International Journal of Innovation and Economic Development
ISSN 1849-7020 (Print)
ISSN 1849-7551 (Online)

URL: http://dx.doi.org/10.18775/ijied.1849-7551-7020.2015.32.2002
DOI: 10.18775/ijied.1849-7551-7020.2015.32.2002

Volume 3
Issue 2
April, 2017
Pages 18-35

Investigating the Relationship of E-Government, Control of Corruption, Economic Prosperity and Environmental Degradation: An Analysis of Asian Region

Syeda Anam Hassan

Department of Economics, Hazara University, Mansehra, KPK, Pakistan.

Abstract: To generate and maintain sustainable economic growth, e-government and control of corruption are considered as a key contributor in the nation. E-government not only increases control of corruption and economic growth but also reduces environmental degradation. In this study, the relationship of e-government to control of corruption, economic prosperity and environmental degradation has been investigated. The structural equation model has been employed over the sample period of 2003 to 2013 for nine variables analyzed for selected Asian nation. The results indicate that e-government has a positive and significant association with economic prosperity and control of corruption. However, e-government has a negative and important relationship to environmental degradation. Control of corruption is positively associated with economic prosperity and negatively related to environmental degradation. Finally, economic prosperity increases lead to decrease environmental degradation indicating negative relationship and confirming EKC (Environmental Kuznets Curve). The impact of control variables such that manufacturing, working for population and political stability all are positive to economic prosperity while exports and urban population show a negative association with the economic prosperity. In the case of environmental degradation, manufacturing and working population shows negative relationship while exports, political stability, and urban population shows a positive association with the environmental degradation. The study suggests that constructive national policies by practitioners and policy makers are required for the development of e-government.

Keywords: E-government, Corruption, Economic prosperity, Environmental degradation, Asian countries.

1. INTRODUCTION

"E-government" states to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transmute relations with citizens, trades, and other arms of government (World Bank, 2009). In other words, it refers to use of information and communication technologies (ICTs) and the internet to enhance the access and distribution of all aspects of government services and processes for the benefit of citizens, industries, employees and other shareholders (Krishnan and Teo, 2012).

Existing research on the impact of e-government defines that the growth and maturity of e-government in a country has the potential to offer several benefits such as improved service delivery, increased democratization (Haldenwang,2004), lessening corruption and increased government pellucidity (Williams et al., 2008), reduction of social division (Srivastav and Teo, 2007) uplift economic growth and business effectiveness (Srivastav and Teo,2008), and improves ecological or environmental quality (Haigh,2004). Sidewise, the literature shows that

ICTs' role in enabling economic prosperity has become more noteworthy (Dedrick, 2003) as the current era of knowledge economy, public-sector ICT-led innovations (e.g., e-government) and key factor contributing nation's prosperity (Dutta and Jain 2005).

As economic activities involve in manufacturing, construction and depletion processes, so cannot be untangled from the environment in which they are found, the effect of such activities on the environment increases as the economy flourishes (Kahuthu, 2006). It means the nations prosper on the cost of polluting the environment. Nonetheless, the improved technology, innovation, advanced production process, energy substitutability and efficiency led to control the environmental degradation along with global pressure on environmental issues, carbon tax and installation of pollution abatement equipment (U.S EPA, 2010).

Therefore, e-government plays a key role in creating awareness to protecting environment, deliver services on environmental related issues, emphasis on services usage along with multichannel services delivery which lowers the cost, time and fuel which directly (deforestation, paper industry, fuel consumption) and indirectly (transportation, urbanization) reduce environmental degradation (Aymes,2017). In developing nations e-governance holds more potential than developed countries for substantial economic growth, tackling corruption, protecting the environment along with innovation and business opportunities. Furthermore, this analysis also incorporates five control variables such that exports, manufacturing, urban population, working population and political stability. As exports, manufacturing and working population increases the economic prosperity by means of productivity, exports earnings, advancements in technologies and more contribution of working population in economic development also increases.

Problem Statement

The relationship between e-government and control of corruption has been examined by taking the panel of high-income countries. These studies are ''micro'' in orientation based on a qualitative case study approach. Moreover, the analysis of the impact of corruption on environmental degradation, e-government, and economic prosperity are still nascent in existing analysis. This study attempts to quantify the relationship between e-government and economic prosperity along with control of corruption and environmental degradation for lower middle-income economies in Asia.

Aim of the study

The core aim of this study is:

- To find out the relationship of e-government with control of corruption, economic prosperity, and environmental degradation.
- To find out the relationship of control of corruption with economic growth and environmental degradation.
- To find out the association between economic prosperity and environmental degradation.
- To quantify the impact of exports, urban population, manufacturing, population aged (15-64) and political stability on economic prosperity.
- To quantify the impact of exports, urban population, manufacturing, population aged (15-64) and political stability on environmental degradation.

These objectives required extensive theoretical and empirical work to formulate strong policy Vista for selected Asian countries.

2. LITERATURE REVIEW

Clark et al., (2003) and Chau (2004) studied that e-government leads to promote e-business. By expanding the Technology-Organization-Environment (TOE) framework, the result shows a positive relationship between e-government and e-business, and their communal impact on national economic affluence. Thus, advancement in the technology, innovations, and

exposition of resources along with the human capital investment lead to increase economic prosperity and welfare.

Krishnan et al., (2011) studied the interactions of electronic-government (e-government) development and electronic-business (e-business) development along with environmental sustainability. Using secondary data from 122 countries, results show that both e-government development and e-business development has a positive association and directly affect the environmental sustainability.

Krishnan et al., (2013) attempt to analyze the cross country analysis of 105 countries by exploring the relationship of e-government to corruption, economic prosperity, and environmental degradation. By using SEM model, the econometric results show that e-government has a positive and significant relationship with economic prosperity directly and indirectly via control of corruption, whereas, e-government has a negative association to environmental degradation.

Kim et al., (2009) studied the association between e-government and corruption which shows that in implementing an OPEN increase in the transparency, symmetric information, strong and efficient leadership along with accountability, reduce corruption. Elbahnasawy (2014), submitted the impact of e-government and internet adoption on corruption. The Arellano–Bover system of GMM is applied on the unbalanced panel data set consists of 160 countries during 1995 to 2009. The empirical results indicate that with the strengthened of e-government and usage of internet adoption the corruption can be controlled significantly. The results are similar to the study of Fredriksson (2014), Yong, (2014) and Diaby and Sylwester (2014).

Haigh (2004) and Chen et al., (2008) studied that Information Systems (IS) and environmental sustainability together with the implementation of electronic government. The results show that automation reduces resources usage, cost, energy consumption, reduce paper, low carbon production and greenhouses emission that lead to less environmental degradation. Maas et al., (2014) studied the pollution prevention, environmental communication, firm size, manufacturing by using multivariate ordinary least square for Germany in 2012. The results show that there is a negative relationship of environmental communication to environmental degradation while firm size is positively connected to manufacturing which in return has a positive impact on the environment. The results are similar to the studies of Bai et al., (2014) and Jungho et al., (2009).

Robertson and Watson (2004) examine the influences on economic prosperity by the level of corruption for the periods 1999 and 2000. By using Corruption Perceptions Index (CPI), the econometric results reveal that the higher the level of corruption, the lower will be economic activities due to uncertain and risky business environment and results in declining FDI. Welsch (2004), tested the relationship among corruption, per capita income and a number of pollution indicators. The econometric result indicates an inverted U-shaped (EKC- Environmental Kuznet curve). Biswas et al., (2012) studied the impact of corruption along with urbanization, working age (15-64), trade openness, energy efficiency and population density on pollution (CO_2 emission) for the period of 1995 to 2005 for more than 100 developing countries. The estimated results of the panel with fixed country and time effects (OLS) indicates that higher the adoption of energy efficient technologies and working population, lower will be the pollution.

Zafar et al., (2013) studied the impact of trade openness and corruption to environmental degradation in Pakistan from the time frame 1980 to 2011. The results estimated by employing ARDL approach confirmed the indication of Environmental Kuznets Curve (EKC) in the case of Pakistan. The corruption significantly deteriorates the environment whereas awareness,

education and proper law and order reduce the environmental degradation. Finally, results suggest the Pigovian tax on pollution emitting industries along with usage of recommended dose of fertilizer is required for a meaningful decline in pollution proportion.

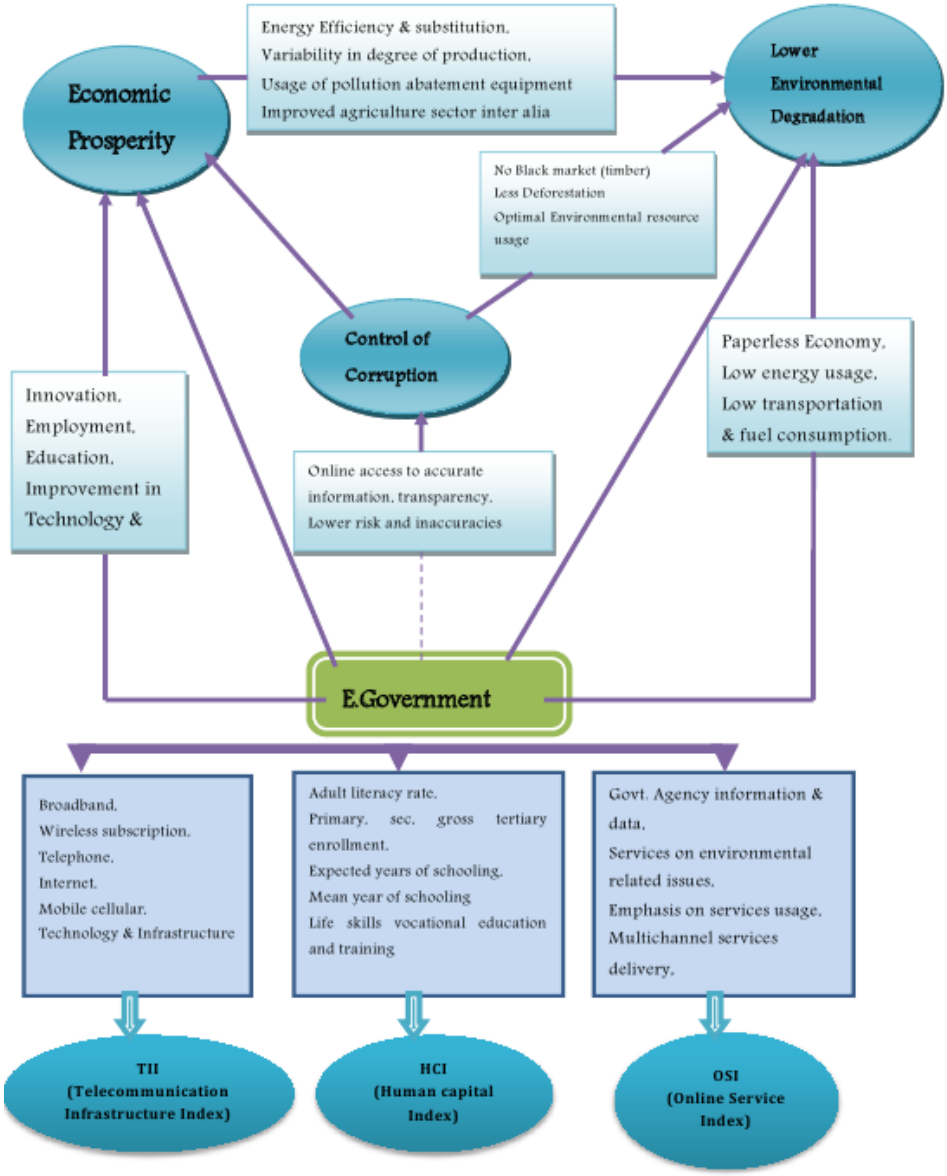
Chen and Huang (2013) studied the CO2 emission with the relation to electric power consumption, energy use, FDI, GDP, and urban population. The results of Panel Cointegration (FMOLS and DOLS) for N-11 countries for 1981–2009 time proves the existence of Environmental Kuznets curve (EKC) and a positive relation of emissions to electric power consumption, urban population, and energy use. The existence of EKC is also studied by Shahbaz (2013) for Pakistan in 1971–2009 time frames. While Stolyarova (2013) studied Per capita CO2 emissions to Per capita GDP for 93 countries (7 groups) in 1960-2008 shows positive relation. The negative relation of urbanization to environmental sustainability is also observed in the study of Nagendra et al., (2014) for India and Cebula and Clark (2014), Lee at al., (2017). Melville (2010) studied the impact of business initiatives on the natural environment. The study specifies that business initiatives are a leading form of social organization and subsidize to the deteriorating and vilification of the natural environment. Moreover, IS researchers, educators, journal editors, and association leaders are liable for the unveiling the ecological issue and then implementing transformative policies (Watson et al., 2010).

Elliot (2011) studied the importance of natural environment along with the activities by human behavior which deteriorates the earth's natural environment. By incorporating transdisciplinary, integrative framework for IT-enabled business transformation, the result shows that there is a positive and significant association between economic activities and environmental degradation. Therefore, enhancing economic activities at the cost of environment is alarming in a global world. The implementation of eco-friendly technologies should be adopted in order to meet increasing demand without hitting environmental sustainability. The results are similar to the studies of Finel and Tapio (2012) and Chhetri (2017).

Borhan et al., (2013) studied to empirically examine the relationship of CO2 to the quality of life and economic growth in East Asian 8 nations from the year 1965 to 2010. The results show a positive and significant relationship of population density to pollution along with confirmation of Environmental Kuznets Curve. Iqbal et al., (2013) examined the impact of foreign direct investment (FDI), exchange rate, exports, terrorism and political instability on the economic development in Pakistan for the time frame 1973 to 2010. The results estimated by VAR based on Johansen Co-integration exposed that exports, FDI, and exchange rate positively wedged the economic growth whereas terrorism and political instability have adversely affected the economic growth of Pakistan.

Mushtaq et al., (2014) studied the relationship of manufacturing, exports and trade openness on GDP. The Panel Regression -Hausman test is used for Bangladesh, India, Nepal, Pakistan and Sri Lanka for time frame 1980 -2011. The results show a positive relation of GDP to manufacturing and exports as comparable to the study of Houseman, et al., (2014) and Cappsel et al., (2016). The analysis of Yoon et al., (2014) and Arouri et al., (2014) for 30 OECD economies during 1960–2013 indicates the positive relation of GDP per capita to working population, life expectancy, and inflation rate and negative relation to urbanization. The results are similar to the study of Arouri et al., (2014). Figure 1 displays a hypothetical framework that is extracted from the previous literature.

Figure 1: Theoretical Framework based on existing literature



Source: Authors' extraction from the previous literature.

The above theoretical frame work in Figure 1 depicts the channel and literature studied regarding the e-government to control of corruption, economic growth, and environmental dilapidation. E-government index itself comprises of three main indices that are: Telecommunication Infrastructure index (TII), Human capital index (HCI) and online service Index (OSI). Telecommunication Infrastructure index (TII) consist of broadband, wireless subscription, telephone, the internet, mobile cellular, technology, and infrastructure.

Human capital index (HCI) include adult literacy rate, primary, secondary and tertiary gross enrollment, expected years of schooling, mean year of schooling, life skills vocational education and training. And online service Index (OSI) covers Government Agency information and data, services on environmental related issues, emphasis on services usage along with multichannel services delivery.

Therefore, e-government as a broader aspect covers and marks the main economic variables directly and indirectly. The Human capital index directly incorporates the education and employment which increases the GDP per capita. As the increase in e-government lead to increase educational and life skill vocational training, primary, secondary and tertiary enrollment which increases the employment and thus GDP per capita increases. Consequently, e-government directly contributes in boosting up GDP per capita that is taken as an economic prosperity in this analysis.

Telecommunication Infrastructure Index (TII) incorporated in e-government deals with enhanced service, facilities, information, and accessibility of all the data along with concern issues at hand (Information-Communication-Interaction-Transaction) and indirectly reduces the paper, energy and transport cost and corruption as well by symmetric information.

Moreover, the improving technology and infrastructure bring innovations, business, and employment opportunities and increases the economic prosperity together. Therefore, provision of these online services via e-government reduces transportation cost along with fuel consumption, low paper and documentation usage (less deforestation) ultimately decreases environment degradation (CO2 emissions) and increases economic prosperity. Finally, Online Service Index (OSI) provides online accurate, well-organized and updated information and data accessibility of Government agencies which leads to lowers the risk, uncertainties, and inaccuracies that directly helps in control of corruption or reduces corruption in another perceptive.

Furthermore, OSI index includes services on environmental related issues, emphasized on services usage along with multichannel services delivery which directly cooperates in lowering environmental degradation by creating awareness and providing information concerning environmental rules, regulation and policies.

3. RESEARCH METHODOLOGY

This chapter illustrates the methodology to conduct this study including of Structural Equation Model (SEM) used to quantify the relationship of e-government to economic prosperity, control of corruption, environmental degradation along with four control variables (manufacturing, urban population, working population and political stability).

3.1 Considerations based on Nations

There are 46 countries in the lower middle-income country group. Among these 16 countries are in Asian region including Pakistan. But for particular study due to unavailability of data 11countries are selected over a period of 2003-2013.

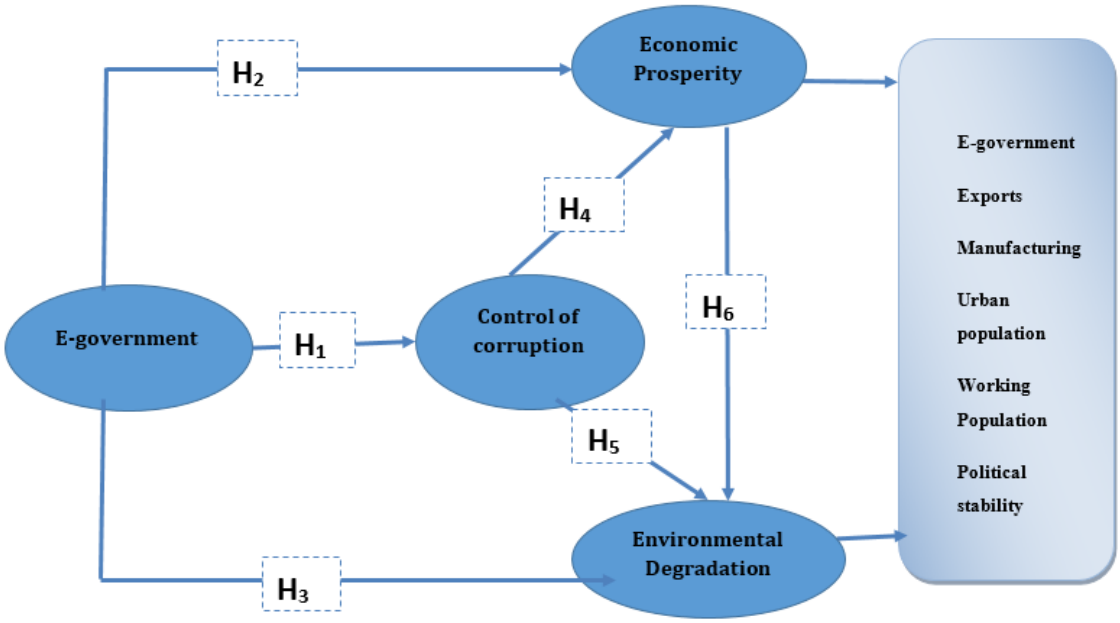
The secondary data is collected from United Nation Public Administration country studies (UNPACS, 2014), World Development Indicators (WDI, 2014), and The Worldwide Governance Indicators (WGI, 2014). The included nations are Armenia, Georgia, India, Indonesia, Mongolia, Pakistan, Philippines, Sri Lanka, Timor-Leste, Uzbekistan, and Viet Nam.

The nine variables are included in this study as the whole. However, three basic economic variables (e-government, control of corruption and economic prosperity) will serve as independent and dependent variable as per constructed hypothesis in a set of six structural equations.

3.2 Conceptual Framework

The hypothesis is set out based on the objective of the research analysis. Figure 2 shows the conceptual framework for ready reference.

Figure 2: Conceptual Framework



Source: Based on Krishnan et al. (2013).

The six major hypotheses are constructed as defined in the conceptual framework. These are as follow:

- H1= There is a positive association between e-government maturity and control of corruption (Klitgaard (1988), Srivastav and Teo (2008) and Lio, et al., (2011).
- H2= There is a positive relationship between e-government maturity and economic prosperity (Porter (1990), Dutta and Jain (2005) and Melville, (2010).
- H3= There is a negative relationship between e-government maturity and environmental degradation. Elliot, (2011), Andersen and Henriksen (2006), Watson et al., (2010) and West (2014).
- H4= There is a positive relationship between control of corruption and economic prosperity. Mauro (1995), Getz and Volkema, (2001) and Robertson and Watson (2004).
- H5= There is a negative relationship between control of corruption and environmental degradation. Lopez and Mitra (2000), Robbins (2000) and Welsch (2004).
- H6= There is a negative association among economic prosperity and environmental degradation (Kahuthu, 2006), Lee and Lee (2009) and Hugoand Bardsley (2014).
-

Finally, control variables (Exports, manufacturing, urban population, working population, and political stability) together with e-government is regressed on economic prosperity and environmental degradation respectively.

3.3 Model Specification

SEM tests theorized hypothetical models, particularly when using large samples, in command to support our understanding of the compound relationships between constructs (Hair et al., 2006; Schumacker and Lomax, 2004).

System least square analysis and SEM are an extension of the general linear model (GLM) that enables the investigator to test a set of regression equations instantaneously. A key feature of system least square under SEM is that variables are understood to handle with the problem of endogeneity with in the model.

In order to explain the relationship between different economic variables among each other in the ASIAN context, the study uses System least square approach by using Structural Equation model (SEM) during 2003-2013. This study estimates the nexus of association among e-government, control of corruption, economic growth and environmental degradation within a simultaneous equation system.

$$CoC_{it} = \beta_0 + \beta_1 E.gov_{it} + u_{it}$$
$$GDP_{it} = \beta_0 + \beta_1 E.gov_{it} + u_{it}$$
$$ED_{it} = \beta_0 + \beta_1 E.gov_{it} + u_{it}$$
$$GDP_{it} = \beta_0 + \beta_1 CoC_{it} + u_{it}$$
$$ED_{it} = \beta_0 + \beta_1 CoC_{it} + u_{it}$$
$$ED_{it} = \beta_0 + \beta_1 GDP_{it} + u_{it}$$
$$GDP_{it} = \alpha_0 + \alpha_1 E.gov_{it} + \alpha_2 Exp_{it} + \alpha_3 Man_{it} + \alpha_4 UP_{it} + \alpha_5 PA_{it} + \alpha_6 PS_{it} + \zeta_{it}$$
$$ED_{it} = \gamma_0 + \gamma_1 E.gov_{it} + \gamma_2 Exp_{it} + \gamma_3 Man_{it} + \gamma_4 UP_{it} + \gamma_5 PA_{it} + \gamma_6 PS_{it} + \psi_{it}$$

- Where,
- CoC is Control of Corruption = Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. (-2.5 to 2.5)
- GDP = GDP Per Capita PPP (Constant 2011 international $)
- ED = Environmental Degradation = CO2 Intensity (Kg per kg of oil equivalent energy use)
- E-gov = E-government (Index Range 0-1)
- Exp = Exports (% of GDP)
- Man = Manufacturing (% of GDP)
- UP = Urban population (% of total)
- PA = Population Aged 15 to 64 (% of total)
- PS = Political stability (Index Range -2.5 to 2.5)
- t = 1, 2…11 years;
- i = 1, 2…11 countries and

Ui, t ζ_{it} and ψ_{it} represents error term.

4. DATA ANALYSIS AND INTERPRETATION

Table 1: Descriptive Statistics

Variables	Mean	Std. Dev.	Minimum	Maximum
E-government(0 - 1)	.3913901	.1012403	.04633	.60468
Control of Corruption (-2.5 to 2.5)	-.6429348	.3060789	-1.306461	.25329
Economic Prosperity ($1025-$4035)	5060.115	1872.94	1234.812	9425.737
Environmental Degradation	2.240615	.5790797	1.227823	3.398345
Exports (Goods and services percentage of GDP)	32.31887	17.35249	8.316151	80.02862
Manufacturing(percentage of GDP)	14.73067	6.460957	2.501989	28.25284
Urban Population(percentage of total)	41.31957	14.64246	18.297	70.366
Population Age(15-64) (percentage of total)	63.81086	5.573274	48.32665	70.71695
Political Stability(-2.5 to 2.5)	-.8220877	.8713614	-2.811578	.9606435

Table 1 shows the descriptive statistics of all the considered economic variables. The mean value of e-government shows the index value that is 0.391 that is far behind than 1 and even below than 0.50. It depicts weak E-government in Asian region rather the value is not moderate [as for correlation with economic prosperity i.e. 0.664], although, on average in last 13 years e-. government maturity is still improving. The result depicts that E-government is in developmental phases of maturity.

Table 2: SEM (Structural Equation Model) Estimated by System Least Square

Dependent Variable	Independent Variables	Coefficient	Std. Error	t. Statistics	Prob.	R-Square	Adjusted-R2
Control of corruption	Constant	-1.015	0.106	-9.549	0.000		
	EG	0.951	0.263	3.617	0.000	0.099	0.091
Economic Prosperity	Constant	7.160	0.110	64.929	0.000		
	EG	3.280	0.272	12.023	0.000	0.548	0.544
Environmental Degradation	Constant	0.993	0.094	10.547	0.000	0.046	0.038
	EG	-0.564	0.233	-2.420	0.015		

Table 2 shows the estimated result by system least square approach by using structural equation model where e-government serves as an independent variable (Exogenous) and control of corruption, economic prosperity and environmental degradation serve as dependent variables.

The econometric results depict that on the average increase in e-government increases the control of corruption by 0.95 units (percent points) that are at 1 percent level of significance and shows 0.099 percent variations in control of corruption due to change in e-government. Therefore, positive value 0.95 shows improvement in control of corruption due to increase in e-government. The improvement in e-government indicates improvement in the stages of e-government that leads to increasing the index value more toward 1. It means that increase in accountability, administration via online access of information regarding government data and agencies, reduces the inaccuracies and risk which provide transparent and symmetric information to all the citizens where no power can be exercised to rig the private gain through malpractices, bribery, extortion, improper political contribution and abuse of discretion. Hence, improvement in e-government combat corruption (increases control of corruption) and estimated results are consistent with the studies of Klitgaard (1988), Lio, et al., (2011), UNDP (2008) and Goel at al., (2012).

Table 3: SEM Estimated by System Least Squares

Dependent Variable	Independent Variables	Coefficient	Std. Error	t. Statistics	Prob.	R-Square	Adjusted-R2
Economic Prosperity	Constant	8.799	0.088	99.408	0.000	0.142	0.134
	CoC	0.552	0.124	4.439	0.000		
Environmental Degradation	Constant	0.627	0.054	11.573	0.000	0.068	
	CoC	-0.220	0.076	-2.965	0.003		0.060

The econometric results depict that on the average increase in e-government increases the economic prosperity by 3.2 percent that is significant at 1 percent and shows 0.54 percent variations in economic prosperity due to change in e-government. The results are consistent with the previous studies of Dedrick, (2003), Dutta and Jain (2005) and Lee et al., (2017). Therefore, e-government is positively and significantly associated with economic prosperity. Additionally, on the average increase in e-government decrease the environmental degradation by 0.56 percent with 5 percent level of significance and shows 0.046 percent

variations in environmental degradation due to change in e- government. The result is consistent with the studies of Elliot, (2011), Layne and Lee (2004) and West (2014). Table 3 shows the estimated result where control of corruption serves as an independent variable and economic prosperity along with environmental degradation is dependent variable in structural equations.

Also building up the mechanism, control of corruption plays a crucial role increasing economic prosperity. The results depict that on the average increase in control of corruption increases the economic prosperity by 0.55 percent with 1 percent level of significance and shows 0.142 percent variations in economic prosperity due to the control of corruption. It infers that corruption has deterrent effects on economic growth as it increases the risk and uncertainty faced by prospective investors (Getz and Volkema, 2001) as well as adding inducements and other uncertain expenses to the expenses of doing business (Robertson and Watson, 2004), (Mauro, 1995). Thus a negative effect on investment, lead to lessening economic growth. The empirical results show that on average rise in control of corruption decreases environmental degradation by 0.22 percent that is significant at 1 percent and shows 0.068 percent variations in environmental degradation due to the control of corruption. The result is consistent with the studies of Lopez and Mitra (2000), Welsch (2004), Robbins (2000) and Dogan and Turkekul(2016).

Table 4 shows the estimated result where economic prosperity serves as an independent variable and environmental degradation as the dependent variable. The results show that one percent increase in economic prosperity decreases the environmental degradation by 0.27 percent that is significant at 1 percent and shows 21 percent variations in environmental degradation due to economic prosperity. It shows that the energy efficiency and energy substitution in the production process play a key role in decreasing CO2 emission. The regional perspective viewed that the CO2 emission in Asia, Africa, and the Middle East have increased during the last 40 years but have decreased more during the last ten years. The main causes of the decrease in CO2 emission in these regions are due to the improvement in energy moderation and energy substitution.

Table 4: SEM Estimated by System Least Squares

Dependent Variable	Independent Variables	Coefficient	Std. Error	t. Statistics	Prob.	R-Square	Adjusted-R2
Environmental Degradation	Constant	3.064	0.404	7.578	0.000	0.212	0.206
	EP	-0.271	0.047	-5.674	0.000		

The findings are consistent with the studies of Zhang and Wang (2014). Furthermore, the analysis strongly supports the EKC hypothesis. Therefore, it infers that Asian Nations are reached at that certain level of income where societies effectively spend in environment protection schemes; adopt environmental policies, rules and regulations along with the installation of pollution abatement equipment. Therefore, energy mix, energy substitution, awareness to nations (Quitzow et al., (2011), spending earnings and resources to implement costly environmental schemes increases growth along with decreasing environmental degradation. The results of this analysis are consistent with the previous studies of Dinda and Coondoo (2006) and Lee and Lee (2009).

Finally, five control variables are regressed on economic prosperity and environmental degradation by incorporating e-government as an independent variable. Table 5 shows the estimated results via the approach of structural equation model by using system least square where economic prosperity serves as a dependent variable (Endogenous).

Table 5: SEM Estimated by System Least Squares in case of Economic Prosperity

Independent Variables	Coefficient	Std. Error	t. Statistics	Prob.	R-Square	Adjusted-R2
E-government	2.138	0.262	8.159	0.000	0.808	0.799
Exports	-0.307	0.053	-5.715	0.000	Durbin-Watson	1.84030
Manufacturing	0.354	0.057	6.184	0.000		
Urban Population	-0.041	0.013	-3.067	0.002		
Working Pop	2.034	0.049	40.913	0.000		
Political Stability	0.056	0.031	1.802	0.071		

Note: Dependent Variable- Economic Prosperity.

The estimated results show that on the average increase in e-government increase the economic prosperity by 2.1 percent that is at 1 percent level of significance. The improvement in e-government increases the GDP per capita and in chain different economic factors. The result is consistent with the studies of Haldenwang (2004) and Melville (2010).

The econometric result shows that one percent increase in exports decreases the economic prosperity (GDP per capita) by 0.30 percent that is significant at 1 percent. The increasing dependence of developing nations over developed nations, globalization is worsening the import-export condition, macroeconomic shocks, and a mounting trade deficit that have bound the nations to depreciate their currencies that are mainly used for the development of macro economic condition (Powell and Chacha(2016). But its channel to mark the output level is a highly provocative issue in open economy collected works. The reason behind this relationship is that in Asian region contribution of exports to GDP has been decreased between 13 and 17 percent point in 2010 along with significant decline in GDP growth about 16 to 20 percentage points due to lower demand component than heavy imports contribution in GDP (United Nations, 2014). In addition, the nations are in a phase of J-curve phenomena and Marshall Lerner condition in violation.

The econometric result of this analysis displays that one percent increase in manufacturing increases the economic prosperity (GDP per capita) by 0.35 percent that is significant at 1 percent. The literature shows that manufacturing has substantially increased consumers' standard of living, strengthened productivity, employment and reinforced citizen by the endowment. Moreover, rapid advancement in innovation and dynamism, and through international competition, the prices of manufactured goods' has been reduced since of high-technological usage process and contemporary manufacturing which provides consumers more goods for fewer financial resources (Timmons, et.al., 2014).Moreover, one percent increases in the urban population decreases the economic prosperity (GDP per capita) by 0.04 percent that is significant at 1 percent.

The econometric result displays that one percent increase in working population (population aged 15 to 64) increases the economic prosperity (GDP per capita) by 2.034 percent that is significant at 1 percent. It means that increase in working population (skilled/employed population) leads to increase in manufacturing, investment, innovation, research and productivity which significantly contributes to increasing economic prosperity. The results are consistent with the previous studies of Yoon et al., (2014) and Caselli et al., (2016). The empirical result shows that on average (one percent point) increase in political stability increases the economic prosperity (GDP per capita) by 0.056 percent that is significant at 10 percent. As the political stability leads to increase potential investors (Zhang, 2016), FDI, Government projects (Bocinsky et al., 2016) increase in the rates of productivity growth,

private investment, increase in the scale of physical and human capital accumulation along with increasing certainty in consumption and production plan. The findings are consistent with the studies of Jong-a-Pin (2009) and Aisen and Veiga (2011). Finally, E-government together with five control variables show 0.80 percent variation in economic prosperity (GDP per capita), and there is no issue of autocorrelation that is 1.840 nearer to 2.0.

Table 6: SEM Estimated by Least Squares in case of Environmental Degradation

Independent Variables	Coefficient	Std. Error	t. Statistics	Prob.	R-Square	Adjusted-R2
E.Gov	-0.068109	0.114746	-0.593570	0.5529	0.893616	0.888990
Exports	0.219658	0.023593	9.310423	0.0000	Durbin-Watson	1.79
Manufacturing	-0.638550	0.025079	-25.46132	0.0000		
Urban Population	0.131845	0.005946	22.17430	0.0000		
Working Population	-0.090459	0.021772	-4.154828	0.0000		
Political Stability	0.068065	0.013621	4.996988	0.0000		

Note: Dependent Variable- Environmental Degradation.

Table 6 shows the estimated results via the approach of structural equation model by using system least square where environmental degradation serves as the dependent variable (Endogenous).

The econometric results show that on the average increase in e-government decrease the environmental degradation by 0.068 percent that is insignificant in case of combined regression with control variables. It means that automated provided services reduce documentation and record keeping process in which intensive fuel is used for paper and pulp industry which results in high energy consumption and greenhouse gas emissions along with increasing overall infrastructure costs, time and resources. Moreover, excessive transportation, fuel combustion in paper manufacturing, and deforestation led to increasing environmental degradation. Environmental degradation can be reduced by improving e-government maturity. The estimated results are steady with the studies of Klitgaard (1988), Lio, et al., (2011).

The econometric result confirms this impact by showing that one percent increase in exports increases the environmental degradation by 0.219 percent that is significant at 1 percent and increase in manufacturing decreases the environmental degradation by 0.638 percent that is significant at 1 percent. The econometric result shows that one percent increase in urban population increases the environmental degradation by 0.13 percent that is significant at 1 percent. In current studies, the estimated result exhibits that one percent increase in working population (population aged 15 to 64) decreases the environmental degradation by 0.09 percent that is significant at 1 percent. Likewise, the econometric result of the current analysis displays that on the average increase in political stability increases the environmental degradation by 0.060 percent that is significant at 1 percent. Summing up, e-government including five control variables show 0.89 percent variation in environmental degradation, and there is no issue of autocorrelation as the Durbin-Watson values are 1.79 that is nearer to 2.

Finally, Pair-wise Granger causality test (Granger, 1969) is applied for the determining of statistical hypothesis which further helps in useful forecasting. Table 7 shows the estimated result via Pairwise Granger Causality Tests at lag 2.

Table 7: Determining the direction of causation

Null Hypothesis:	F-Stat	Prob.	Result	Direction
COC does not Granger Cause EG	0.776	0.542	Accepted	Unidirectional causality from EG to CoC
EG does not Granger Cause COC	2.051	0.092	Rejected	
EP does not Granger Cause EG	2.848	0.040	Rejected	Bidirectional causality from EP to EG and EG to EP
EG does not Granger Cause EP	2.907	0.037	Rejected	
ED does not Granger Cause EG	0.298	0.878	Accepted	No causality
EG does not Granger Cause ED	0.110	0.978	Accepted	
EP does not Granger Cause COC	0.464	0.762	Accepted	Unidirectional causality from CoC to EP
COC does not Granger Cause EP	2.374	0.056	Rejected	
ED does not Granger Cause COC	0.499	0.481	Accepted	Unidirectional causality from CoC to ED
COC does not Granger Cause ED	4.454	0.036	Rejected	
ED does not Granger Cause EP	0.141	0.966	Accepted	No causality
EP does not Granger Cause ED	0.167	0.954	Accepted	

4. CONCLUSION AND RECOMMENDATIONS

Governments around the world have set very ambitious goals to establish online information that facilities the citizen in the efficient and effective way. The econometric results show that on the average increase in e-government increases the control of corruption by 0.95 units, increases the economic prosperity by 3.2 percent, and decrease the environmental degradation by 0.56 percent that is at 1 and 5 percent level of significance respectively. The results moving in the structural pattern further reveals that on the average increase in control of corruption increases the economic prosperity by 0.55 percent and decreases environmental degradation by 0.22 percent that is significant at 1 percent. It infers that riskless business decisions via symmetric information increase the investment along with increasing the potential investors, efficient allocation of economic resources and tax payers which increase the economic prosperity. Whereas in the case of the environment, controlling of corruption among foresters led to extensive habitat maintenance along with reducing over depletion of natural resources, active formation and implementation of environmental rules and policies directed to maintain environmental quality and optimal level of environmental protection.

Moreover, one percent increases in economic prosperity decreases the environmental degradation by 0.27 percent. It reveals that the energy efficiency and energy substitution in the production process play a key role in decreasing CO2 emission approving the Environmental Kuznets Curve for the Asian region. Whereas, exports need considerable focus, as one percent increase in exports decreases the economic prosperity (GDP per capita) by 0.30 percent along with increasing the environmental degradation by 0.219 percent that is too outrageous. The heavy import commodities burden, irrational export structure (high input

prices and lower price of exported good), energy crises and natural disasters after 20th century have badly hit the nation's prosperity (Giblin, et al., 2013).

In the case of manufacturing, results reveal that one percent increase in manufacturing increases the economic prosperity (GDP per capita) by 0.35 percent and decreases the environmental degradation by 0.638 percent that is significant at 1 percent. As environmental standards are strictly followed by the manufacturing firm since the 20th century due to awareness to protect the environment at the global level, pollution abatement equipment and advanced technology are being installed in order to lower the CO2 tax and meeting EPA standards (Pichelli, 2012).

On the contrary node, one percent increase in the urban population decreases the economic prosperity (GDP per capita) by 0.04 percent along with increasing the environmental degradation by 0.13 percent that is significant at 1 percent. The results are consistent with existing literature as urban population leads to misallocation of human resources, increases the burden on the economy using slum population (unskilled) in cities and increased cost of living with the additional outcome of hazardous diseases due to the absence of quality health and living facilities (Notes, 2010). Not only deteriorating economic resources but also damage the natural habitat and environment by declining the agricultural land, disruption in the ecosystem, misallocation of environmental resources especially by more construction/building process ensuing climate changes which substantially degraded the environment (Frederick et al., 1995). Finally, Granger causality result shows that there is a bidirectional relationship between economic prosperity and e-government, the unidirectional relationship of e-government to control of corruption, and control of corruption to economic prosperity and environmental degradation.

As a policy making the Asian region need an organized, well developed, and large scale infrastructure accessibility for the initiative of flexible and comprehensive architectural model that supports the development of complete mechanized services with strategic planning, designing, and building major systems (Le, 2012). The architectural model means technology investments in a manner to avoid unnecessary duplication of infrastructure and link business processes through shared, sufficiently protected information systems and leverage different business processes, services and activities that are located outside active boundaries.

E-government projects should mainly focus towards automation of common and core processes of each sector. Likewise, Governments should ensure that authorities and agencies at all levels having adequate knowledge and skills to support small-scale businesses and other trades in order to assure successful co-management arrangements. Asian region can substantially increase economic prosperity by effective planning and deployment of e-services, enhancing their ICT infrastructure and raise the level of human capital, including improvement of the ICT literacy of citizens, to make use of the new technologies so as to realize the full benefits of online and mobile services (Gallouj et al., 2015).

Since the 1990s, the energy consumption of industry per unit of value added in developed countries and some developing nations has fallen by around 1.3% per year on average but up to mark improvement is still required by sustained and focused efforts for energy efficiency. Thus, there is immense need of developing and expanding the sustainable use of automation services provided by e-government along with more paper recycling and recovered paper usage process that could help in reducing energy consumption in the industry. The Asian lower middle-income region must be characterized by high institutional capacity, more formal strategic and visionary regulations, less presence of bureaucratic involvement in environmental policies and proper establishment of e-government to bring a productive result for current and future generation.

ACKNOWLEDGEMENTS

I am beholden to my supervisor Dr. Shehla Amjad, and Dr. Azizullah Sayal for guiding to making this write up a success. Special thanks to the Editors of the Journal for the many valuable comments on the previous version of the paper which has improved its quality and content to the present state.

REFERENCES

- Aisen, A and Veiga, F, J (2011). How Does Political Instability Affect Economic Growth? International Monetary Fund WP/11/12 -IMF Working Paper. Middle East and Central Asia Department.
- Andersen, K. V., & Henriksen, H. Z. (2006). E-government maturity models: Extension of the Layne and Lee model. Government information quarterly, 23(2), 236-248. Crossref
  Arouri, M, Youssef, A, B, Nguyen-Viet, C and Soucat, A (2014). Effects of urbanization on economic growth and human capital formation in Africa Program on the Global Demography of Aging PGDA Working Paper No. 119, online available at: http://www.hsph.harvard.edu/pgda/working.htm
- Aymes, J. F. L. (2017). México and the TPP: a critical view on diversification and intellectual property. Bandung: Journal of the Global South, 4(1), 1. Crossref
- Bai, J., Jayachandran, S., Malesky, E, J., and Olken, B, A., (2014). "Does Economic Growth Reduce Corruption? Theory and Evidence from Vietnam." pp.1-64.
- Biswas, A, K., Farzanegan, M, R and Thum, M (2012). "Pollution, shadow economy and corruption: Theory and evidence". Ecological Economics-Elsevier. Vol. 75.pp.114–125. Crossref
- Bocinsky, R. K., Rush, J., Kintigh, K. W., & Kohler, T. A. (2016). Exploration and exploitation in the macrohistory of the pre-Hispanic Pueblo Southwest. Science advances, 2(4), e1501532. Crossref
- Borhan, H., Ahmed, E. M., & Hitam, M. (2013). CO2, Quality of Life and Economic Growth in East Asian 8. Journal of Asian Behavioural Studies, 3(8), 14-24.
- Caselli, Francesco, and Andrea Tesei(2016). "Resource windfalls, political regimes, and political stability." Review of Economics and Statistics 98.3 : 573-590.
- Crossref
- Cebula, R, J., and Clark, J.R (2014). "Impact of Economic Freedom, Regulatory Quality, and Taxation on the Per Capita Real Income: An Analysis for OECD Nations and Non-G8 OECD Nations." Munich Personal RePEc Archive (MPRA) Paper No. 56605, posted 13. Online available at: http://mpra.ub.uni-muenchen.de/56605/
- Chau, Banerjee, P. and P.Y.K. (2004). "An evaluative framework for analyzing e-government convergence capability in developing countries, Electronic Government" 1 (1), pp. 29–49. Crossref
- Chen, A.J.W. Boudreau, M.-C, and Watson, R.T. (2008). Information systems and ecological sustainability, Journal of Systems and Information Technology 10 (3), pp. 186–201. Crossref
- Chen, J, H and Huang, Y, F (2013). "The Study of the Relationship between Carbon Dioxide (CO2) Emission and Economic Growth" Journal of International and Global Economic Studies, 6(2), pp. 45-61.
- Chhetri, R. P. (2017). Promoting Sustainable Consumption and Production for a Better Future in Nepal. In Sustainable Asia: Supporting the Transition to Sustainable Consumption and Production in Asian Developing Countries (pp. 213-238). Crossref
- Clark D. Gillett, S. Lehr, W. Sirbu, M. and Fountain, J. E. (2003). Local Government Stimulation of Broadband: Effectiveness, E-government, and Economic Development, NCDG Working Paper No. 03-002, 2003.
- Dedrick, J. Gurbaxani, V. Kraemer, K.L. (2003). Information technology and economic performance: a critical review of the empirical evidence, ACM Computing Surveys 35 (1), 2003, pp. 1–28. Crossref
- Diaby, A and Sylwester, K (2014). "Bureaucratic competition and public corruption: Evidence from transition countries" European Journal of Political Economy. Elsevier. Vol. 35. pp. 75–87. Crossref
- Dinda, S and Coondo, D (2006). "Income and emission: a panel data-based Cointegration analysis," Ecological Economics, vol. 57, pp. 167-181, 2006. Crossref
- Dogan, E., & Turkekul, B. (2016). CO2 emissions, real output, energy consumption, trade, urbanization and financial development: testing the EKC hypothesis for the USA. Environmental Science and Pollution Research, 23(2), 1203-1213. Crossref

- Dutta, S. Jain, A. (2005). An Analysis of the Diffusion of Information and Communication Technologies of Nations, The Global Information Technology Report, World Economic Forum, Geneva, Switzerland, 2005.
- Elbahnasawy, N, G (2014). "E-government, Internet Adoption, and Corruption: An Empirical Investigation" World Development Vol. 57, pp. 114–126. Online available at: Crossref Crossref
- Elliot, S. (2011). Trans disciplinary perspectives on environmental sustainability: a re- source base and framework for IT-enabled business transformation, MIS Quar- terly 35 (1), pp. 197–236.
- Finel, N and Tapio, P (2012). "Decoupling transport CO2 from GDP". Finland Futures Research Centre (FFRC) eBOOK 1/2012. ISSN-1797-1322. pp. 1-42.
- Fredriksson, A. (2014). "Bureaucracy intermediaries, corruption and red tape" Journal of Development Economics-Elsevier. Vol, 108, pp. 256–273 Crossref
- Gallouj, F., Weber, K. M., Stare, M., & Rubalcaba, L. (2015). The futures of the service economy in Europe: a foresight analysis. Technological Forecasting and Social Change, 94, 80-96. Crossref
- Getz, K.A and Volkema, R.J (2001) "Culture, perceived corruption, and economics, Business and Society'' 40 (1), pp. 7–30. Crossref
- Giblin, T., Kennedy, K., and McHugh, D. (2013). The economic development of Ireland in the twentieth century. Routledge.
- Goel, R. K., Nelson, M. A., and Naretta, M. A. (2012). The internet as an indicator of corruption awareness. European Journal of Political Economy, 28(1), 64–75. Crossref
- Granger, C. W. J. (1969). "Investigating Causal Relations by Econometric Models and Cross-spectral Methods". Econometrica. 37 (3): 424- 438, doi:2307/1912791, Jstor.
- Haigh, N (2004). Linkages between e-business and sustainability outcomes: an exploratory study, Innovation: Management, Policy and Practice 6 (2), pp. 236–246. Crossref
- Hair, J.F. Jr., Black, W., Babin, B.J., Anderson, R.E., and Tatham, R.L., (2006). Multivariate data analysis, 6th edition, Pearson Prentice Hall, upper Saddle River, NJ.
- Haldenwang, C. V (2004). Electronic government (e-government) and development, The European Journal of Development Research 16 (2), pp. 417–432. Crossref
- Hugo, G., and Bardsley, D. K. (2014). Migration and environmental change in Asia. In People on the Move in a Changing Climate (pp. 21-48). Springer Netherlands. Crossref
- Iqbal, A., Azim, P., Akram, W., and Farooq, M, U., (2013). "Impact of Foreign Direct Investment and Exports on the Economic Growth: A Case Study of Pakistan." Journal of Asian Development Studies, 2(3): 1-9. ISSN 2304-375X
- Jong-a-Pin, R. (2009). "On the measurement of political instability and its impact on economic growth." European Journal of Political Economy 25, 15–29. Crossref
- Jungho, B. Yongsung, C, and Won, K, W., (2009). "The environmental consequences of globalization: A country-specific time-series analysis". Ecological Economics 68: 2255–2264. Crossref
- Kahuthu, A. (2006). Economic growth and environmental degradation in a global context, Environment, Development and Sustainability 8 (1), pp. 55–68. Crossref
- Khan, G. F. (2017). Social Media for Government: A Practical Guide to Understanding, Implementing, and Managing Social Media Tools in the Public Sphere. Springer. Crossref
- Klitgaard, R. (1988). Controlling Corruption, University of California Press, Berkeley, CA
- Krishnan, S., and Teo, T. (2012). Moderating effects of environmental factors on e-government, e-business, and environmental sustainability. Journal of the American Society for Information Science and Technology 63 (10), pp. 1929–1946. Crossref
- Krishnan, S., Teo, T. S., and Lim, V. K. (2013). "Examining the relationships among e-government maturity, corruption, economic prosperity and environmental degradation: A cross-country analysis". Information and Management, 50(8), 638-649. Crossref
- Krishnan, Satish, and Teo. T (2011)."Moderating effects of environmental factors on e-government, e-business, and environmental sustainability." Elsevier.
- Le, T. A. (2012). Sustainable urban transport assessment. Evaluation opportunities for Asia cities: the case of Hanoi.
- Lee, C.-C and Lee, J.-D. (2009). "Income and CO2 emissions: evidence from panel unit root and Cointegration tests," Energy policy, vol. 37, pp. 413-423, 2009. Crossref
- Lee, J.W. and Layne, K (2004). Developing fully functional e-government: a four stage model, Government Information Quarterly 18 (2), pp. 122–136.
- Lee, Suzanna M., et al.(2017). "The relation of perceived and objective environment attributes to neighborhood satisfaction." Environment and behavior 49.2 .pp.136-160. Crossref

- Lio, M.-C. Liu, M.C. and Ou, Y.-P. (2011). Can the internet reduce corruption? A cross-country study based on dynamic panel data models Government Information Quarterly 28 (1), pp. 47–53. Crossref
- Lopez, R. and Mitra, S. (2000). Corruption, pollution, and the Kuznets environment curve, Journal of Environmental Economics and Management 40 (2), 2000, pp. 137– 150.
- Maas, S., Schuster, T., and Hartmann, E. (2014). Pollution Prevention and Service Stewardship Strategies in the Third-Party Logistics Industry: Effects on Firm Differentiation and the Moderating Role of Environmental Communication .Business Strategy and the Environment, 23(1), 38-55. Crossref
- Mauro, P. (1995). Corruption and growth, Quarterly Journal of Economics 110, pp. 681–712. Crossref
- Melville, N.P. (2010). "Information systems innovation for environmental sustainability", MIS Quarterly 34 (1), pp. 1–21.
- Mushtaq, M., Nazir, R., Ahmed, S., Nadeem, M., and Abbas, A. (2014). Trade Openness-Manufacturing Output Nexus: A Panel Data Study. Management and Administrative Sciences Review, 3(2), 256-261.
- Pichelli, J. (2012). The effects of environmental regulation on stock markets: evidence from the United States and China.
- Porter, M.E. (1990). The Competitive Advantage of Nations, Free Press, New York, NY. Crossref
- Powell, J., & Chacha, M. (2016). Investing in stability: economic interdependence, coups d'état, and the capitalist peace. Journal of Peace Research, 53(4), 525-538. Crossref
- Quitzow, R., Libo, W and Jacob, K., (2011). "Green Jobs in Asia: Achievements, Strategies and Potentials" Economy of Tomorrow. Department for Asia and Pacific. ISBN 978-3-86498-729-8.
- Ray, B. (2017). Quality of life in selected slums of Kolkata: a step forward in the era of pseudo-urbanisation. Local Environment, 22(3), 365-387. Crossref
- Robbins, P. (2000). "The rotten institution: corruption in natural resource management, Political Geography" 19 (4), pp. 423–443. Crossref
- Robbins, P. (2000). "The rotten institution: corruption in natural resource management, Political Geography" 19 (4), pp. 423–443. Crossref
- Robertson, C. and Watson, A. (2004). "Corruption and change: the impact of foreign direct investment", Strategic Management Journal 25 (4), pp. 385–396. Crossref
- Schumacker, R. E., and Lomax, R.G., (2004). A beginner's guide to structural equation modelling, 2nd edition. Mahwah, NJ; Erlbaum.
- Shahbaz, M (2013). "Does financial instability increase environmental degradation? Fresh evidence from Pakistan" Economic Modelling. Vol.33. pp. 537–544. Crossref
- Shahbaz, M., Mallick, H., Mahalik, M. K., & Sadorsky, P. (2016). The role of globalization on the recent evolution of energy demand in India: Implications for sustainable development. Energy Economics, 55, 52-68. Crossref
- Sjoholm, F. (2016). Foreign Direct Investment and Value Added in Indonesia (No. 1141).
- Srivastava, S.C. and Teo, T.S.H. (2008).The relationship between e-government and national competitiveness: the moderating influence of environmental factors, Communications of the Association for Information Systems 23 (2), pp. 73–94.
- Srivastava, S.C. Teo, T.S.H. (2007). E-government payoffs: evidence from cross-country data, Journal of Global Information Management 15 (4), pp. 20–40. Crossref
- Srivastava, S.C. Teo, T.S.H. (2007). E-government payoffs: evidence from cross-country data, Journal of Global Information Management 15 (4), pp. 20–40.
- Stolyarova, E (2013). "Carbon Dioxide Emissions, economic growth and energy mix: empirical evidence from 93 countries" Climate Economics Chair, Paris-Daupnine University CDC Climat. stolyarova@chaireeconomieduclimat.org.
- Timmons, J, Gold, S and McNelly, J (2012). Facts about Manufacturing. Online available at: themanufacturinginstitute.org/.../Facts-About-Manufacturing/.../A9

- S EPA (2010). Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Pulp and Paper Manufacturing Industry. Office of Air and Radiation. Sector Policies and Programs Division Office of Air Quality Planning and Standards U.S. Environmental Protection Agency.
- United Nation public Administration country studies (UNPACS, 2014). Online available at: unpan3.un.org/egovkb/en-us/Reports/UN-E-government-Survey-2014
- United Nations "E-government Survey" (2014). Online available at: http://gadebate.un.org/ ISBN 978-92-1-123198-4.

- Watson, R.T. Boudreau, M.-C and Chen, A.J. (2010). Information systems and environmentally sustainabledevelopment: energy informatics and new directions for the IS community, MIS Quarterly 34 (1), pp. 23–38.
- Welsch, H (2004). "Corruption, growth, and the environment: a cross-country analysis", Environment and Development Economics 9 (5), pp. 663–693. Crossref
- West, D.M (2014). Global E-government, 2005, hhttp://www.insidepolitics.org/i, (accessed June 10, 2014).
- Williams, J. MacKinnon, D.P. (2008). "Resampling and distribution of the product methods for testing indirect effects in complex models, Structural Equation Modeling": A Multidisciplinary Journal 15 (1), pp. 23–51.
- World Bank (2009). "E. government" online available at: http://web.worldbank.org/wbsite/external/topics/extinformationandcommunicationandtechnologies/extegovernment/0,,menuPK:702592~pagePK:149018~piPK:149093~theSitePK:702586,00.html
- World Development Indicator (WDI) 2014. Online available at: data.worldbank.org/products/wdi
- Worldwide Governance Indicator WGI(2014). Online available at: http://info.worldbank.org/governance/wgi/index.aspx#home .
- Xie, X., Jia, Y., Meng, X., & Li, C. (2017). Corporate social responsibility, customer satisfaction, and financial performance: The moderating effect of the institutional environment in two transition economies. Journal of Cleaner Production, 150, 26-39. Crossref
- Yong, A, N, J, S, K, V, J. (2014). "Willingness to Adopt e-Procurement to Reduce Corruption: Results of the PLS Path Modeling", Transforming Government: People, Process and Policy. Vol. 8 Issue No: 4 pp.1 -22. Online available at: Crossref
- Yoon, J, W., Kim, J and Lee, J (2014). Impact of Demographic Changes on Inflation and the Macroeconomy. International Monetary Fund WP/14/210. Online available at: https://www.imf.org/external/pubs/ft/wp/2014/wp14210.pdf Crossref
- Zafar, F., Anwar, S., Hussain, Z., Ahmad, N., (2013). "Impact of Trade Liberalization and Corruption on Environmental Degradation in Pakistan." Journal of Finance and Economics, Vol. 1, No. 4, pp. 84-89. Online available at: http://pubs.sciepub.com/jfe/1/4/4
- Zhang, B., & Wang, Z. (2014). Inter-firm collaborations on carbon emission reduction within industrial chains in China: Practices, drivers and effects on firms' performances. Energy Economics, 42, 115-131. Crossref
- Zhang, X. Q. (2016). The trends, promises and challenges of urbanisation in the world. Habitat International, 54, 241-252. Crossref