theoretical Overview

The main purpose of this section is to recall what, according to economic theory, can be classified as the main sources of economic growth. Subsequently, we will turn our attention to what theory postulates about the relationship between foreign trade, FDI and economic growth. Obviously, this issue is of particular relevance due to the intense process of globalization that the Spanish economy, and the world economy, has undergone in recent decades. In fact, although there are different definitions of globalization, it is worth mentioning that one of the most widely used is precisely the definition that understands globalization as the continuous increase in international trade and foreign capital flows, so that the study of

their effects on growth seems entirely relevant. For a more comprehensive overview of globalisation and its consequences on economic growth, see, for example, Villaverde and Maza (2011).

Although particularly relevant today, the analysis of the determinants of economic growth goes back many years. Thus, most economic growth models, whether neoclassical or 'endogenous growth' models, consider that the first and main source of economic growth is the accumulation of production factors, especially capital (physical, public, human and technological). Smith, the first great economist concerned with the issue, emphasized three factors: land, labor and capital. Marshall, for his part, added the organization of production as a fourth factor, although he also pointed out that the distribution of income and wealth affected the degree of efficiency of the system and, therefore, its economic growth. Schumpeter, who popularized the concept of *creative destruction*, turned the attention to technological aspects, through invention, innovation and entrepreneurship. Harrod and Domar, initially, and later Solow and his followers, introduced mathematics into the analysis of economic growth. In particular, Solow can be considered as the founder of the 'neoclassical revolution', in which the focus is on a production function with constant returns to scale and exogenous technical progress. In this setting, output and capital grow in the long run at a rate equal to the sum of the growth rates of population (if the rate of activity remains constant) and technical progress. Despite the progress that this approach represented in comparison with the less formalized (and more rigid) approach of Smith and his followers, frustration with the consideration of technical progress as exogenous gained ground until, in the 1980s, a new revolution took place in the theory of economic growth, with the appearance and development of the endogenous growth theory. The basic premise of this theory is that technological progress is likely not exogenous but depends on economic factors, such as, for example, the amount of capital per worker and, above all, expenditure on R&D activities, expenditure which, in turn, depends on the fecundity of the research process and the possibilities of appropriating its results, Consequently, technical progress and, with it, growth become endogenous, i.e., they are determined from within the economic system itself.

Continuing with growth models, it should be noted that, although initially these theoretical models were essentially developed in the context of a closed economy, they soon came to consider that openness to the rest of the world (with the consequent increase in foreign trade and investment flows) was, in itself, an additional (and important) source of economic growth. Adapting the growth models of a closed economy to the case of an open economy is relatively straightforward. Indeed, if in a closed economy all investment must necessarily be financed by domestic savings, this restriction is broken,

totally or partially, when the closed economy maintains trade and financial relations with the rest of the world. Thus, assuming the existence of capital mobility, capital inflows from abroad can be added to loanable funds from domestic savings in order to finance domestic investment; in this way, the capital stock is raised (Baldwin and Seeghezza, 1996, formalize this relationship) and, consequently, the level of income per capita. In any case, it has to be indicated that, in the context of neoclassical growth models, external indebtedness only contributes to economic growth in a transitory way, not constituting, therefore, a mechanism that allows raising, in the long-term (i.e., in a sustained manner), the growth rate of the economy. Despite this being the case, in addition to the effects on growth caused by the (potential) increase in financing capacity, opening up to the outside world also promotes economic growth through mechanisms such as labor mobility, increased competitive pressure and market expansion, which increases the chances of such growth being sustained.

From the point of view of endogenous growth models for open economies, one of the main mechanisms explaining the link between economic growth and external openness is the so-called spillover effect, or the appearance of externalities on an international scale. The idea underlying this effect is that, although capital may be subject to diminishing returns in the domestic sphere, trade and financial openness (with the consequent enlargement of the market mentioned above and, as a consequence, the better use of the economies of scale it entails) may give rise to constant or increasing returns, especially in the sectors most closely linked to research and development. Another relevant idea in this type of model, overlapping to some extent with the previous one, is the one that arises from the connections between the exchange of goods and the exchange of technology and knowledge (Rivera Batiz and Romer, 1991). Indeed, given that in endogenous growth models the accumulated stock of knowledge constitutes one of the main drivers of economic growth (since it facilitates and makes the realization and application of technological innovations easier and cheaper), it is obvious that everything that contributes to its increase will also contribute to such growth. Thus, if it is considered that the introduction of new products – via external openness – increases the stock of knowledge, it seems logical to think that the international exchange of products will serve to disseminate this knowledge more and better, thus establishing a direct link between the degree of a country's external openness and its rate of economic growth.

This brief review of the theory of economic growth shows that, in addition to the classic factors there are others that also play a fundamental role in the process of economic growth. Indeed, in the context of an open economy, factors such as international trade and foreign investment, which are precisely addressed in this paper, must be added to the accumulative processes of production factors and technological improvements.

The role of international trade was first highlighted by Adam Smith and later by David Ricardo, who pointed out that countries that specialize (in absolute or relative terms) through international trade can produce and consume more and at lower costs, thus improving their level of welfare. Specifically, Smith's main message was that, through the division of labor, it is possible to increase the efficiency of an economy; although such efficiency is limited by the size of the market, economies can overcome this limitation through international trade, since it increases the size of the market, among other things. In this way, trade increases efficiency and welfare and, therefore, economic growth.

Many studies also consider FDI as a growth driver (see, for example, Tang and Selvanathan, 2008). Without being exhaustive, it can be said that there are at least six ways in which FDI affects (or can affect) the economic growth of the region or country that receives it:

- Technological improvement, since it favors the appearance of externalities through a mechanism of technology and knowledge transfer from the sender to the receiver (know-how); for this to occur, however, it is necessary that the economic area receiving the FDI flows meets certain minimum levels of human capital, infrastructure, free market, political and economic stability, etc. (see e.g. Fernando Morales and Moreno, 2020).

- Increase in physical and financial capital, serving as a complement to internal financing.

- Rise in economic activity due mainly to the interrelationships between the companies formed through FDI and local companies.

- Increase in exports. As a rule, the higher the weight of multinational companies in the investment flows received, the greater the increase.

- Creation of employment, of a more qualified workforce and, consequently, an increase in productivity.

- Contribution to GDP of the new economic activity and increase in tax revenues.

To summarize all of the above, we could take a statement by Van der Ploeg and Tang (1994) in which they argue that international trade can boost growth through the exploitation of economies of scale and the creation of an incentive to innovate instead of imitating. Krueger (1997) expresses himself in similar terms, stating that trade and payments liberalization is crucial for both industrialization and economic development. Likewise, and focusing on FDI, many authors allude to it as a factor for growth, provided that certain initial conditions are met in the country (or region) that receives it, since it is a mechanism that, by its nature, increases the stock of capital, leads to the expansion of markets and favors the diffusion

of knowledge (see, in summary, the work of De Mello, 1997). In short, it seems that the recent literature on economic growth comes to the general conclusion that one of the main drivers of economic growth is free trade in goods and capital. Therefore, the main objective of the following section is to find out whether the Spanish regions fit this pattern or whether, on the contrary, the intense growth in these regions had nothing to do with the increasing internationalization of the Spanish economy.

International Trade, Foreign Direct Investment and Economic Growth: An Empirical Analysis

Methodological Approaches

In this section, we adopt an eminently empirical perspective when discussing the determinants of economic growth. First of all, we believe that it is worth highlighting the existence of numerous empirical studies that tend to support, most of them through a cross-section analysis and for different countries, the positive association between globalization (basically understood as the increase in trade and financial flows) and economic growth (Barro, 1991; Frankel and Romer, 1999; Dollar and Kraay, 2002; Villaverde and Maza, 2011; Banday et al., 2021). These studies show conclusively that countries that actively participate in international trade and open up to foreign direct investment generally have higher economic growth rates than countries that are more poorly integrated into today's global economy.[1] Despite this, it should be noted that this type of study has been criticized due to the low robustness of its results (Rodriguez and Rodrick, 2000; Srinivasan and Bhagwati, 2001), which has led to the application of new econometric approaches, based above all on the use of panel data techniques. These techniques avoid aggregation problems and allow the variability of the data over time to be introduced into the analysis.

Hence, we try to contribute to the literature from two points of view. On the one hand, finding out whether in the Spanish case and during the pre-crisis period we can consider, or not, international trade and FDI as drivers of regional growth. On the other hand, and following the pattern set by Coulombe (2007), we analyze the relationship between international trade, FDI and economic growth from three different, although complementary, methodological approaches, which allows us to obtain additional results to those of previous works. Among them we highlight, for example, the distinction between the short and long-term effects of the aforementioned variables on growth.

---

[1] In this regard, it should be noted that empirical evidence has shown that the relationship between economic growth and foreign trade is heterogeneous. A recent study, for example, concludes that the link is stronger the lower the degree of development of the area considered (Dufrenot et al., 2010).

First, we estimate a conventional economic growth equation, in which such growth depends on the initial per capita income of the region considered and on a series of additional variables among which we introduce, as we have just pointed out, trade and FDI. Specifically, the estimated equation, which we will call the dynamic specification of the model (from now on DS), is as follows:

$$\Delta GDPpc_{it} = \alpha_i + \beta_1 GDPpc_{it-1} + \beta_2 \widetilde{GDPpc}_{it} + \beta_3 \left(TR/GDP\right)_{it-1} + \beta_4 \left(FDI/GDP\right)_{it-1} + \beta_5 HC_{it-1} + \beta_6 PS_{it-1} + \varepsilon_{it} \quad \dots(1)$$

In this expression, all variables are expressed in logarithms (the growth rate is proxied as the difference of logarithms), with $GDPpc_{it}$ denoting the per capita income of region i at time t (obtained from the Spanish Statistics Institute), TR referring to international trade (from datacomex database) and FDI denoting foreign direct investment (from datainvex database). Likewise, we have included as control variable HC (denoting human capital, which is approximated by the weight of employed persons with higher education, obtained from the series published by the *Instituto Valenciano de Investigaciones Económicas* or IVIE). Another control variable is the weight of the primary sector in total GDP (again from the Spanish Statistics Institute), denoted by PS, because given the high correlation between the weight of the secondary sector and trade, and the weight of the tertiary sector and FDI, if they were included there would be multicollinearity problems. Furthermore, we considered the variable $\widetilde{GDPpc}$, which is a measure of the business cycle computed using the well-known Hodrick-Prescott filter; it should be noted, in any case, that the results obtained were robust to the change of filter. The inclusion of this variable capturing the economic situation, which, incidentally, improves the estimates notably, is because the use of annual data makes it difficult to separate between short- and long-term effects (something that, as we have said, is one of our objectives in this paper). Finally, we have included regional fixed effects in the regression equation based on the results of the well-known Hausman test.

Secondly, we have proceeded to estimate an error correction model (hereafter ECM). In this model, we aim to eliminate one of the main drawbacks of the DS model, namely that it does not allow us to identify the short-term effects of our variables of interest: trade and FDI.[2] Thus, given our ECM specification, we will be able to point out the effect of these variables on economic growth in the short-term. To be precise, the estimated equation reads as follows:

---

[2]   A circumstance we believe is of particular importance in the case analyzed since we have annual periodicity data.

$\Delta GDPpc_{it} =$

$\alpha_i + \beta_1 GDPpc_{it-1} + \beta_2 \widetilde{GDPpc}_{it} + \beta_3 \Delta\left(^{TR}/_{GDP}\right)_{it} + \beta_4 \Delta\left(^{FDI}/_{GDP}\right)_{it} +$

$\beta_5\left(^{TR}/_{GDP}\right)_{it-1} + \beta_6\left(^{FDI}/_{GDP}\right)_{it-1} + \beta_7 HC_{it-1} + \beta_8 PS_{it-1} + \varepsilon_{it}$ ...(2)

where Δ denotes the growth rate and all variables have the known meaning.

Finally, we employ an adaptation of the panel data model proposed by Frankel and Romer (1999). This approach, unlike the previous ones, is a static approach (hereafter SA) in which lags of the dependent variable are not included. The estimated equation, in this case, is:

$GDPpc_{it} = \alpha_i + \beta_1 \widetilde{GDPpc}_{it} + \beta_2\left(^{TR}/_{GDP}\right)_{it} + \beta_3\left(^{FDI}/_{GDP}\right)_{it} + \beta_4 HC_{it} +$

$\beta_5 PS_{it} + \varepsilon_{it}$ ...(3)

where once again all variables have the known meaning.

Although the SA specification appears radically different from the DS and ECM ones, the relationship between them arises when the existence of serial correlation is taken into consideration. Therefore, the presence of serial auto correlation in the residuals obtained in the DS and ECM estimations has been tested, the results showing that the null hypothesis of no serial auto correlation cannot be rejected at 95% in either case. This does not occur, however, in the case of the SA model, where the absence of serial auto correlation in the residuals is clearly rejected at the indicated level. Consequently, to address the problem of the residuals of the SA equation being correlated over time, we have modeled them as follows (for more details see Coulombe, 2007):

$\varepsilon_{it} = \rho\varepsilon_{it-1} + u_{it}$ ...(4)

Before proceeding to comment on the results obtained in the three proposed specifications, let us make some additional comments regarding the estimation method employed in each case. On the one side, in order to solve potential problems of heteroskedasticity, we have used the generalized least squares technique (with cross-section weights) in all estimations; likewise, for the standard errors, we have used the White correction to correct for heteroskedasticity in the estimations.

On the other side, regarding the potential endogeneity of the variables of interest, i.e. trade and FDI, in the estimates, we have used the version of the Hausman test proposed by Davidson and MacKinnon (1993) to test for its presence. The results obtained indicate that endogeneity problems are not present in the two initial specifications, the DS and ECM; in other words, the use of time lags in these estimations eliminates potential endogeneity problems that might exist. In the SA model, however, the opposite is true.

According to the aforementioned test, the null hypothesis of exogeneity can be rejected at 95%, so in this case we have chosen the generalized least squares method in two stages, using as instruments two lags of the trade and FDI variables, in addition to the exogenous independent variables. The Sargan test confirmed that the null hypothesis of instrument validity cannot be rejected at 95%.

Results

The results obtained in the estimations of the two models with a dynamic component (DS and ECM) are shown in Table-2; these results reveal, among others, the following facts that deserve to be highlighted:

• Starting with our variables of interest, the coefficients associated with international trade and foreign direct investment turn out, in all cases, to be positive and statistically significant at 95%. In other words, our results point to the role of these two variables as drivers of regional growth. Furthermore, if we look at their coefficients, we see that the role played by trade in the growth process has been greater than that played by FDI.

• The coefficient associated with the one-period lagged level of per capita income is negative, although it is statistically significant only in the DS (and only at 90%). It seems, therefore, that the empirical evidence casts doubt on the existence of a regional convergence process in Spain during the time span analyzed.

• As for the control variables, the results obtained are as expected. That is to say, it seems that the regions with greater endowments of human capital have seen their rate of growth intensify compared to that of the regions with lower endowments; quite the opposite occurs, however, in the regions where the weight of the primary sector is high.

• As regards the variable denoting the regional business cycle, it should be noted that it is significant (and positive, as expected) in both cases. As previously indicated, its inclusion improves the estimates, since it eliminates short-term fluctuations in the growth rate of regional per capita income (Coulombe, 2007).

• Finally, as concerning the short-term effects of trade and FDI, the ECM specification (last columns of the table) shows that, in the case of the former, the short-term effects are the opposite of the long-term effects, a surprising circumstance that will require further work to try to find a plausible explanation. This is not the case, however, for FDI, where the short-term effects are also positive. In any case, the most important result of the ECM model is that the above conclusion – that both trade and FDI have positive long-run effects on economic growth – is robust to the inclusion of a short-run effect in both variables.

Table-2: Economic Growth, International Trade and FDI (1995-2008): Dynamic Models

| | Dependent Variable: $\Delta GDPpc_{it}$ | | | |
| | DS | | ECM | |
	Coef.	t-student	Coef.	t-student
$GDPpc_{it-1}$	-0.026**	-1.64	-0,023	-1,53
$\widetilde{GDPpc}_{it}$	0.706*	11.28	0,680*	11,46
$(TR/GDP)_{it-1}$	0.015*	3.42	0,009*	1,96
$(FDI/GDP)_{it-1}$	0.001*	2.39	0,002*	3,60
HC_{it-1}	0.014**	1.74	0,018*	2,45
PS_{it-1}	-0.052*	-7.01	-0,049*	-7,24
$\Delta(TR/GDP)_{it}$	-	-	-0,019*	-2,90
$\Delta(FDI/GDP)_{it}$	-	-	0,001**	1,84
R^2		0.65		0.67

Notes: All equations include fixed effects; (*) significant at 95%; (**) significant at 90%.

Source: Spanish Statistics Institute, datacomex, datainvex, IVIE, and own elaboration.

Table-3 shows the results obtained in the estimation of the static model (SA), from which the following conclusions, among others, can be drawn:

1. Both the effect of FDI and, above all, that of international trade on the level of per capita income are positive and statistically significant at 95%. Once again, trade appears to be a stronger growth driver than FDI.

2. The coefficients associated with the control variables keep their sign, once again highlighting that a higher level of human capital and a lower weight of the agricultural sector lead to a higher level of regional growth.

3. The variable representing the business cycle continues to be positive and statistically significant.

Table-3: Economic Growth, International Trade and FDI (1995-2008): Static Model.

| | Dependent Variable: $GDPpc_{it}$ | |
| | SA | |
	Coef.	t-student
$\widetilde{GDPpc}_{it}$	1.710*	5,89
$(TR/GDP)_{it}$	0.170*	10,96
$(FDI/GDP)_{it}$	0.036*	2,23
HC_{it}	0.328*	26,15
PS_{it}	-0.333*	-4,52
R^2		0.94

Notes: All equations include fixed effects; (*) significant at 95%.

Source: Spanish Statistics Institute, datacomex, datainvex, IVIE, and own elaboration.

Conclusions

After highlighting the intense process of regional growth that took place in Spain during the period before the onset of the Great Recession (specifically, from 1995 to 2008), this paper has briefly reviewed the most important aspects postulated by economic theory on the relationship between international trade, FDI and economic growth. Subsequently, an empirical analysis of this issue has been presented, revealing the findings that both FDI and, above all, international trade have had positive long-term effects on regional growth; in other words, both variables have acted as drivers of regional development in Spain. These results are robust to different proposed specifications, and therefore give reason to point out, even more so in a context such as the current one, that the internationalization of regional economies should be one of the basic priorities on the agenda of regional governments in Spain, and of course of the national government, in order to return to a path of sustained growth as soon as possible.

References

Baldwin, R. & Seghezza, E. (1996). Trade-induced investment-led growth. NBER Working Paper, nº 5582.

Banday, U.J., Murugan, S. & Maryam, J. (2021). Foreign direct investment, trade openness and economic growth in BRICS countries: evidences from panel data. *Transnational Corporations Review,* 13(2), 211-221.

Barro, R. (1991). Economic growth in a cross-section of countries. *Quarterly Journal of Economics,* 106(2), 407-443.

Barro, R. & Sala-i-Martín, X. (2003). *Economic Growth*. Cambridge, Massachusetts, London, England: MIT Press.

Birch-Sorensen, P. & Whita-Jacobsen, H.J. (2005). *Introducing Advanced Macroeconomics: Growth and Business Cycles*. New York: McGraw Hill.

Coulombe, S. (2007). Globalization and regional disparity: A Canadian case study. *Regional Studies,* 41(1), 1-17.

Davidson, R. & MacKinnon, J.G. (1993). *Estimation and Inference in Econometrics*. New York: Oxford University Press.

De Mello, L.R. (1997). Foreign direct investment in developing countries and growth: A selective survey. *Journal of Development Studies,* 34, 1-34.

Dollar, D. & Kraay, A. (2002). Institutions, trade, and growth. *Journal of Monetary Economics,* 50, 133-162.

Dufrenot, G., Mignon, V. & Tsangarides, C. (2010). The trade-growth nexus in the developing countries: a quantile regression approach. *Review of World Economics,* 146(4), 731-761.

Fernando Morales, H. & Moreno, R. (2020). FDI productivity spillovers and absorptive capacity in Brazilian firms: A threshold regression analysis. *International Review of Economics & Finance,* 70, 257-272.

Frankel, J.A. & Romer, D. (1999). Does trade cause growth? *American Economic Review,* 89(3), 379-399.

Krueger, A. (1997). Trade policy and development: How we learn. *American Economic Review,* 87(1), 1-22.

Rivera-Batiz, L. & Romer, P. (1991). Economic integration and endogenous growth. *Quarterly Journal of Economics,* 2, 531-555.

Rodriguez, F. & Rodrick, D. (2000). Trade policy and economic growth: a skeptic's guide to the cross-national evidence. In B. Bernanke & K. Rogoff (Eds.), *Macroeconomics Annual 2000*, MIT, Cambridge MA.

Sala-i-Martin, X. (1994). *Notes on Economic Growth*. Barcelona: Bosch.

Srinivasan T.N. & Bhagwati J. (2001). Outward-orientation and development: Are revisionists right? In D. Lal & R.H. Snape (Eds.), *Trade, Development and Political Economy*, Palgrave Macmillan.

Tang, S. & Selvanathan, S. (2008). Foreign Direct Investment, Domestic Investment and Economic Growth in China: A Time Series Analysis. *World Economy,* 31(10), 1292-1309.

Van der Ploeg, F. & Tang, P. (1994). Growth, deficits and research and development in the global economy. In F. van der Ploeg (Ed.), *The Handbook of International Macroeconomics*, Blackwell.

Villaverde, J. & Maza, A. (2011). Globalisation, Growth and Convergence. *World Economy,* 34(6), 952-971.

Villaverde, J. & Maza, A. (2013). To what extent do regional disparities depend on the measure and indicator employed?: A reference to the EU. *Revista de Economía Mundial,* 34, 145-171.

———— ● ————

The Influence of Knowledge Management on Organisational Performance of Lagos Electricity Distribution Company, Nigeria

Ale, Olatide Aarinola

Abstract

Two hundred employees of Lagos Electricity Distribution Company, Nigeria (Eko and Ikeja distribution companies) were selected to examine the influence of knowledge management on the organisation's performance. Copies of structured questionnaire were used to gather data; validity and reliability tests were carried out with Cronbach Alpha coefficients. Pearson Correlation Coefficient and Linear Regression Models were also used for the data analysis. The results of the mean table showed the level of knowledge management practices, while the Pearson correlation indicates that there exists a positive relationship between technical, structural, cultural, human knowledge and organisation performance, and the strength was further tested using linear regression. From the findings, the study concludes that knowledge management dimensions are fundamental to the performance of the selected LEDCs. The study recommends that the selected LEDCs need improvement in the areas of staff knowledge, skills, customer care, processes for prepaid meters, research and development, and external stakeholders' relationship with the staff. These improvements can come in form of training and development of staff, investment in physical and human resources, restructuring the system, and disregarding the existing non-functional approaches.

Keywords: Knowledge Management, Organisational Performance, Public Enterprise

Introduction

The history of knowledge management (KM) can hardly be described as a smooth journey. The term exploded in popularity in the late 1990s and early 2000s, becoming a major buzzword of the era (Alan, 2014). It is a known fact that knowledge is an inevitable resource or possibly the most

*   Department of Entrepreneurship, The Federal University of Technology, P.M.B. 704, Akure, Ondo State, Nigeria and can be reached at oaale@futa.edu.ng

relevant resource for effective performance (Intezari & Gressel, 2017; Abubakar, Elrehail, Alatailat & Elci, 2019). Without required knowledge organisations would face challenges in changing environments and existing economies globally (Zwain, Teong & Othman, 2012).

According to Davenport and Prusak (2000), "Knowledge is a flexible combination of framed experiences, values, contextual information, and expertise that provide a framework for evaluating and integrating experiences and new information". Hence, it is not only appropriate for documents or archives, but also for the organisation's norms, processes, practices and, standards". Hull (2000) holds that the Knowledge Management phenomenon "is not just a fad, but that during the process, it established itself as a new aspect of management and organisation model of competence". Similarly, Ngah, Tai, and Bontis (2016) defined knowledge management as the clear and efficient management of physical knowledge and related identification and exploitation.

Furthermore, Alaarj, Abidin-Mohammed, and Bustamam (2016) hold that an effective source of knowledge is the knowledge capacity between organisations through innovation, knowledge creation, knowledge absorption, and knowledge sharing while its combination defines knowledge management practices that will ultimately transform into organisational performance. However, knowledge management fastens an organisation's capacity suitably for the greatest result (Mitra, O'Regan, & Sarpong 2017). It was contextualized by Stankowski (2008), that Knowledge management is the effective use of intellectual assets to improve organisational performance. This suggests that knowledge management cannot be overemphasized because of its strategic role in achieving organisational performance. Organisations must possess superior performance capability to survive and outperform their competitors in this current turbulent and very dynamic business environment. Thus, researchers need to specify the type of performance they are investigating from onset in their discussions. (Cadogan, 2012) while Murphy, Trailer, and Hiller (1996) recommend that researchers should use multiple measures covering non-financial and financial goals to support strategic plans to allow for a broader, comprehensive conceptualization of a firm's performance. However, non-financial and financial measures of organisational performance indicate the extent of objectives and results attainment (Lebans & Euske, 2006) In this instance, the need for a better public enterprise in the face of a knowledge-based economy was greatly magnified by the requirement for performance. The reasons mentioned are that public enterprises would continue to make higher contributions to the Gross Domestic Product of most nations, while they are also critical to the resolution of many important and frequently occurring societal issues. However, Hilman and Kaliappen (2014) note that

organisations may evaluate their performance with different performance measures. Thus, to achieve the objective of this study, a non-financial measure was adopted to determine the influence of knowledge management on organisational performance in the Nigeria power sector.

To survive at both micro and macro levels in the global knowledge economy, integrated and coherent knowledge is imperative for efficiency in performance (Archer-Brown & Kietzmann, 2018). It has been discovered that at the micro-organisation level it has a strong effect on performance (Jasimuddin & Zhang, 2011), while at the macro level it enables organisations to contribute to economic growth and development (Santoro &. Usai, 2018). This affirms the earlier position of Bhojaraju (2005), that knowledge management improves organisational operations such as Business Process Re-engineering, Total Quality Management, organisational learning amongst others and offers a new focus to maintain a competitive advantage.

Electricity development in Nigeria dates back to the late 19th century when the first power station was installed in the city of Lagos in 1896 according to history, the electricity development model took the form of companies from 1896-1950 (Wikipedia, 2021). However, Nigeria Electricity Regulatory Commission (NERC) stated that the first electric utility company, known as the Nigerian Electricity Supply Company was established in 1929. The National Electric Power Authority (NEPA) who had monopoly was in charge of the generation, transmission, and electricity distribution in Nigeria. Power sector reform began in 2001 according to the commission with the enactment of the National Electricity Policy with the aim of making every home have electricity by the year 2012.

Major problems in Nigeria's energy sector, mainly blackout and inefficiency in service delivery, have forced the government to take drastic actions. The Electricity Sector Reform Act of 2005 was enacted which gives room for the establishment of a company that manages the resources of the NERC. The reform resulted in the separation of the national electricity company into a series of 18 successive companies, 6 power generation companies, and 11 distribution companies across the 36 states of Nigeria, and a national energy transportation company.

On 30 September 2013, PHCN ceased to exist due to privatization. The independent regulatory agency, as furnished in the Electric Power Sector Reform Act of 2005 was entrusted with observing and managing the Nigerian power industry, giving licenses to advertise members, and ensuring consistence with market rules and working rules. (Wikipedia, 2021).

The privatization of the 11th distribution organisation was achieved in November, 2014 (NERC,2005). The eleven electric distribution companies

are Abuja, Benin, Eko, Enugu, Ibadan, Ikeja, Jos, Kano, Kaduna, Port-Harcourt, and Yola Electricity Distribution Company (Wikipedia, 2021). However, the focus of this study is on Eko and Ikeja Distribution companies located in Lagos State Nigeria.

From a historical perspective, the Local Electricity Distribution Companies regulate the use of electricity in Nigeria. It has been observed based on happenings within the power sector the reality indicates underperformance due to the current structure and system less utilize structural, cultural, technical, and human knowledge. Besides, regardless of this enterprise being important to the monetary advancement of the nation and different measures taken by the public authority to work on its performance including privatization of its services, the most amazing fact is that despite the privatization of the sector, they are yet to effectively provide power to the populace as expected. These are indications of challenges that require effective harnessing of resources at the disposal of the Nation. Without this knowledge utilization, the nation will continue on this weak trajectory in addressing these challenges (Jelena, 2012). By implication, the current power sector problems can be attributed to inadequacy as to how knowledge utilization should be used in solving the current and consistent power issues that successive governments have faced in Nigeria. With all these, the sector trajectory is far from meeting the expectations of the Nigerian populace regarding the constant power supply. This necessity of knowledge management will assist these firms as they will eliminate obstacles and make them have a key understanding of what to do effectively (Allame 2011).

From the foregoing, this study explored the components of knowledge management as used by Agbim, Oriarewo, & Owutuamor, 2013; Chuang, 2004; Lee & Choi, 2003; Gold, Malhotra, & Segars, 2001) regarding technical knowledge (information technology), structural knowledge, (people, and processes) cultural knowledge (accumulation, utilization, sharing practices) and human knowledge (ownership, and identification) and how they affect organisational performance in terms of service delivery and customer satisfaction in the Nigeria power sector.

Furthermore, past experimental investigations, for example, Gold et al. (2001) and Jennex (2008) in the United States, Chong (2006) in Malaysia, Liu and Tsai (2007) and Wu and Wang (2006) in Taiwan, and Al-Busaidi and Olfman (2005) in Oman, have given proof on the significance of knowledge management and organizational performance.

Alsalim and Mohamed (2013) and Sadq, et al. (2020) observed a positive connection between Knowledge Management practices and organizational performance in Iraq. In Kenya Maseki (2012) likewise concentrated on the impact of knowledge management on organisational performance. Raula, Vuki Bosilj, and Temberger (2012) explored the impact of knowledge

management on company performance in Slovenia and Croatia. Agbim, et. al. (2013) utilized 328 representatives in the Nigerian service industry to examine the impacts of knowledge management components on organizational performance. These studies' investigation focuses on different industries, banking, services, and more on the developed economy. This study found the need to research a critical sector which these studies did not attempt.

The study's objectives are to investigate how technical, structural, cultural, and human knowledge can influence organisational performance. This current study's research questions are considered dependent because of the autonomous factors on the reliant variable as expressed in the hypotheses below:

Research Hypotheses

H_{01}: Technical knowledge has no influence on organisational performance.
H_{02}: Structural Knowledge does not have an influence on organisational performance.
H_{03}: Cultural Knowledge does not have an effect on organisational performance.
H_{04}: Human knowledge does not affect organisational performance.

Literature Review

This section was discussed under three main sub-headings viz-a-viz; Theoretical review, conceptual review, and empirical review in order to understand the relationship that shapes knowledge management and organizational performance.

Theoretical Review

Two theories were used for this study to understand the importance of Knowledge management to achieve excellent organisational performance.

Creation Theory

As indicated by this theory, opportunities to make and sell new goods or services don't exist except if organisations find ways to make them (Weick, 1979; Gartner, 1985; Baker & Nelson, 2005; Sarasvathy, 2001). Organisations act, sit tight for a reaction to their activities, normally from the market, and afterward correct and act once more, as indicated by theory (Weick, 1979). Similarly, Arthur (1989) characterized creation theory as a path-reliant and rising cycle. The theory, according to Nonaka and Toyama (2015), enables knowledge-generating capacity to create new learning, extends throughout the business, and is demonstrated in items, administrations, and frameworks. According to the theory, when knowledge is acquired, it enables organisations in extending learning from the individual to the collective, corporate, and occasionally inter-

organisational levels (Nonaka & Toyama, 2015). This is typical of the Nigerian company, where the sector consists of Eko and Ikeja distribution companies. Following the sector's privatization, there are potentials to provide innovative services that meet global expectations and meet the demands of consumers.

Human Capital Theory

In the 1960s, economists Gary Becker and Theodore Schultz acknowledged that education and training were investments that would increase productivity. The theory developed by Becker is aimed at improving human assets globally (Murray, 2016). The theory assumes that human assets are resources that give organisations the incentives for success (Murray, 2016). Therefore, Garavan, McCarthy, and Carbery (2017) explain the theory to focus on how individuals contribute to organisations' success, through the use of expertise, understanding, and capabilities. The theory is interested in how human capital makes effective use of its skills as a factor to improve organisational performance (Assaker, Hallak, & O'Connor, 2020). Human capital is delineated knowledge, skills, and abilities acquired through investment, education and other sources of experience (Hardeep, 2015). This theory is relevant to this study as human resource knowledge remains the distinct asset that the power sector relies upon to make the sector productive and effective. This knowledge involves; level of training, education, managerial, and work experience (Mihardjo, Jermsittiparsert, Ahmed, Chankoson, & Hussain, 2020). Hence, knowledge management is a strategic resource required to enhance the operation of human capital for improved performance (Singh, Mittal, Sengupta, &. Pradhan, 2019).

Figure-1: Conceptual Framework
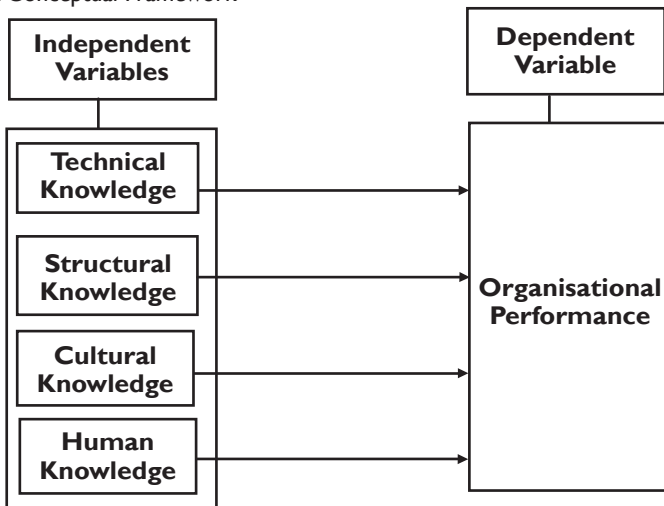
Source: Researcher (2021)

Conceptual Review

Knowledge Management

One of the major advantages of applying Knowledge Management practices in organisations is its positive effect on organizational performance. Previous studies indicate that Knowledge management is the most single, and complicated asset that the management of firms needs unlike other business resources (Gituma, 2017; Dlamini 2017). Knowledge management is delineated by Megan and Jon (2007), the authors defined knowledge management 'as the interaction by which organisations get value from their scholarly and knowledge-based resources'.

It could be portrayed as the precise administration of an organisation's knowledge resources to make worth and meeting strategic and key prerequisites. It is the cycles, techniques, and frameworks that help and improve the capacity, evaluation, sharing, retirement. It could be for human expertise or for organisational practices (Alan, 2014). In the same way, knowledge management involves enabling organisations to improve internal processes and developing systems to leverage existing knowledge. To this extent, knowledge management comprises building on existing organisational assets to strengthen performance across departments (Stankosky, 2008). Similarly, knowledge management strengthens a firm's internal processes by making it effective and efficient towards performance within the industry (Bhojaraju, 2005). Previous studies contextualized knowledge management to have four dimensions. These are – technical, structure, culture, and human knowledge required to build competencies (Gold, Malhotra & Segars, 2001; Lee & Choi, 2003, cited by Daifallah, Mohammad & Issam, 2015).

Technical Knowledge

Technical knowledge management indicates the need to review and establish processes the organisation would pass knowledge regarding the use of Information Technology, to achieve efficiency. Technical knowledge involves the abilities employees display in the use of tools, quality of information, and accessibility which have a great influence on organisational performance (AlMashari, Zairi, & Alathari, 2002; Artail, 2006). By implication to the Nigerian power sector technical dimensions obviously require utilizing relevant internal knowledge through the support of information technology, which in turn could spur knowledge discovery towards achieving internal efficiency (Santoro & Usai, 2018).

Structural Knowledge

While structural knowledge management explains the extent of firms' operational processes in promoting correlated actions. Structural knowledge management involves and ensures the promotion of knowledge-related

activities. This knowledge deals with systems (Agbim, *et.al.,* 2013). Similarly, cultural knowledge refers to the organisation's shared beliefs, values, and morals, which are mostly held by its employees.

Human Knowledge

Furthermore, the degree of intellectual and expertise displayed by the organisation's workforce is referred to as human knowledge. Human knowledge refers to the talents and abilities of employees in a company (Stone, 2008). Intellectual management enables formal and external performance by promoting the intangible and tangible reputation among stakeholders of the organisation (Brito, Pais, Dos Santos, & Figueiredo, 2020; Darroch, 2005). It is assumed that the intellectual and expertise displayed by the organisations is difficult for competitors to imitate because it provides comparative advantage (Bratianu & Orzea, 2010; Pereira, Mellahi, Temouri, Patnaik & Roohanifar, 2019; Karamustafa & Ülker, 2020).

Cultural Knowledge

Common norms shared across organisation members include common language, common values, and understanding are explained by cultural knowledge. Making progress depended emphatically on workers' inspiration to take part in information sharing when individual and organizational goals are accomplished. Hence, organisations are expected to encourage an atmosphere where knowledge is shared among staff to utmost success (Singh, 2018). These four dimensions enable the organisation to create values that lead to competitive advantage and organisational performance (Daifallah, Mohammad & Issam, 2015), hence knowledge management is germane to organisational development. It permits consistent serious elements in the endeavor and considers information to be the essential potential for further developing efficiency in the organization (Jokanovic, Zivlak, Okanovic, Ulibrk, & Dudak, 2020).

Kolam (2004) in Bhojaraju (2005) indicate that huge potentials associated with knowledge management involve enhancing intellectual assets, unique resources, critical functions and potential bottlenecks. However, Emadzade, Mashayekhi and Abdar (2012) conclude that there exists no consensus on knowledge management strategy in relation to a firm's performance. It was observed that for knowledge management to influence a firm's strategic opportunity and performance, it is subject to review existing strategies and the capabilities needed to achieve that. It additionally involves understanding the course of information creation, sharing, transformation, application and making of new information (Meese & McMahon, 2012). In this case, understanding the review of strategies and processes, involves enables managers to remove obstacles

that would lead to achieving corporate objectives (Allame, 2011). However, beyond lack of directions, firms' one key obstacle is when the firms fail to understand what knowledge they possess (William, John & Peter, 2012). In other words, organisations may fail to recognize the potential knowledge that already exists within them (Nevo, Benhasat & Wand, 2009).

The areas of unawareness are workforces having specific skills (knowledge holders) but considered invaluable to managers of the same organisation (Nevo, Benhasat & Wand, 2009). As such it is fundamental for businesses especially public enterprises to know staff potentials particularly as it relates to technical, cultural, structural and human knowledge. This is because knowledge is the pivotal means to innovate, collaborate and optimize a firm's decisions. By implication, knowledge management is the wheel that propels human assets for high-quality performance (Du Plessis, 2005).

Organisational Performance

Performance may be regarded as an important construct in strategic management research, as it is one of the most important and regularly utilized as a dependent variable basically in all fields of management. (Ibrahim & Mahmood, 2016; Santos & Brito, 2012). Despite its importance, there is no agreement on its definition, dimensionality, and measurement, which restricts research and comprehension of the concept due to the construct's complexity (Santos & Brito, 2012).

Further, the relationship between knowledge management and organizational performance has been broadly investigated. Nonetheless, there appear to be uncertain findings (Aliyu & Mahmood, 2015). Similarly, Gamage and Weerankon (2017) note that despite the theoretical, conceptual, and empirical developments in strategy performance analysis, little agreement exists on the essence and shape of this relationship.

Tseng and Lee (2014) note that further developing organisational performance is viewed as a fundamental necessity for corporate strategic management. Thus, organisations will more often than not contribute the vast majority of their endeavors to work on their exhibition since, the accomplishment of an organisations depends generally on its performance, which identifies with its capacity to successfully carry out systems to accomplish organizational goals. Pierre, Timothy, George, and Gerry (n.d) identified three parts of organisational performance which include: financial performance (profits, return on assets, return on investment), market performance (sales, market share) and shareholder return.

Similarly, organisational performance may be described as one of the indices used for effective and efficient review of a firm's progress towards achieving desired goals. (Richard, Devinney, George & Johnson, 2009). However, different perspectives to the issues of performance as raised by

scholars include; the financial perspective, which focuses on the financial improvement of firms (Robinson, Anumba, Carrillo, & Al-Ghassani, 2006). The directions of these measures are often taken from economic, value and business cash flow. The customer perspective focuses on values delivered to customers as well as increases in market sales for a product and services (Chen, Huang, & Cheng, 2009). Similarly, these measures are taken to ensure firms' improvement regarding time quality, satisfaction, market share service efficiency. Besides, the internal process focuses on the improvement of key activities, in areas that bother on operations control, customer relationship, innovation, and external relationships with stakeholders. In this sense, the dimensions of organisational performance cover different areas of the spectrum. However, this study considered it strategic to evaluate the non-financial aspect of organisational performance.

Service Delivery
To succeed in the present competitive business environment, organisations rendering services must be efficient with their service delivery system and be responsive to the demands of their customers for efficient and quality services. This can assist to increase their performance.

The actual delivery of products and services to customers or clients is referred to as service delivery. In this manner, it is all about when, where, and how service or good is conveyed to the customers or clients and the nature wherein it was conveyed; regardless of whether reasonable or uncalled for (Lovelock & Wright, 2002 cited in Nico & Ophillia, 2015).

Empirical Review
Past investigations have reported a positive relationship between Knowledge Management and organizational performance (Gold, *et al.*, 2001; Al-Busaidi & Olfman, 2005; Chong, 2006; Wu & Wang, 2006; Liu & Tsai, 2007; Jennex, 2008; Alsalim & Mohamed, 2013; Sadq, *et. al.*, 2020).

Abdel, Gawaher, and Mohamed (2013) in their study on "The role of knowledge management in strengthening organisational performance in Egyptian organisations", using questionnaire to gather data, the study found a positive correlation in the use of knowledge management to aid the execution of management capacities and decisions.

Katsuro, Mapira, Mangava, and Chimbindi (2013) conducted a study on "The roles of knowledge management on organisational performance using a case study approach. A sample of 60 employees was taken out of 100 employees used. Samples were stratified into departments, with the use of questionnaires and interviews in collecting data. The finding revealed a negative correlation between organisational performance and knowledge management. A different study, with the use of structural equation models with PLS software found that technical knowledge has negative effects on the organisation while culture and structure knowledge have significant effects on organisational performance (Afshari, Nasab, & Dickson, 2020).

Boumarafi and Jabnoun (2008) in their study on "the relationship between knowledge management and organisational performance", in 89 private and public sector organisations in the United Arab Emirate also showed that the variables of knowledge management have an effect on a company's performance. Similarly, Kharabsheh, Magableh, and Sawadha (2012) investigated how knowledge management practices affect a firm's activities towards organisational performance by using a structured questionnaire administered on thirteen pharmaceutical firms and subject its multiple regressions test. The research findings indicate that there is a significant positive relationship between knowledge management and organisational performance. In Isfahan, Iran, Emadzade, Mashayekhi, and Abdar (2012) investigated the effect of knowledge management capabilities on firm's performance. The study used a survey questionnaire, which was administered to 245 small company owners from 86 small businesses, regression was used for data analysis; it was found that knowledge management and organisational performance are inextricably related. Maseki (2012) also studied the impact of knowledge management on organisational performance in Kenya. The results of the study, which used a descriptive research survey with commercial banks as the sample, showed a relationship between knowledge management and organisational performance.

Agbim, et. al. (2013) used 328 employees in the Nigerian service industry to investigate the effects of the knowledge management components on company performance. The findings show that human, technical, cultural, and structural knowledge all had a favorable relationship with company performance. Thereby demonstrating that knowledge management is a strategic asset that can help organisations gain a long-term competitive edge in a dynamic environment of business. Also, the study by Jabeen, Shehu, Mahmood & Kofarmata (2014) examined the impact of total quality management, knowledge management and business performance of Nigerian SMEs which showed a positive significant impact on knowledge management and business performance. Further, KPMG (2012) reported that most obstacles in organisations commence from non-directional investment.

Methodology

Research Design
This research adopted a cross-sectional research design with an overview plan to gather data from the respondents. To achieve the objectives, a survey approach was utilized to clarify the objectives and request designated sample interest.

Population and Sample Size of the Study

Employees of Eko and Ikeja Electricity Distribution companies who were currently working in Lagos State make up the study's population. The target sample was purposively selected. There were 220 employees who were eligible to fill out the survey questionnaire. As a result of unreturned copies of the questionnaire, just 200 of the 220 administered copies were usable for data analysis.

Measurements of Variables

To guarantee the pragmatic content and adequacy of the research model, a structured copy of questionnaire was completed and all exogenous factors were developed operationalized from the existing study adopted from Chuang (2004) which incorporated human, cultural, technical and structural knowledge. To measure the 4 constructs, a 5-point Likert scale was used ranging from 1 strongly disagree to 5 strongly agree. The researcher adapted previous researchers' instruments items were modified to suit the Nigerian environment and nature of the industry.

Cronbach Alpha was utilized to look at the instrument's reliability at a 5 percent level of significance, to decide the dependability of the instrument. The most used measurement of internal consistency is Cronbach Alpha, and the outcomes exhibit a significant degree of consistency. According to Edwards (2003), achieving instrument consistency is a good measure of reality check that solves the conceptualization problem**.**

Analysis of Data

Data collected from fieldwork at Eko and Ikeja Electricity Distribution Companies were analyzed using simple percentages, and hypotheses were tested using Pearson Moment Correlation and Linear Regression in Statistical Package for Social Sciences (SPSS) software 20.0 version on the research variables to determine the independent variables' significant role on the dependent variable.

Results and Discussions

Table-1: Cronbach's Alpha Test for Each Construct

Construct	No of Items	Coefficient Alpha (α)
Technical knowledge	3	.795
Structural Knowledge	3	.856
Cultural knowledge	3	.726
Human knowledge	3	.784

Source: Fieldwork, 2021

Table-1 shows that the Cronbach alpha coefficient surpassed the threshold of 0.7. To guarantee the reliability of the instrument the test-retest technique was utilized. The instrument was administered twice on

Eko Distribution staff at Victoria Island Lagos within the interval of two weeks. Therefore, the instrument was adjudged reliable.

Data Analysis

Table-2: Copies of Questionnaire Distributed / Response Rate (percent)

Number of Copies of Questionnaire Administered	Number of Copies of Questionnaire Retrieved	Number of Copies of Questionnaire not Retrieved
220	200	20

Source: Fieldwork, 2021

   The above table shows that 90.9 percent of the total number of copies of the questionnaire were retrieved while 9.1 percent were not retrieved. This means there was a high response rate.

Table-3: Demographic Characteristics of Respondents

Variables	Frequency	Percentage
Gender		
Male	136	68
Female	64	32
Total	200	100
Age		
Below 20 years	5	2.5
20-30 years	64	32.0
31-40 years	62	31.0
41-50 years	46	23.0
Above 50 years	23	11.5
Total	200	100.0
Higher Educational Qualification		
WAEC / GCE	29	14.5
ND / NCE	86	43.0
HND / B.Sc	57	28.5
M.Sc / MBA	28	14.0
Total	200	100.0
Years in Service of the Organisation		
Below 5 years	83	41.5
5-10 years	89	44.5
10-15 years	21	10.5
15-20 years	7	3.5
Total	200	100.0
Position		
Executive Directors	10	5.0
Directors	31	15.5
Manager	34	17.0
Technical Staff	125	62.5
Total	200	100.0

Source: Fieldwork, 2021

The above table shows the demography characteristics of the respondents. The result from the above table in terms of age shows that 68 percent of the respondents are male and 32 percent are female respondents. This, therefore, means that it is evident that the sample used for the study consists of both males and females in the enterprise. In terms of age, it reveals that 2.5 percent are below 20 years, 32 percent between 20-30 years, 31 percent between 31-40 years, 23 percent between 41-50 years, and 11.5 percent above 50 years respectively. This implies that the sample consists of more middle-aged respondents. For educational qualification, it shows that 14.5 percent have obtained WAEC / GCE, 43 percent have obtained ND / NCE, 28.5 percent have obtained HND / B.Sc. and 14 percent have obtained M.Sc. / MBA respectively. This implies that the respondents of this study, all have formal education. However, a considerable number of them are ND / NCE holders. In terms of the number of years spent in the organisation, 41.5 percent have spent below 5 years in service, 44.5 percent have spent between 5-10 years, 10.5 percent between 10-15 years, while 3.5 percent between 15-20 years respectively. This implies that the majority of the respondents have spent between 5-10 years in the enterprise. For the position occupied by the respondents; 5 percent are executive directors, 15.5 percent are Directors, 17 percent are Managers, and 62.5 percent are technical staff respectively. This shows that most of the respondents are technical staff.

Table-4: Descriptive Statistics of Questions Answered by Respondents

	N	Minimum	Maximum	Mean	Std. Deviation
1. The Electricity Distribution Company staff search for new knowledge due to advancement in technology to enhance performance.	200	1.00	5.00	1.8350	1.02618
2. The technical knowledge of staff has sustained efficiency in service delivery.	200	1.00	5.00	1.7650	1.10721
3. Presently, the operational efficiency is based on infrastructural improvement in the sector's effectiveness in terms delivery and installations of meters and transformers.	200	1.00	5.00	2.0250	1.11831

		N	Minimum	Maximum	Mean	Std. Deviation
4.	The recent processes used by the leadership of the enterprise has enabled it achieve effectiveness and efficiency in terms delivery and installations of meters and transformers.	200	1.00	5.00	2.0200	1.20701
5.	The newly established procedures facilitate electricity distribution Company staff knowledge sharing.	200	1.00	5.00	1.9300	1.06337
6.	The recent use of data bases for customers support by the electricity distribution Company has led to value creation in services.	200	1.00	5.00	1.8700	1.14440
7.	The electricity distribution Company staff understand the importance of value.	200	1.00	5.00	1.9700	1.03657
8.	The electricity distribution Company are rewarded for the use of their expertise.	200	1.00	5.00	1.9250	1.11155
9.	The electricity distribution company **staff** are encouraged to value group relationship.	200	1.00	5.00	2.0100	1.10271
10.	The skills possessed by staff have driven the organisation's sustained efficiency in the supply of power.	200	1.00	5.00	1.9750	1.20484
11.	The electricity distribution company staff are expertise on their own work which assisted performance.	200	1.00	5.00	2.1800	1.14198
12.	The experience of the staff of electricity distribution company has strengthened value creation in service delivery.	200	1.00	5.00	2.1400	1.24828

Source: Field survey, 2021.

Descriptive Statistics Result

The strongly disagree and disagree responses were consolidated to form disagree (1) for the purposes of analysis, while a comparative breakdown yielded the agree column (3). The level of practice is determined by the mean of each variable. A variable whose mean value is less than 2.0000 shows the less influence of knowledge management variables are associated with the performance of Eko and Ikeja Electricity Distribution Companies, while the mean value above 2.0000 indicates the current levels of influence of knowledge management associated with the performance of Eko and Ikeja Electricity Distribution Companies as revealed in the table above. The mean score for each of the dimensions is also shown in the above table. The table indicates that the result possesses the following mean value: 1.8350, 1.7650, 2.0250, 2.0200, 1.9300, 1.8700, 1.9700, 1.9250, 2.0100, 2.1800, 1.9750, and 2.1400 respectively.

Test of Hypotheses

Hypothesis 1

H_{o1}: Technical Knowledge has no influence on organisational performance.
Correlations

		TK	**OP**
TK	Pearson Correlation	1	0.704
	Sig. (2-tailed)		0.000
	N	200	200
OP	Pearson Correlation	0.704	1
	Sig. (2-tailed)	0.000	
	N	200	200

Source: Researcher's computation, 2021

From the above table, the p-value (0.000) is less than 0.05 (at 2-tailed test) and there is a positive significant relationship between knowledge management and organizational performance as displayed in the above table of Pearson Correlation above. This implies that organisational performance is influenced by technical knowledge.

Hypothesis 2

H_{o2}: Structural knowledge does not influence organisational performance.
Correlations

		SK	**OP**
SK	Pearson Correlation	1	0.600
	Sig. (2-tailed)		0.000
	N	200	200
OP	Pearson Correlation	0.600	1
	Sig. (2-tailed)	0.000	
	N	200	200

Source: Researcher's computation, 2021

The p-value (0.000) is less than 0.05 (at 2-tailed test), there is a positive significant relationship between structural knowledge and organisational performance, as displayed in the above table of Pearson Correlation. This implies that organisational performance is influenced by structural knowledge.

Hypothesis 3

H_{03}: Cultural knowledge does not affect organisational performance.

Correlations

		SK	OP
CK	Pearson Correlation	I	0.652
	Sig. (2-tailed)		0.000
	N	200	200
OP	Pearson Correlation	0.652	I
	Sig. (2-tailed)	0.000	
	N	200	200

Source: Researcher's computation, 2021

The p-value (0.000) is less than 0.05 (at 2-tailed test), there is a positive significant relationship between cultural knowledge and organisational performance, as displayed in the above table of Pearson Correlation. This implies that organisational performance is influenced by cultural knowledge.

Hypothesis 4

H_{04}: Human knowledge does not affect organisational performance.

Correlations

		SK	OP
HK	Pearson Correlation	I	0.453
	Sig. (2-tailed)		0.000
	N	200	200
OP	Pearson Correlation	0.453	I
	Sig. (2-tailed)	0.000	
	N	200	200

Source: Researcher's computation, 2021

From the above computation, the p-value (0.000) is less than 0.05 (at the 2-tailed test). Thus, there is a positive significant relationship between Human knowledge and organisational performance, as shown in the above table of Pearson Correlation. This means that knowledge management affects organisational performance.

In order to further prove the extent of the strength that exist between the two variables, the earlier tested variables were subjected to Regression Analysis.

Linear Regression Analysis Result

The regression analysis is utilized to decide the strength of the relationship between knowledge management and organizational performance.

Table-5: Summary of Result (Dependent Variable – Organisational Performance)

Variable(s)	Coefficient	T-statistics	P-Value
ORGPER	2.033	19.882	0.000
Technical Knowledge	0.5023	11.825	0.000
Structural Knowledge	0.6319	16.155	0.000
Cultural Knowledge	0.4814	9.097	0.000
Human Knowledge	0.3120	7.408	0.000
F-Statistics = 52.227(0.0000)		R-Square=.699 Adj-R-Square=.687	

Source: Researcher's SPSS Output, 2021

Discussions

The result from the above equation can be stated as: ORGPER= 2.033 + 0.5023 TECKN+0.6319 STRKN+ 0.4814CULKN + 0.3120HUMKN, with the coefficient of (19.882), (11.825), (16.155), (9.097), and (7.408) at 5 percent significant level. The result, therefore, indicates that all the dimensions of knowledge management in Table-5, have a positive and significant effect on organisational performance, with the coefficient and probability value that technical knowledge (β_1 = 0.5023, P-value <0.05), structural knowledge (β_2 = 0.6319, P-value <0.05), cultural knowledge (β_3 = 0.4814, P-value <0.05) and human knowledge (β_4 = 0.3120, P-value <0.05). The F-Statistics = 52.227 P-value <0.05) indicates that knowledge management is a good predictor of performance in the LEDCs. The Adj-R^2 = 68.7 percent. This suggests 68.7 percent variation in Local Electricity Distribution Companies performance in the study area is accounted for by knowledge management. This means that technical and structural knowledge influence performance more in the selected enterprise. However, the model did not explain 31.3 percent of the change in organisational performance of the LEDC, implying that there are other factors associated with organisational performance which was not captured.

Therefore, there exists evidence, that the technical expertise of employees largely influenced the performance of the employees of organisation. Technical skill is found to be significant to the organisation's thrives towards becoming efficient in Nigeria. Structural knowledge is also found to be imperative to the Local Electricity Distribution Companies in the study area. As such, better structural knowledge would strengthen their service delivery. Also, shared beliefs, values, and orientation are found to be a strong phenomenon that strengthens knowledge management among the staff of Local Electricity Distribution Companies in Nigeria. Lastly, human knowledge is found to be sacrosanct to the organisation's performance.

The study's finding is in agreement with Agbim*, et. al.* (2013) that found that the dimensions of knowledge management have a significant and positive relationship with organisation performance. By implication, the study establishes that knowledge management is strategically relevant to assisting an organisation improve its operations and performance towards its long-term objective.

Conclusions and Recommendations

The objective of the study was to investigate the influence of knowledge management variables on the organisational performance of LEDCs in Lagos State. It was established that structural, technical, cultural, and human knowledge all have positive significant influences on organizational performance with technical and structural knowledge having stronger influence. However, the level of influence of all the four variables used has not really led to the efficiency of the organisation and that is why the Local Electricity Distribution Companies till date need improvements in the areas of the staff knowledge, skills, customer care, processes for prepaid meters, search for new knowledge due to advancement in technology and external stakeholders' relationship with the staff. As indicated by the mean results, the study further shows that for the enterprises to operate effectively and efficiently, the current management system needs to acknowledge the role knowledge of management. The study findings agreed with that of Agbim et.al. (2013) on the positive influence of technical knowledge, structural, cultural and human knowledge on the performance of an organisation. Therefore, based on the observed situations of the enterprises, the study is aligned with the study of Nonaka and Toyama (2015) that found that creation theory can be used to understand knowledge capacity that would generate new learning, spread throughout the business, and is exemplified in items, administrations, and frameworks.

The enterprises are still faced with challenges to be efficient and operate in dynamic ways that will lead to satisfactory service delivery. The study, therefore, concludes that the LEDCs need to rethink their approaches as indicated by Allame (2011) that, effective knowledge management involves the review of strategies and processes, which will enable managers of organisations to remove obstacles that would lead to achieving corporate objectives. This implies that knowledge management practices cannot be effective if the organisation's current modes of operations are not revisited. The study also found that approaches of the organisation placed priority more on achieving efficiency through infrastructural improvement, delivery, and installation of meters and transformers across most states and local areas of operations. This is in contrast with KPMG (2012) that reported that most firms' obstacles commence from non-directional investment

caused by a preference for infrastructures rather than a review of strategies and processes. The study, therefore, recommends that the LEDCs should improve their current knowledge strategy and this will boost their overall performance. Finally, knowledge management practice is not merely for performance, rather it will increase the capabilities of the organisation and these improvements can come in form of training and development of staff, investment in physical and human resources, restructuring the system, and disregarding the existing non-functional approaches.

Managerial Implications

The managerial implication of this present study is that an additional and continuous investment of resources and time is required in knowledge management for improved organisational performance. Additionally, this present study shows the importance of knowledge management. This will assist managers and policymakers of both enterprises to understand the knowledge management variables unique to their individual enterprises.

Limitations of Study and Suggestions for Further Studies

Firstly, the present study utilized a cross-sectional research design, which only allows data to be gathered for only a period of time. Thus, the use of longitudinal research design may be employed by future researchers to investigate the influence of knowledge management on organisational performance.

Secondly, the study investigated two variables viz-a-vis the dependent and independent variables, further studies may introduce either moderating, mediating, or control variables.

Thirdly, the study area for this study was Lagos State, further studies may cover the eleven (11) Electricity distribution companies in Nigeria or cover geo-political zones.

Fourthly, the current study focused on only power distribution companies (DISCOs), further studies may carry out a comparative study between the distribution companies and power generating companies (GENCOs) or evaluate the performance of the Generating Companies.

Finally, this study used only non-financial measures as a proxy to measure organisational performance, further studies may employ non-financial and financial performance measures as suggested by Cardogan (2012), Murphy, Trailer, and Hiller (1996), Lebans and Euske (2006) amongst others.

References

Abdel, N., Gawaher, H., & Mohamed, M. (2012). The Role of Knowledge Management in Enhancing Organisational Performance. *Information Engineering and Electronic Business Journal.* 5, 27-35.

Abubakar, A. M., Elrehail, H., Alatailat, M. A., & Elçi, A. (2019). Knowledge Management, Decision-Making Style, and Organisational Performance. *Journal of Innovation Knowledge.* 4, 104-114. https://doi.org/ 10.1016/j.jik.2017.07.003

Afshari, A. H., Nasab, & Dickson G. (2020). Organisational Culture, Social Capital, and Knowledge Management, *International Journal of Knowledge Management*, 16(2). 52-66.

Agbim, K.C., Oriarewo, G.O., & Owutuamor, Z. B. (2013). The Impact of Knowledge Management Capabilities on Organisational Performance: A Survey of the Service Sector. *Journal of Business Management & Social Sciences Research,* 2(9), 61-67.

Alaarj, S., Abidin-Mohamed, Z., & Bustamam, U. S. B. A. (2016). Mediating Role of Trust on the Effects of Knowledge Management Capabilities on Organisational Performance. *Procedia Social Behaviourial Sciences.* 235, 729-738. http://doi.org/10.1016/j.sbspro.2016.11.074

Al-Busaidi, K., & Olfman, I. (2005). An Investigation of the Determinants of Knowledge Management Systems Success in Omani Organisations, *Journal of Global Information Technology Management,* 3(3), 6-27.

Alan, F. (2014). A Synthesis of Knowledge Management Failure Factors. Retrieved from at http://www.knowledge-managementtools,Net/ Knowledge-management-definition.

Allame, S. M. (2011). Effect of Organisational Culture on the Success of Knowledge Management Systems Implementation (Case Study): Saderat Bank in Isfahan Province). *Interdisciplinary Journal of Contemporary Research in Business,* 2 (9), 321-346.

AlMashari, M., Zairi, M. & AlAthari, A. (2002). An Empirical Study of The Impact of Knowledge Management on Organisational Performance. *Journal of Computer Information Systems*, 42 (5), 74-82.

Al-Sardia, S., & Ahmad, H. (2014). The Moderating Effect of Role Stressors on the Influence of Evolutionary Process Change Factors in Internal Customer Satisfaction in Telecommunication in Jordan. *Asian Social Science,* 10(4), 114-130.

Archer-Brown C. & Kietzmann, J. (2018). Strategic Knowledge Management and Enterprise Social Media, *Journal of Knowledge Management*, 22(6).

Artail, H. A. (2006). Application of Knowledge Management Measures to the Impact of A Specialized Groupware System on Corporate Productivity and Operations. *Information & Management*, 43 (4), 551-564.

Assaker, G. R. H.& O'Connor, P. (2020). Examining Heterogeneity through Response-Based Unit Segmentation in PLS-SEM: A Study of Human Capital and Firm Performance in Upscale Restaurants, *Current Issues in Tourism*, 23(2), 137-152.

Baker, T., & Nelson, R. (2005). Creating Something from Nothing: Resource Construction through Entrepreneurial Bricolage. *Administrative Science Quarterly*, 50, 329-366.

Bhojaraju, G. (2005). Knowledge Management: Why Do We Need It for A Corporation? *Malaysian Journal of Library and Information Science*, 10(2), 37-50.

Boumarafi, B., & Jabnoun, N. (2008). Knowledge Management and Performance in UAE Business Organisations. *Knowledge Management Research & Practice,* 6(3), 233-238.

Bratianu, C., & Orzea, I. (2010). Organisational Knowledge Creation. *Management, Marketing Challenges for Knowledge Society*, 5(3), 41-62.

Brito, E., Pais, L., Dos Santos, N. R., & Figueiredo, C. (2020). Knowledge Management, Customer Satisfaction, and Organisational Image Discriminating Certified From Non-Certified (ISO 9001) Municipalities. *International Journal of Quality & Reliability Management*, 37(3), 451-469.

Cardogan, J.W. (2012). International Marketing, Strategic Orientations, and Business Success: Reflections on the Road Ahead. *International Marketing Review* 29(4), 340-348. https://doi.org/ 10.1108/02651331211242656.

Chang, T. & Chuang, H. (2009). Performance Effects of Knowledge Management: Corporate Management Characteristics and Competitive Strategy Enablers. *Asian Journal of Management and Humanity Sciences,* 4, 181-199.

Chen, M., Huang, M. & Cheng, Y. (2009). Measuring Knowledge Management Performance Using A Competitive Perspective: An Empirical Study. *Expert Systems with Applications*, (36), 8449-8459.

Chong, S., (2006). Knowledge Management Critical Success Factors: A Comparison of Perceived Importance Versus Implementation in Malaysian ICT Companies, *The Learning Organisation*, 13(3). 230-256.

Chuang, S. H. (2004). A Resource-Based Perspective on Knowledge Management Capability and Competitive Advantage: An Empirical Investigation. *Expert Systems with Applications,* 27(3), 459-465.

Cronbach, L. J. (1951). Coefficient Alpha and the Internal Structures of Tests. *Psychometrika*, 16(3), 297-333.

Daifallah, O., Mohammad A., & Issam M., A. (2015). The Influence of Knowledge Management on Organisational Performance in Service Organisations in Jordan. *Information and Knowledge Management*, 5(12).

Darroch, J. (2005). Knowledge Management, Innovation, and Firm Performance. *Journal of Knowledge Management*, 9(3), 101-115.

Davenport, T.H. & Prusak, L. (2000). Working Knowledge: How Organisations Manage What they Know. Harvard Business School Press, Boston, MA.

Dlamini, P. N. (2017). The Use of Information and Communication Technology Tools in Managing Indigenous Knowledge in the Province of Kwazulu-Natal, South Africa(Doctoral dissertation). The University of Zululand.

Du Plessis, M. (2005). Drivers of Knowledge Management in the Corporate Environment. *International Journal of Information Management, 25*(3), 193-202.

Edwards, M., (2003). *Knowledge Management Definitions and Solution*. The Free Press: New York.

Emadzade, M.K., Mashayekhi, B., & Abdar, E. (2012). Knowledge Management Capabilities and Organisational Performance. *Interdisciplinary Journal Contemporary Research in Business,* 3(11), 781-790.

Gamage, P & Weerankoon, W. (2017). Difference in Level of Entrepreneurial Knowledge and Strategic Orientation in Terms of Gender. *Journal of Engineering and Management Research.* Retrieved from https://www.semanticscholar.org/paper/Difference-in-Level-of-Entrepreneurial-Knowledge GamageWeerakoon/b33ca11c60e9ffcaf33ef420cd57ebae393f6837?sort=relevance&citedPapersSort=relevance&citedPapersLimit=10&citedPapersOffset=10

Garavan, T., McCarthy, A., & Carbery, R. (2017). *Handbook of International Human Resource Development: Context, Processes, and People*. Edward Elgar Publishing.

Gartner, W. B. (1985). A Conceptual Framework for Describing the Phenomenon of New Venture Creation. *Academy of Management Review*, 10, 696.

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge Management: An Organisational Capabilities Perspective. *Journal of Management Information Systems,* 18(1), 185-214.

Hardeep, C. P. B. (2015). Examining Intellectual Capital and Competitive Advantage Relationship, *International Journal of Bank Marketing*, 33(3), 376-399.

Hilman, H. & Kaliappen, N. (2014). Market Orientation Practices and Effects on Organisational Performance: Empirical

Insight From Malaysian Hotel Industry. SAGE Open, 4, 1-8. http://dx.doi.org/10.1177/2158244014553590

Hull, R. (2000). *Knowledge Management and the Conduct of Expert Labour in Managing Knowledge*. Basingstoke: Macmillian.

Ibrahim, N.M.N. & Mahmood, R., (2016). Mediating Role of Competitive Advantage on the Relationship Between Entrepreneurial Orientation and the Performance of Small and Medium Enterprises. *International Business Management Journal,* 10(12), 2444-2452.

Intezari, A., Intezari, A., Gressel, S. (2017). Information and Reformation in KM Systems: Big Data and Strategic Decision-Making. *Journal of Knowledge Management*, 21(1), 71-91.

Jabeen, R., Shehu, M. S., Mahmood, R., & Kofarmata, B. A. (2014). TQM and Knowledge Management Impacts on SME Performance. *International Postgraduate Journal of Business,* 6(2), 23-43.

Jasimuddin S. M. & Zhang, Z. (2011). Transferring Stored Knowledge and Storing Transferred Knowledge, *Information Systems Management*, 28(1), 84-94.

Jelena, R., Vesna, B. & Mojca, I. (2012). The Impact of Knowledge Management on Organisational Performance. *Economic and Business Review* 14(2), 31-36.

Jokanovic, B.; Zivlak, N.; Okanovic, A. C., Ulibrk, J., & Dudak, L. (2020). The Model of Knowledge Management Based on Organisational Climate. S*ustainability* 12, 3273.

Karamustafa, K., & Ülker, P. (2020). Impact of Tangible and Intangible Restaurant Attributes on Overall Experience: A Consumer-Oriented Approach. *Journal of Hospitality Marketing & Management*, 29(4), 404-427.

Katsuro, P., Mapira, N., Mangava, S., & Chimbindi, V. (2013). Impact of Knowledge Management on Organisational Performance: A Case Study of the Grain Marketing Board (GMB).

Kharabsheh, R., Magableh, I., & Sawadha, S. (2012). Knowledge Management Practices and Its Impact on Organisational Performance in Pharmaceutical Firms. *European Journal of Economics, Finance and Administrative Sciences,* 48, 6-15.

Kheng, Y.K., June, S., & Mahmood, R. (2013). The Determinants of Innovative Work Behavior in the Knowledge Intensive Business Services Sector in Malaysia. *Asian Social Sciences,* 9(15), 47-59.

KPMG (2012). Revamping Project Management. Retrieved from http://mospi.nic.in/sites/default/files/Kpmg1.pdf

Lebans, M. & Euske, K. (2006). *A Conceptual and Operational Delineation of Performance. Business Performance Measurement*. Cambridge University Press.

Lee, H., & B. Choi, (2003). Knowledge Management Enablers, Process, and Organisational Performance: An Integrative View and Empirical Examination. *Journal of Management Information Systems*, 20(1), 179-228.

Liao, C., Wang, H., Chuang, S., Shih, M., & Liu, C. (2010). Enhancing Knowledge Management for R&D Innovation and Firm Performance: An Integrative View. *African Journal of Business Management,* 4(14), 3026-3038.

Liu, P., & C. Tsai, (2007). Effect of Knowledge Management Systems on Operating Performance: An Empirical Study of Hi-Tech Companies Using the Balanced Scorecard Approach, *International Journal of Management*, 24(4), 734-741.

Megan, M. & Jon, S. (2007). Knowledge Management. Retrieved from http://www.cio.com/article/2439279/enterprise-software/knowledge-management-definition and-solutions.

Mihardjo, L. W. Jermsittiparsert, K. Ahmed U., Chankoson, T. & Hussain, H. I. (2020). Impact of Key Human Resources Practices (Human Capital, Training And Rewards) on Service Recovery Performance with Mediating Role of Employee Commitment of the Takaful Industry of the Southeast Asian region, *Education + Training*, 63(1). 9-17.

Mitra, A., O'Regan, N., & Sarpong, D. (2017). Cloud Resource Adaptation: A Resource-Based Perspective on Value Creation for Corporate Growth. *Technological Forecasting and Social Change*. 4(5), 13-20.

Murray, R. (2016). *Human Capital and Employee Attitudes: An Investigation of the Antecedents of Job Satisfaction through Organisational Support and Person-Organisation Fit Theory* (Doctoral dissertation). California State University, Fullerton.

Nevo, D., Benbasat, I. & Wand, Y. (2009). The Knowledge Demands of Expertise Seekers in Two Different Contexts: Knowledge Allocation Versus Knowledge Retrieval, Decision Support Systems, (53), 482-489.

Ngah, R., Tai, T., & Bontis, N. (2016). Knowledge Management Capabilities and Organisational Performance in Roads and Transport Authority of Dubai: The Mediating Role of Learning Organisation. *Knowledge Process Management* 23, 184-193.

Nico, M., & Ophillia, L. (2015). The Perceptions and Nature of Service Delivery Innovation Among Government Employees: An Exploratory Study. *Journal of Governance and Regulation*, 4(4), 575-580.

Nigeria Electricity Regulatory Commission (2005), History of PHCN. Retrieved from https://nerc.gov.ng/index.php/home/nesi/401-history.

Nonaka, I. & Toyama, R. (2002). A Firm as A Dialectical Being: Towards A Dynamic Theory of the Firm Industrial and Corporate Change.

Pereira, V., Mellahi, K., Temouri, Y., Patnaik, S., & Roohanifar, M. (2019). Investigating Dynamic Capabilities, Agility and Knowledge Management within EMNEs-longitudinal Evidence from Europe. *Journal of Knowledge Management*, 23(9), 1706-1728.

Pierre, J. Timothy, D. George, S. & Gerry, J. (n.d). Measuring Organisational Performance as A Dependent Variable: Towards Methodological Best Practices.

Santoro G. & Usai, A. (2018). Knowledge Exploration and ICT Knowledge Exploitation through Human Resource Management, *Management Research Review*, 41(6), 701-715.

Santos. J.B., & Brito, L.A.L. (2012), Towards A Subjective Measurement Model for Firm Performance. 97-117. 9(6). https://doi.org/10.1590/S1807-76922012000500007

Sarasvathy, S. D. (2001). Causation and Effectuation: Towards A Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. *Academy of Management Review*, 26(2), 243.

Singh, P. K. (2018). Knowledge Strategy, Sharing Behavior and Performance, *Management Research Review*, 41 (3), 395-411.

Singh, S. K., Mittal, S. Sengupta, A. & Pradhan, R. K. (2019). A Dual-Pathway Model of Knowledge Exchange: Linking Human And Psychosocial Capital with Prosocial Knowledge Effectiveness, *Journal of Knowledge Management*, 23(5), 5-10.

Stankosky, M. (2008). Keynote Address to ICICKM (International Conference on Intellectual Capital, Knowledge Management and Organisational Learning), 9-10.

Stone, R.J., (2008). *Human Resource Management* (6th ed.). John Wiley and Sons: New York.

Tanriverdi, H. & Venkatramen, V. (2005). Knowledge Relatedness and the Performance of Multi-business Firms. *Strategic Management Journal*, 26, 97-119.

Tseng, S., & Lee, P. (2014). The Effect of Knowledge Management Capability and Dynamic Capability on Organisational Performance. *Journal of Enterprise Information* Management 27(2). https://doi.org/10.1108/JEIM-05-2012-0025.

Richard, P., Davinney, S. & Johnson, G. (2009). Measuring Organisational Performance: Towards Methodological Best Practices. *Journal of Management,* 35 (3), 718-804.

Robinson, H. S., Anumba, C.J., Carrillo, P.M., & Al-Ghassani, A.M. (2006). STEPS: A Knowledge Management Maturity Roadmap for Corporate Sustainability. *Business Process Management Journal*, 12 (6), 793-808, https://doi.org/10.1108/14637150610710936/full/html.

Shehu, A.M. (2014). The Relationship Between Market Orientation and Firm Performance: A Look at Nigerian SMEs. *Developing Country Studies,* 4(12), 87-93.

Shukri, B. M., & Mahmood, R. (2014). Linking Transformational Leadership and Corporate Entrepreneurship to Performance in the Public Higher Educations in Malaysia. *Advances in Management and Applied Economics,* 4(3), 109-122.

Vera, D. & Crossan, M. (2003). *Organisational Learning and Knowledge Management: Towards an Integrative Framework.* Blackwell Publishing, Oxford, UK, 122-141.

Wikipedia (2021). Power Holding Company of Nigeria. Retrieved from https://en.wikipedia.org/wiki/Power_Holding_Company_of_Nigeria#cite_note-4.

Wu, J. H., & Y. M. Wang, (2006). Measuring KMS Success: A Specification of the deLone and mcLean's Model. *Information & Management*, 43, 728-739.

Zaied, A. N. H., Hussein, G. S., & Hassan, M. M. (2012). The Role of Knowledge Management in Enhancing Organisational Performance. *Information Engineering and Electronic Business, 5,* 27-35.

Zaim, H., Muhammed, S., & Tarim, M. (2019). Relationship Between Knowledge Management Processes and Performance: Critical Role of Knowledge Utilization in Organisations. *Knowledge Management Research. Practices* 17, 24-38. https://doi.org/10.1080/14778238.2018.1538669.

Zwain, A., Teong, L. & Othman, S. (2012). Knowledge Management Processes and Academic Performance in Iraq HE/s: An Empirical Investigation. *International Journal of Academic Research in Business and Social Sciences*, 2 (6), 11-21.

Demand and Supply Trend of Rubber in India: An Elucidative Analysis

V. T. Vasagan[1]

Ajay Chakraborty[2]

Abstract

This paper investigates the significant trend of rubber production and consumption in Indian market. It has been identified that 8,22,500 hectares of land is brought under rubber cultivation in India to boost rubber cultivation. This is reflected in the increase in import of rubber at faster rate than production. Data are collected from Rubber Statistical News (Monthly) released by Statistics & Planning Departments of Rubber Board of Kerala and Rubber Board of India. Descriptive and inference analysis are used to bring meaningful information for the benefit of stakeholders.

It has been found that the land brought under cultivation has increased at the rate of 2.09% within the span of 15 years. At the same time Trappable Rubber Area also increased from 447,015 hectares in 2005-06 to 692,900 hectares in 2020-21. It has been also observed that the rubber production during 2005-06 and 2020-21 was negative. On other hand, consumption of rubber increased from 801,110 Tonnes in 2005-06 to 1,096,410 Tonnes in 2020-21. At the same time, the price during this period has increased at the rate of 3.3%. There was an imbalance between supply and demand for rubber. The demand for rubber is greater than supply of rubber in India which supported the import of Rubber, which has been increased by 10.57% during 2005-06 and 2020-21. Hence, this paper recommends enhancing local production by which Indian farmers are benefited.

Keywords: Consumption, Demand for Rubber, Supply of Rubber, India, Production

Introduction

India's rubber growing region is segregated into traditional and non-traditional. Traditional region is confined to southwest coasts of Tamilnadu and Kerala. Non-Traditional regions are confined with to coasts of

1   Assistant Professor, Department of Management Studies, ICFAI University Nagaland, Dimapur and can be reached at vasant75@ymail.com
2   Assistant Professor, Department of Commerce, ICFAI University Nagaland, Dimapur and can be reached at ajaychakraborty30@gmail.com

Karnataka, Goa, Konkan Region of Maharashtra, Andhra Pradesh and Orissa, the northeastern region and Andaman and Nicobar Islands etc., where rubber is being grown at large scale compared to other commercial crops.

Review of Literature

There are fragmented literatures available on Rubber Cultivation in India and allied areas. But they are very narrow. There were number of studies undertaken by different scholars that were limited to the areas of Kerala and Tripura. The study of Haripada Datta (2019) on natural rubber was limited to production and productivity of Tripura. This present study covers entire regions of rubber cultivation area of India. Along these lines, Thomas and Panikkar (2000) paid attention on Indian rubber plantation industry and its growth. But the present study attempts to explore the trend of rubber in respect of demand and supply of India. The study of Krishnakumar and Rajeswari (1995) identified natural rubber cultivation in non-traditional areas of India. Saraswathyamma and Marattukalam (1995) focused on planting materials required cultivation. Rubber Statistical News (Monthly) released by Statistics & Planning Departments, Rubber Boards of Kerala and information updated, time to time by the Rubber Board of India are main sources of data for the present study. These are available as raw data which has been considered for analysis to explore hidden facts for the benefit of Indian farmers who have given up rubber cultivation and who are willing to cultivate.

Objectives of the Study

Based on the review of literature, following objectives are established to elucidate the study:

• To review the area under cultivation (ha) and production (Tonnes) in respect of rubber in India since 2005

• To explore Average Production (Tonnes) and Average Yield (Kg/ha) in respect of rubber production in India since 2005

• To discover the impact of Consumption of Rubber (Tonne) on Production of Rubber (Tonne) in India since 2005

Hypotheses for the Study

Based on the objectives established for the purpose of the study, the following hypotheses are framed:

• There is no significant association between area under cultivation (ha) and production (Tonnes) in respect of rubber cultivation in India

• There is no significant association between Average Production (Tonnes) and Average Yield (Kg/ha) in respect of rubber production in India

• There is no significant association between Production of Rubber (Tonne) and Consumption of Rubber (Tonne) in India

Result and Discussion

Rubber is one of the major commercial crops of India. At present 8, 22,500 hectares of land is brought under rubber cultivation in India. It has been observed that import of rubber increased at faster rate. Hence, this paper attempt to explore production and consumption pattern of Rubber in India. The present Table-1 exposes the Annual Trends of Natural Rubber in India.

Table-1: Annual Trend of Production, Consumption, Import and Export of Natural Rubber in India along with Area of Production and Average Prices of Rubber

Year (April to March)	Rubber area (ha)	Trappable Rubber Area(ha)	Production (Tonne)	Average yield (kg/ha)	Consumption (Tonne)	Import (Tonne)	Export (Tonne)	Average price of RSS-4 at Kottayam (Rs/100kg)
2005-06	597,610	447,015	802,625	1,796	801,110	45,285	73,830	6,699
2006-07	615,200	454,020	852,895	1,879	820,305	89,799	56,545	9,204
2007-08	635,400	458,830	825,345	1,799	861,455	86,394	60,353	9,085
2008-09	661,980	463,130	864,500	1,867	871,720	77,762	46,926	10,112
2009-10	686,515	468,480	831,400	1,775	930,565	177,130	25,090	11,498
2010-11	711,560	477,230	861,950	1,806	947,715	190,692	29,851	19,003
2011-12	734,780	490,970	903,700	1,841	964,415	214,433	27,145	20,805
2012-13	757,520	504,040	913,700	1,813	972,705	262,753	30,594	17,682
2013-14	778,400	518,100	774,000	1,629	981,520	360,263	5,398	16,602
2014-15	795,135	533,675	645,000	1,443	1,020,910	442,130	1,002	13,257
2015-16	810,800	558,900	562,000	1,437	994,415	458,374	865	11,306
2016-17	818,000	584,600	691,000	1,553	1,044,075	426,188	20,920	13,549
2017-18	820,900	612,000	694,000	1,458	1,112,210	469,760	5,072	12,980
2018-19	822,000	637,900	651,000	1,453	1,211,940	582,351	4,551	12,595
2019-20	822,300	663,700	712,000	1,459	1,134,120	457,223	12,872	13,522
2020-21p*	822,500	692,900	715,000	1,442	1,096,410	410,478	11,343	14,185

Sources: Rubber Board, India updated on 03-06-2021 P= Provisional

The Table-1 clearly indicates that the area under Rubber Cultivation was 5,97,610 hectares in 2005-06 which has been increased to 8,22,500 hectares in 2020-21. The land brought under cultivation has increased at the rate of 2.09% by average within the span of 15 years. At the same time Trappable Rubber Area also increased from 447,015 hectares in 2005-06 which has been increased to 692,900 hectares in 2020-21. But there was a moderate increase in rubber production of 802,625 Tonnes in 2005-06 which has been increased to 715,000 Tonnes in 2020-21. The rate of growth of Rubber production during this period of 2005-06 and 2020-21 was negative which needs concern to stakeholders. On other hand, rubber consumption has increased from 801,110 tonnes in 2005-06 to 1,096,410

Tonnes in 2020-21. The consumption of rubber has increased at the rate of 1.9% during this period. Hence, this situation encouraged import of rubber. Moreover the farmers involved in rubber cultivation were able to fetch better price which was increased from Rs.66.99 per kg in 2005-06 to Rs.141.85 per kg in 2020-21. The price has been increased at the rate of 3.3% per year during this period. Hence, farmers who come into rubber cultivation will be able to fetch better price in future and be benefited. The following diagrams are able to represent the data into clear picture.

Figure-1: Annual Trend of Rubber Cultivation Area and Production in India
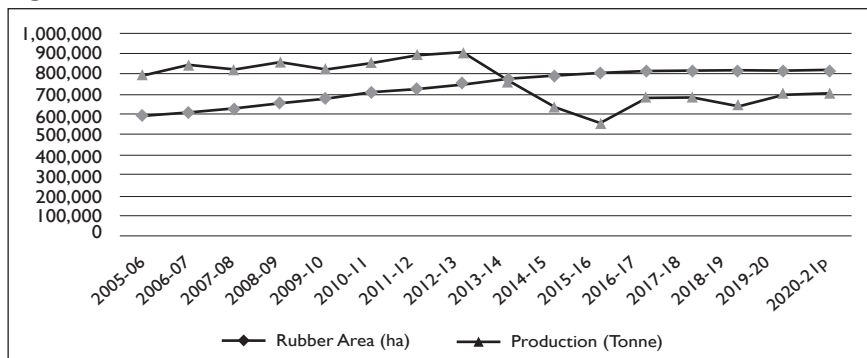
Source: Compiled from collected data

The Figure-1 represents that area under rubber cultivation in India since 2005 which is steadily increased. But the trend of increase in respect of area of rubber was in upward direction from 2005-06 till 2012-13 and later in downward direction. Thereafter, the growth trend was inert. Thus, there was a positive relationship between the area under rubber cultivation and rubber production. When the area under rubber cultivation was being inert in 2013-14, the rubber production declined. This is due to lack of adoption of new method of cultivation and technology to improve the productivity. This is well understood with the help of average yield of rubber production which is represented in the following diagram.
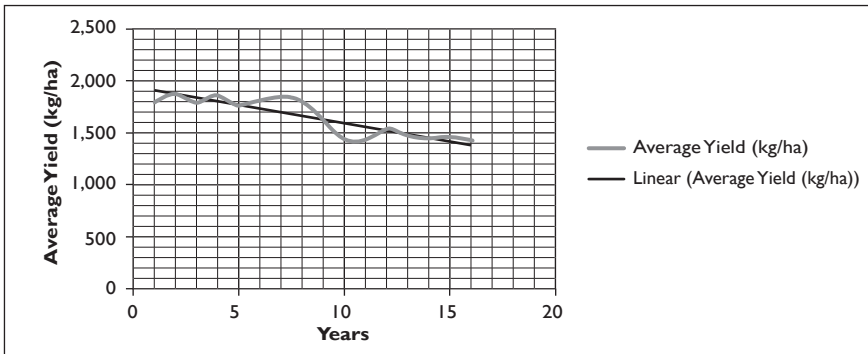
Figure-2: Average Yield (kg/ha)
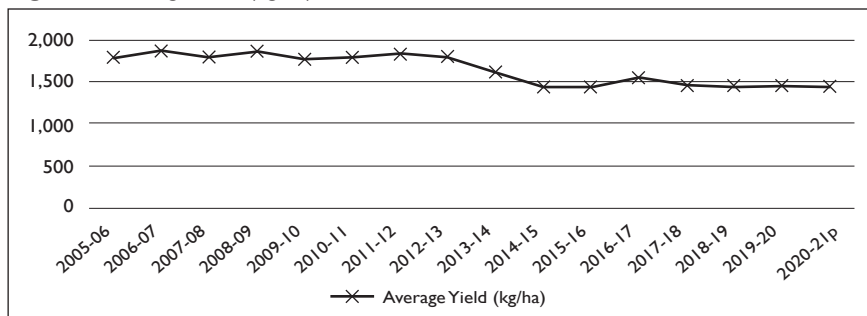
Source: Compiled from data

The average yield of rubber per hectare was 1796 Kg in 2005-06. But this yield has declined to 1442 Kg per hectare in 2020-21 in spite of increase in the area of cultivation. This needs a special attention on the part of stakeholders of Rubber Board of India. The average yield per hectare in respect of linear scale is presented in the following diagram:

Figure-3: Linear Average Yield

Source: Compiled from collected data

The average yield (Kg/ha) linear curve sloped downward exposes decreasing trend of Rubber Productivity. This trend is realized due to traditional method of cultivation, lack of technology, poor fertility of land, less awareness of cultivator regarding the benefit of rubber cultivation and lack of research activity to improve the productivity. The Linear Average Price is presented in the following diagram.

Figure-4: Linear Average Price
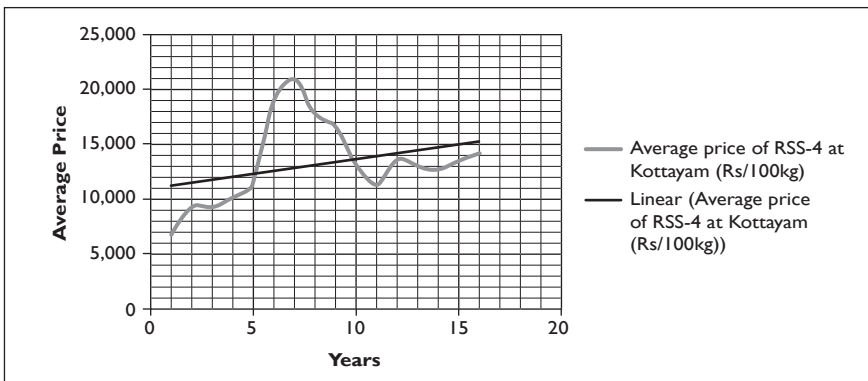
Source: Compiled from collected data

The average price curve and the average linear price curve slope upward which indicates increase in price of Rubber. It has a fetched a price of

Rs. 6699 per 100 Kg in 2005-06 which has increased to Rs. 14,185 per 100 Kg in 2020-21. This price increased at the rate of 3.3% per year. At the same time the consumption of rubber at national level increased. This is the positive sign for the farmer to take up rubber cultivation. Hence, the consumption pattern has been presented in the following diagram.

Figure-5: Linear Consumption
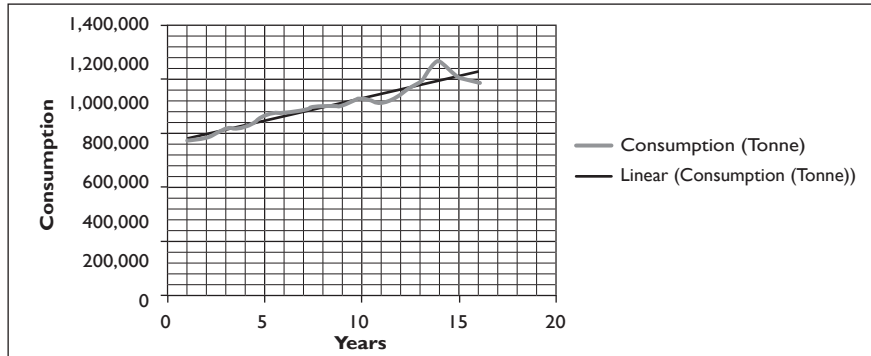
Source: Compiled from collected data

The linear consumption curve moving upwards exposes increasing trend of demand of Rubber. It has been increased from 8,01,110 (Tonnes) in 2005-06 to 1,09,6,410 (Tonnes) in 2020-21. The consumption of rubber has been increased at the rate of 1.99% during 2005-06 to 2020-21. The demand for rubber is realized due to the establishment of more rubber industries in the country. This provides an advantage situation to the farmers who are willing to undertake rubber cultivation and assures getting better price for their product. At the same time it is necessary to understand whether the farmers get better supporting price for their yield which is presented in the following diagram.

Figure-6: Average Yield and Price
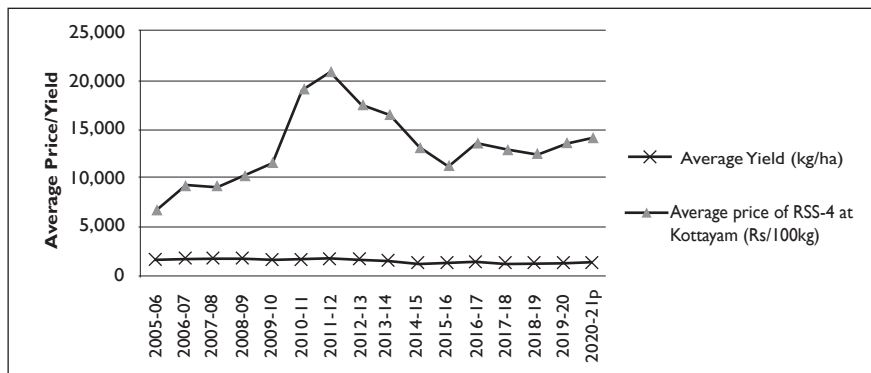
Source: Compiled from collected data

In the Figure-6, the average price curve moves in upwards direction where as average yield curve moves in downward direction. Here, the average price is increasing whereas the average yield is decreasing. The price is increased at the rate of 3.3%. This created an opportunity to other countries to meet the demand for rubber in India. Due to increase in consumption of rubber in the country, import of rubber is encouraged. This can be seen in the following diagram.
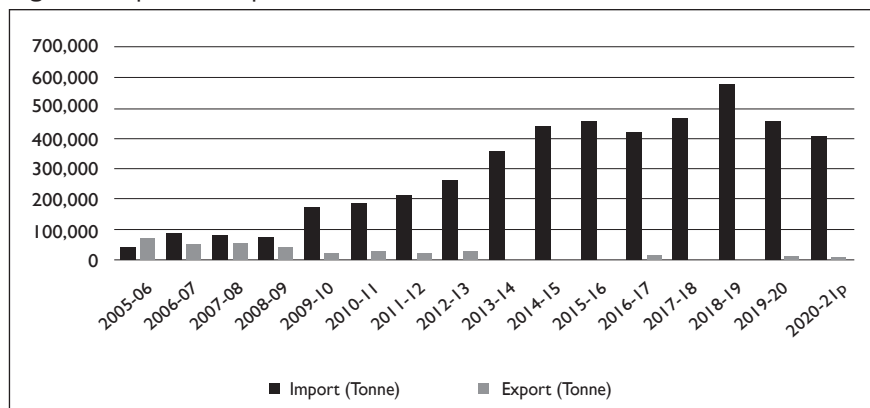
Figure-7: Trend of Export and Import of Rubber in India
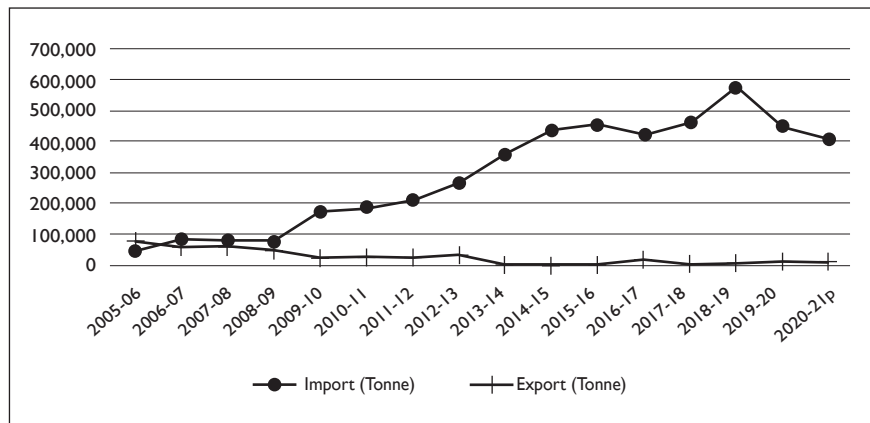
Source: Compiled from collected data

The Figure-7 shows the increasing trend of import and diminishing trend of export of rubber. Here, import increased at the rate of 10.57% between 2005-06 and 2020-21. This is an opportunity to the farmers, to get better income by involving in rubber cultivation. The following diagrams show the export and import of rubber in India since 2005.

Figure-8: Export and Import of Rubber

Source: Compiled from collected data

The Figure-8 explains the quantity of export and import of rubber in India since 2005. The import slowly increased whereas export slowly decreased. In the year 2019-20 export became 12,872 tonnes against 4, 57,223 tonnes of import during the same period. Hence, the farmers by cultivating rubber are able to generate required income since the demand for the rubber is more than local supply. This is well explained by the following table.

Table-2: Production and Consumption Pattern of Rubber in India

Year (April to March)	Production (Tonne)	Import (Tonne)	P+I (Tonne)	Export (Tonne)	P+I-E (Tonne)	Consump-tion (Tonne)
2005-06	802,625	45,285	847,910	73,830	774,080	801,110
2006-07	852,895	89,799	942,694	56,545	886,149	820,305
2007-08	825,345	86,394	911,739	60,353	851,386	861,455
2008-09	864,500	77,762	942,262	46,926	895,336	871,720
2009-10	831,400	177,130	1,008,530	25,090	983,440	930,565
2010-11	861,950	190,692	1,052,642	29,851	1,022,791	947,715
2011-12	903,700	214,433	1,118,133	27,145	1,090,988	964,415
2012-13	913,700	262,753	1,176,453	30,594	1,145,859	972,705
2013-14	774,000	360,263	1,134,263	5,398	1,128,865	981,520
2014-15	645,000	442,130	1,087,130	1,002	1,086,128	1,020,910
2015-16	562,000	458,374	1,020,374	865	1,019,509	994,415
2016-17	691,000	426,188	1,117,188	20,920	1,096,268	1,044,075
2017-18	694,000	469,760	1,163,760	5,072	1,158,688	1,112,210
2018-19	651,000	582,351	1,233,351	4,551	1,228,800	1,211,940
2019-20	712,000	457,223	1,169,223	12,872	1,156,351	1,134,120
2020-21p	715,000	410,478	1,125,478	11,343	1,114,135	1,096,410

Source: Compiled from collected data

The Table-2 indicates that the area under Rubber production which was 802,625 Tonnes in 2005-06 has been increased to 715,000 Tonnes in 2020-21. The rate of growth of Rubber production during the period between 2005-06 and 2020-21 was negative which needs concern of stakeholders. On the other hand, rubber consumption has increased from 801,110 Tonnes in 2005-06 to 1,096,410 Tonnes in 2020-21. The consumption of rubber has increased at the rate of 1.9% during this period. In order to meet the demand of the market, rubber was imported from other countries. The import was 45,285 Tonnes in 2005-06 which has been increased to 715,000 Tonnes in 2020-21. The import of Rubber during the rate period between 2005-06 and 2020-21 was increased at the rate of 10.57%.

Consumption = Demand = Supply

Here, Consumption is greater than demand. The patter can be explained as follows:

(Demand) Consumption = Production + Import – Export (Supply)

But here,

(Demand) Consumption > Production + Import – Export (Supply)

In the present trend, there is variation between total consumption and total availability of Rubber in India. The total supply of Rubber in India is more than actual demand. If the import is substituted by more local production on one side supply decreased, on other hand, price increased. Hence, farmers who undertake rubber cultivation will be able to fetch better price in future and be benefited. The following diagrams well represent the data into clear picture.

Figure-9: Supply and Consumption of Rubber in India
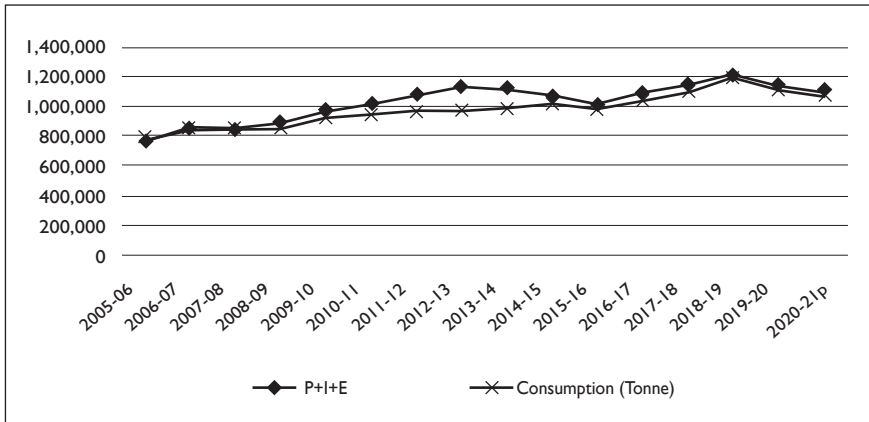
Source: Compiled from collected data

Figure-9 shows the supply of rubber and consumption of rubber (Demand) in the country. The curves show that supply of rubber meets the demand of rubber in the country. The supply is able to meet the demand by undertaking import. If the import could be reduced, local production can be increased, Indian farmers will be benefited. If the local production becomes more than demand the extra production can be exported. Hence, the trends are statistically analyzed as follows:

Area Under Rubber Cultivation and Rubber Production in Tonnes in India
Based on data, Linear Regression summary model is analyzed to prove the hypotheses.

(1) There is no significant association between area under cultivation (ha) and production (Tonnes) in respect of rubber in India

Table-3: Model Summary[b] for Area Under Rubber Cultivation (ha) and Rubber Production in India (Tonnes)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
I	.670[a]	.449	.410	79847.072	.449	11.429	I	14	.004	.811

a. Predictors: (Constant), Rubber area (ha)

b. Dependent Variable: Production (Tonne)

Source: Compiled from collected data

Table-3 shows the R and R^2 values. The R value is 0.670 indicates a high degree of positive correlation between the variables. The R^2 0.449 indicates the total variation in the dependent variable, Production (Tonne) which is explained by the independent variable, Rubber cultivated area (ha). Here, p value 0.004 is smaller than the table values of 0.05. Hence the null hypothesis is cannot be accepted. Therefore, there is a significant association between area under cultivation and production in respect of rubber cultivation in India. This is further discussed with the help of ANOVA analysis.

Table-4: ANOVA[a] for Area Under Rubber Cultivation(ha) and Rubber Production in India (Tonnes)

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	72868951721.155	I	72868951721.155	11.429	.004[b]
I	Residual	89257768127.282	14	6375554866.234		
	Total	162126719848.438	15			

a. Dependent Variable: Production (Tonne)

b. Predictors: (Constant), Rubber area (ha)

Source: Compiled from collected data

In ANOVA Table-4, Rubber Production in India (Tonnes) is significantly predicted by independent variable Area Under Rubber Cultivation (ha) at 95% of confidence level.

Table-5: Coefficients[a] for Area Under Rubber Cultivation(ha) and Rubber Production in India (Tonnes)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
I (Constant)	1405758.221	189474.829		7.419	.000	999375.130	1812141.312
Rubber area (ha)	-.857	.254	-.670	-3.381	.004	-1.401	-.313

a. Dependent Variable: Production (Tonne)

Source: Compiled from collected data

The common regression equation is
$$Y = a + bX$$

Table-5 shows the effects of Area Under Rubber Cultivation(ha) and Rubber Production in India(Tonnes), as given by the regression equation. The regression Model for the study can be written as follows:

Rubber Production in India (Tonnes) = 1405758.221– 0. 857 (Rubber area (ha)

Since the model established for the study fit, the null hypothesis is rejected. Hence, there is a significant association between area under cultivation and production in respect of rubber in India.

Average Production (Tonnes) and Average Yield (Kg/ha) of Rubber Production in India

Based on the data, Linear Regression summary models are analyzed to prove each hypotheses.

(2) There is no significant association between Average Production (Tonnes) and Average Yield (Kg/ha) in respect of rubber production in India.

Table-6: Model Summary[b] for Average Production (Tonnes) and Average Yield (Kg/ha) in Respect of Rubber Production in India

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
I	.920[a]	.847	.836	73.907	.847	77.426	I	14	.000	.738

a. Predictors: (Constant), Production (Tonnes)

b. Dependent Variable: Average yield (kg/ha)

Source: Compiled from collected data

Table-6 shows the R and R^2 values. The R value of 0.920 indicates a high degree of positive correlation between the variables. The R^2 value of 0.847 indicates the total variation in the dependent variable, Average yield (kg/ha) which is explained by the independent variable, Rubber Production (Tonnes). Here, the p value is 0.000 which is smaller than the table values of 0.05. Hence the null hypothesis cannot be accepted. Therefore, there is a significant association between Average Production (Tonnes) and Average Yield (Kg/ha) in respect of rubber production in India. This is further discussed with the help of ANOVA analysis.

Table-7: ANOVA[a] for Average Production (Tonnes) and Average Yield (Kg/ha) in Respect of Rubber Production in India

Model		Sum of Squares	df	Mean Square	F	Sig.
I	Regression	422916.577	I	422916.577	77.426	.000[b]
	Residual	76471.173	14	5462.227		
	Total	499387.750	15			

a. Dependent Variable: Average yield (kg/ha)

b. Predictors: (Constant), Production (Tonne)

Source: Compiled from collected data

In ANOVA Table-7, Average yield (kg/ha) is significantly predicted by independent variable Rubber Production (Tonnes) in India at 95% of confidence level.

Table-8: Coefficients[a] for Average Production (Tonnes) and Average Yield (Kg/ha) in Respect of Rubber Production in India

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	411.503	142.311		2.892	.012	106.277	716.730
Production (Tonnes)	.002	.000	.920	8.799	.000	.001	.002

a. Dependent Variable: Average yield (kg/ha)

Source: Compiled from collected data

The common regression equation is

Y = a + bX

Table-8 shows the effects Average Production (Tonnes) and Average Yield (Kg/ha) in respect of Rubber Production in India and is given by the regression equation and the regression Model for the study can be written as follows:

Average yield of Rubber Production in India (kg/ha) = 411.503 – 0. 002 Production (Tonnes)

Since the model established for the study fit, the null hypothesis is rejected. Hence, there is a significant association between Average Production (Tonnes) and Average Yield (Kg/ha) in respect of rubber production in India.

Consumption (Tonne) and Production (Tonne) of Rubber in Respect of India

Based on data, Linear Regression summary model are analyzed to prove the hypotheses.

(3). There is no significant association between Consumption (Tonne) and Production (Tonne) in respect of rubber in India

Table-9: Model Summary[b] for Consumption (Tonne) and Production (Tonne) of Rubber in Respect of India

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.906[a]	.820	.807	50831.694	.820	63.858	1	14	.000	.642

a. Predictors: (Constant), Supply

b. Dependent Variable: Consumption

Source: Compiled from collected data

Table-9 shows the R and R^2 values. The R value of 0.906 indicates a high degree of positive correlation between the variables. The R^2 value of 0.820 indicates the total variation in the dependent variable, i.e., Consumption of Rubber (Tonnes) which is explained by the independent variable, i.e., Supply of Rubber (Tonnes) or Production of Rubber (Tonnes). Here, the p value is 0.000 which is smaller than the table values of 0.05. Hence the null hypothesis cannot be accepted. Therefore, there is significant association between Consumption (Tonne) and Production (Tonne) in respect of rubber in India. This is further discussed with the help of ANOVA analysis.

Table-10: ANOVA[a] for Consumption (Tonne) and Production (Tonne) of Rubber in Respect of India

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	165001188515.822	1	165001188515.822	63.858	.000[b]
1	Residual	36174055277.928	14	2583861091.281		
	Total	201175243793.750	15			

a. Dependent Variable: Consumption

b. Predictors: (Constant), Supply

Source: Compiled from collected data

In ANOVA (Table-10), Consumption of Rubber (Tonnes) is significantly predicted by independent variable, i.e., Supply of Rubber (Tonnes) or Production of Rubber (Tonnes) in India at 95% of confidence level.

Table-11: Coefficients[a] for Consumption (Tonne) and Production (Tonne) of Rubber in Respect of India

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	141460.125	106364.926		1.330	.205	-86669.952	369590.202
Supply	.811	.102	.906	7.991	.000	.594	1.029

a. Dependent Variable: Consumption

Source: Compiled from collected data

The common regression equation is

$$Y = a + bX$$

Table-11 shows the effects of Consumption of Rubber (Tonne) and Production of Rubber (Tonne) in respect of India, which is given by the regression equation and the regression Model for the study can be written as follows:

Consumption of Rubber (Tonnes) in India (kg/ha) = 141460.125 – 0. 811 Supply of Rubber

Since the model established for the study fit, the null hypothesis is rejected. Hence, there is no significant association between Consumption (Tonne) and Production (Tonne) in respect of rubber in India.

Conclusion

The rate of growth of Rubber production during this period between 2005-06 and 2020-21 was negative which needs concern of the stakeholders. On the other hand, rubber consumption has increased from 801,110 tonnes in 2005-06 to 1,096,410 Tonnes in 2020-21.

References

Datta, Haripada (2019). Production and Productivity of Natural Rubber: A Study on Growth Trends of Rubber Plantation in Tripura. *International Journal of Management (IJM)*, 10(4), 115-131. ISSN Print: 0976-6502 and ISSN Online: 0976-6510.

Indian Rubber Statistics (2017). Rubber Board, Ministry of Commerce & Industry, Govt. of Kerala, Kottayam, India.

Krishnakumar, A.K. & Rajeswari, M.J. (1995). Cultivation in non-traditional areas, Natural Rubber, In George P.J. and Jacob C.K. (Ed.), Natural Rubber, Agro management and Crop Processing, Rubber Research Institute, Kottayam, India.

Rubber Statistical News (2021, August). Statistics & Planning Department Rubber Board, 80(3), Kottayam, Kerala.

Rubber Statistical News (2021, July). Statistics & Planning Department Rubber Board, 80(2), Kottayam, Kerala.

Rubber Statistical News (2021, June). Statistics & Planning Department Rubber Board, 80(1), Kottayam, Kerala.

Saraswathyamma C.K., Licy J. & Marattukalam G. Joseph. 'Planting Materials', In George P.J. and Jacob C.K. (Ed.), Natural Rubber, Agro Management and Crop Processing, Rubber Research Institute, Kottayam, India.

Thomas, K.K & Panikkar A.O.N (2000). 'Indian Rubber Plantation Industry: Genesis and Development' In George P.J. and Jacob C.K. (Ed.), Natural Rubber, Agro Management and Crop Processing, Rubber Research Institute, Kottayam, India.

⎯⎯ ● ⎯⎯

Journal of International Economics

GUIDELINES FOR AUTHORS

1. A paper should contain 3000 to 5000 words. All contributions should be submitted in Times New Roman 12-point type, 1.5 lines spacing in A4 size page setup, with margins of one inch from all sides.

2. Manuscript should be accompanied with a declaration by the author that the paper is the author's own work and has neither been published nor submitted for publication elsewhere.

3. The desired order of content is a) Title; b) Author(s) / Affiliation(s); c) Acknowledgement, if any; d) Abstract (200 words); e) Main Text; f) References and g) Appendices

4. The cover page of the article should contain: (i) Title of the article (in bold), (ii) Name(s) of author(s), (iii) Professional affiliation, (iv) Address of correspondence (v) Acknowledgements, if any. Kindly note the author's name should not be mentioned in any other page.

   Example:

   TITLE OF ARTICLE

   NAME OF AUTHOR

   PROFESSIONAL AFFILIATION

   Current University

   School / Department

   City, State, Pin Code

   Email:...

The second page should contain

(i) Title of the article (Times New Roman 16-point type, in bold)

(ii) An abstract in about 100-150 words (Times New Roman 12-point type, single line spacing, in italics

(iii) 3-5 Keywords

(iv) Paper type: Empirical research, Concept paper, Case study, Viewpoint, or General.

(v) Main Headings should be in Times New Roman -14 point type and Sub headings should be in Times New Roman 12-point type, bold font, in italics. Do not number or underline headings.

(vi) Mathematical expressions, figures and charts should be presented in a way that will be easily printable. Tables and diagrams should be numbered consecutively and included in the text. Source must be mentioned below the table / figure.

(vii) References must be given in APA style in alphabetical order and typed on a separate page, single-spaced, at the end of the paper. All references listed must be cited in the article and vice versa.

(viii) Please check your manuscript for clarity, grammar, spellings, punctuation, and consistency of references to minimize editorial changes.

(ix) The editorial team has the right to modify or edit the work in order to match the standard and style requirement of book. Manuscripts are accepted for publication on the understanding that they are subject to editorial revisions.

The manuscript may be sent to:

editorjim@ipeindia.org

COMMON SUBSCRIPTION FORM

To
The Publications Division,
Institute of Public Enterprise,
OU Campus, Hyderabad - 500 007
Telangana, India.

Dear Sir / Madam,
I/We wish to subscribe for the following Journal(s) for _____ year(s) from _____ to _____.

S. No.	Journal Title	Annual Subscription Rates				Put a Tick (√) for Selection
		For India			For other countries	
		Indi-viduals ₹	Academic Libraries ₹	Corpo-rates ₹	Foreign Subscribers (US$)	
1	The Journal of Institute of Public Enterprise	1500/-	2000/-	3000/-	200	
2	Journal of Economic Policy & Research	1500/-	2000/-	3000/-	200	
3	Journal of International Economics	1500/-	2000/-	3000/-	200	
4	Journal of Marketing Vistas	1500/-	2000/-	3000/-	200	
5	IPE Journal of Management	1500/-	2000/-	3000/-	200	
6	Journal of Governance & Public Policy	1500/-	2000/-	3000/-	200	

Please find enclosed herewith a Demand Draft / Cheque, bearing No. _____ drawn on Bank_____ dated_____for Rs/US$._____(In words)_____ drawn in favour of '**Institute of Public Enterprise**'**,** payable at Hyderabad. Please effect the subscription from next issue onwards.

Names of the Journals for which subscription is sent:

1._____   2. _____
3._____   4. _____
5._____   6. _____

Journal Dispatch Address:
Name of the Individual / Organization_____
Address_____
City_____ Pin_____ Country_____
Ph. No._____ Mobile No._____
E-mail Address_____

Signature: **Office Seal:**

Institute of Public Enterprise

Institute of Public Enterprise (IPE), Hyderabad, is a non-profit educational society devoted to Education, Training, Research and Consultancy for business enterprises in public and private sectors. IPE is a premier B-School and is recognised as a 'Centre of Excellence' by the Indian Council of Social Science Research (ICSSR), Ministry of HRD, Government of India, for doctoral studies. It is also recognised by nine universities for guidance of PhD scholars. It has developed strong links with industry and academic institutions and is the founder member of the Association of Indian Management Schools (AIMS).

IPE strongly believes that HR development including education is crucial for economic growth. As part of its long-term education programme, the Institute runs an AICTE-approved PG Diploma in Business Management, which is also recognised as equivalent to MBA by the Association of Indian Universities (AIU). Added to it, the Institute offers MBA in Public Enterprise for practicing managers in collaboration with Osmania University. With the changing needs of the industry, the Institute also runs sector-specific PGDM programs in Marketing Management, Banking, Insurance and Financial Services, International Business and Human Resource Management. IPE also offers a 15 month Exe-PGDM program for Executives.

The Institute has a strong research wing with a number of research scholars, sponsored by ICSSR and IPE, working on topics of current interest. Its PhD programme is one of the largest in social sciences. Research, both basic and applied, is the forte of the Institute and helps it in its training and educational activities. IPE's research studies are extensively used by the Committee on Public Undertakings (COPU), other Legislative and Government Committees, the Economic Advisory Council to the Prime Minister, several Ministries of the Government of India, Planning Commission, Standing Committee on Public Enterprises (SCOPE) and several Finance & Pay Commissions.

Apart from Journal of International Economics, IPE also publishes six other journals titled:
*   The Journal of Institute of Public Enterprise
*   Journal of Economic Policy and Research
*   Indian Journal of Corporate Governance
*   IPE Journal of Management
*   Journal of Marketing Vistas
*   Journal of Governance & Public Policy

IPE INSTITUTE OF PUBLIC ENTERPRISE
ICSSR, MINISTRY OF EDUCATION, GOI RECOGNIZED CENTRE FOR EXCELLENCE IN RESEARCH

Shamirpet Campus, Medchal-Malkajgiri Dist, Hyderabad - 500101
Ph: +91-40-234 90 900   Fax: +91-40-234 90 999
Website: www.ipeindia.org