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International Journal of Current Research
Vol. 7, Issue, 04, pp.15451-15461, April, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

E-GOVERNMENT DEVELOPMENT SCENARIO IN INDIA BASED ON UNITED NATIONS SURVEYS

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ARTICLE INFO

Article History:
Received 06th January, 2015
Received in revised form
20th February, 2015
Accepted 06th March, 2015
Published online 30th April, 2015

Key words:
e-Government in India,
e-Service,
e-Government Development,
Online Services,
EGDI,
OSI.

ABSTRACT

Globally, e-Government (eGovt) Developments (EGD) of countries are still progressing. The developing countries like India with very large population and distributed administrative structure, has many challenges towards this progression. There are tremendous endeavors carried out by Government of India. The eGovt aims single-window e-services to its stakeholders and the countries are enduring efforts for this, India is in the formative stage. This paper explored the EGD scenario in India and benchmarked with the best performers and other similar countries based on EGD surveys carried out by the United Nations during 2003 to 2014. There are incredible efforts in India despite they faced many constraints than other similar developing countries, still India has low indices. The study analyzed the grounds for this squatter. This attempt helped to find the lacking of amenities in the e-Government system of India. The results benefits for the strategy development aimed at further developments towards interoperability and integration issues.

INTRODUCTION

The main aim of e-Government (eGovt) is to provide transparent, efficient and effective public service to its citizenry in a single-window (Gouscos, 2007; Monga, 2008; Chourabi, 2011). The eGovt in India intended to provide its services in an easier, faster and cheaper way of access (Bhattacharya, 2012; Tripathi, 2012). It evolves from one stage to the other i.e. from development of a web page to integration of entire eGovt system elements behind this web interface in a national portal (Esteve, 2007; Fogli, 2012). Thus eGovt interoperability is mandatory for this integration (Paul, 2014, Jaseen, 2011; Lallana, 2007). Conceptually there are four stages for eGovt Development (EGD) like web presence or information, interaction, transaction and transformation or integration (Veljkovic, 2014; Paul, 210). These multiple phases are not dependent on each other, nor need one to be completed before another can begin (Shah, 2007). Most of the developed countries are in the final stage and developing countries like India are in the third stage. The EGD of a country is assessed by how the ICT technologies are utilized to support citizen centric service delivery, and how governments are employing eGovt policies and initiatives (Whitmore, 2012; UN, 2012). The maturity level of eGovt depends on the speed of government progress in various stages of e-service delivery and is measured based on the Online Service Index (OSI) (Veljkovic, 2014; Rorissa, 2011).

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The countries adopted citizen inclusion as key in providing customer-oriented services leads to high e-participation indexes (ePI) (Potnis, 2010; UN, 2014). The United Nations surveyed the countries worldwide for evaluating how they are equipped to deliver e-services and use ICT in the governance process. They are ranked according to the concert of EGD Index (EGDI) that is a calculated based on the indices telecommunications infrastructure (TI), human capital (HC) and online service performance (UN 2003-2014). As per these survey reports, most of the countries have industrialized their eGovt to enhance its public sector service delivery. The developed, economically wealth countries have the top ranks, though developing countries are also performed well.

A largely populated developing country with low economy like India has to face many constraints in their EGD (Paul, 2011a; Baisya, 2008; UN, 2012; Paul, 2011b; Mahapatra, 2007). Even then, they have made tremendous efforts to provide eGovt services to their stakeholders (Guptha, 2010; Paul, 2012). These countries must exert more effort to achieve a given level of EGD than small, high income countries. So that the efforts required by these countries are far greater than that of developed countries (UN, 2012). This paper analyzed the reasons for squatter the indices still they have made greater holistic efforts across the country. This investigation is based on the broader umbrella of global EGD scenario based on the world ranks in the UN surveys from 2003 to 2014 (UN, 2003- 2014). The global trends were analyzed by the countries which were the top performers in 2014 UN Survey and high density developing countries having low per capita income.

Subsequently the paper depicts a comparative analysis of India with the similar but fast developing and economically rich country China. Then It pointed out the factors which hinder the EGDI of India.

The E-Government development (EGD)

In the traditional government system, the citizen needs to visit the administrative centres of a country in diverse geographical locations and waits in a lengthy queue for a long time to access a public service. By the dart of ICT era, the governments transformed into eGovt and aimed to facilitate the citizen interactions done at any time, from anywhere in a single window using handy devices like, PCs, mobiles, tablets etc. (Kulshrestha, S. P., 2013; Palvia, S.C.J., 2008; Paul, A., 2012). It induces a shift from traditional public service delivery modes to integrated electronic modes and is known as e-services or online services (Valdes, G., 2011; Sarikas, O. D., 2007). Then the eGovts transformed into connected government to deliver one-stop services and e-services became value services (UN, 2008; Saha, P., 2010; Fogli, D., 2012; Gouscos, D., 2007). This evolution is shown in Figure 1.

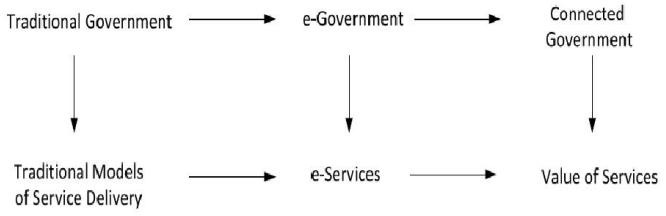

Figure 1: The evolution of public service delivery (UN, 2008)

These evolutionary phases of EGD lead to a matured eGovt system (UN, 2010; Klischewski, 2011). It is not a single step process, it span across time through different incremental steps like emergence, interactive, transactional, and then connected or networked (UN, 2010; Saha, 2010). The end result is collaboration of government organizations and departments by joining-up, creating chains of activities, operating in networks and acting as an integrated whole-of-government system to the public (UN, 2012; Klischewski, 2012; Estevez, 2007). This entails reshaping of the public sector, thus it needs new business models (Gottschalk, 2009). Since the late 90's most of the countries have released their eGovt strategies and defined various approaches for EGD, resulting significant progress at all levels of public administration (Kulshrestha, 2013; Lallana, 2007; Guijarro, 2007; IDABC, 2010). Worldwide government's focus on EGD for effective public services to citizens, as well as the seamless flow of information between diverse departments and institutions in a short time and in an easy way.

Benchmarking the EGD

Benchmarking is a comparison of two or more institutions or entities using a set of indicators (Rorissa, 2011). The EGD of countries are often benchmarked and ranked by International organizations such as the United Nations and the World Bank. These organizations regularly undertake significant studies to produce interactive representation of a country's ranks according to overall pattern and the level of economic, human, and technological development (Whitmore, 2012; Rorissa, 2011; Potnis, 2010; Ayanso, 2011; Berntzen, 2009). The EGD benchmarking evaluates the progress of eGovts at the local, national, regional, and global levels. The evaluation of websites is not a single solution to rank countries and it does not provide a distorted picture of the progress made and challenges faced by the countries. EGD is a function of country's state of readiness, level of progress, resource accessibility, intensity of human resource development, TI and some other factors with the eGovt initiatives (UN, 2003-2014).

United Nations e-Government Development Surveys

The most prominent EGD rankings were produced by the United Nations Public Administration Network (UNPAN). The UN Department of Economic and Social Affair (UNDESA) have carried out Global eGovt Surveys from 2001 to 2014 and have published the survey reports and UN eGovt Development Databases (UNeGovDDs) (UN, 2001-2014). It aimed to help the governments, researchers, private sectors and representatives of civil society to gain deeper understanding in the EGD around the world. Each survey proposes different strategies and common themes among regions. By revising systemic assessment of broad patterns of how governments use ICT in overall development of a country and recognizes the leadership role. Conceptual content analysis is used for analyzing corpus of data that consist of eight surveys of UNDESA. These surveys are served as a tool to identify the strengths and challenges of countries in their eGovt developments. It helps to analyses the global trends, issues and opportunities in the EGD scenario, though it is not a measurement of eGovt progress in an absolute sense. The primary objective is the relative performance rating of national governments to one another. These surveys have faced criticism in recent years (Hicks (2010). The researchers identified several technical issues in the benchmarking results of UN surveys while used as a statistical tool to evaluate the development of eGovt (Whitmore, A., 2012; Rorissa, A., 2011; Potnis, D.D., 2010; Ayanso, A., 2011; Berntzen, L, 2009).

As per UN surveys, the EGD of a country is assessed by how the member nations utilize ICT to provide access for all, WWW in public sector to support citizen centric service delivery, and also how governments are employing eGovt policies and initiatives. The statistical information of TI, HC and ability of e-services were collected. Based on this data the indexes were measured and ranked the member countries according to three indices such as EGDI, OSI and ePI. The EGDI (called eGovt Readiness Index prior to 2010) is a compound scoring of the willingness and capacity of national administrations to use online and mobile technologies to deliver public services. It is a measure of three important dimensions of eGovt such as the provision of online services as OSI, TI Index (TII) and the HC Index (HCI). It is mathematically calculated as,

$$EGDI = (0.34 \times OSI) + (0.33 \times TII) + (0.33 \times HCI)$$

The total number of points scored by each country is normalized to the range of 0 to 1. The OSI is measured on the performance of e-services offered. To arrive at this value, the national websites of each country, including the national websites of each country, including the national central portal,

e-services portal and e-participation portal, with the websites of the related ministries of education, finance, health, labour, social services, and environment as applicable were evaluated. TII is a composite weighted average of five parameters like internet users; telephone lines; mobile subscription; internet subscriptions; and broadband facilities which were measured per 100 persons. The HCI is a composite of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio, with 2/3rd weight to the adult literacy rate and 1/3rd to the gross enrolment ratio. The surveys measured the utilization percentages of maturity stages in comparison with those offered by other countries. The progresses were sought out by the basic and advanced technical features of websites with other evidences of institutional and strategic foundations of eGovt policies for services delivery. The surveys were checked the departmental web pages and national portals for analysing the presences of e-services in emergence, enhanced, interaction, transactional, and networked stages. The countries adopted citizen inclusion as key in providing customer-oriented services, thus governments shifts the role from controller of information and services to that of a proactive facilitator. ePI is assessed in three-level models: e-information that enables citizens with public information and information access on demand; e-consultation engaging people in contributions to and deliberation on public policies and services; and e-decision-making empowering people through co-design of policy options and co-production of service components and delivery modalities. The e-participation is based on this assumption.

Analysis of e-Government development scenarios

The main objective of this analysis is to assess the EGD scenario in India based on the UN surveys. The evaluation is based on the indices EGDI, OSI and ePI with its components and subcomponents.

Methodology

This study used the documentary research method and the UNeGovDDs were considered as primary source materials. The other sources included the eGovt portals, websites, electronic census publication, official web site of telecom department, and other publically available documents of Government of India (GoI). This analysis used a comparative assessment of progress and an interactive representation of a country's EGD in the world. To investigate the EGD scenario of India, we used a method of a relative study of indices and world ranks of countries. The eGovt maturity was investigated on the foot of utilization percentages in different stages of e-service delivery. Initial we evaluated global trends. Subsequently the EGD indices of India and China were compared to assess the performances of India.

Global EGD Scenario

Globally most of the countries are capable of providing public services in their eGovt system. The surveys reflected the fabulous progression of EGD, regardless of whether they are developed or developing country. To investigate the global trends, this study selected ten top ranked countries in 2014 UN survey. A comparative analysis of world ranks and EGDIs of these countries in the four UN surveys are presented in Table 1. Republic of Korea is the top ranked country three surveys. The rank changes showed the incessant efforts of countries and is represented in Figure 2.

Table 1. Trends in EGDIs of top ranked countries

Country	UN EGD Surveys							
	2014		2012		2010		2008	
	World Ranks	Index Value	World Ranks	Index Value	World Ranks	Index Value	World Ranks	Index Value
Republic of Korea	1	0.9462	1	0.9283	1	0.8785	6	0.8317
Australia	2	0.9103	12	0.8390	8	0.7863	8	0.8108
Singapore	3	0.9076	10	0.8474	11	0.7476	23	0.7009
France	4	0.8938	6	0.8635	10	0.7510	9	0.8038
Netherlands	5	0.8897	2	0.9125	5	0.8097	5	0.8631
Japan	6	0.8874	18	0.8019	17	0.7152	11	0.7703
United States	7	0.8748	5	0.8687	2	0.8510	4	0.8644
United Kingdom	8	0.8695	3	0.8960	4	0.8147	10	0.7872
New Zealand	9	0.8644	13	0.8381	14	0.7311	18	0.7392
Finland	10	0.8449	9	0.8505	19	0.6967	15	0.7488

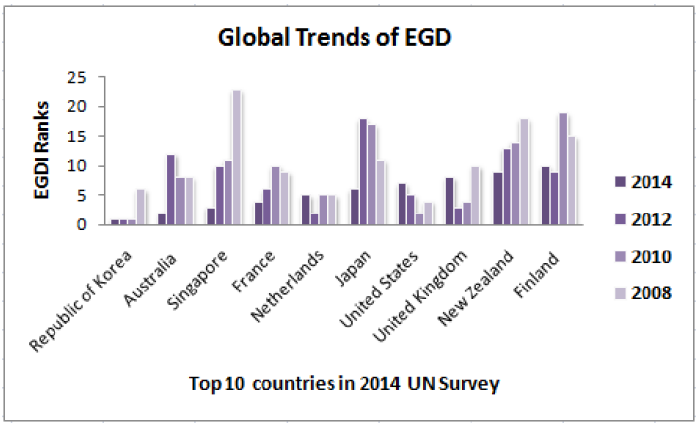

Figure 2. Comparison of Top Ranked Countries on EGDI Ranks

Worldwide the countries are continues its efforts for efficient public service delivery by e-services. This is assessed by the utilization of emergence, interactive, transactional, and networked stages. Table 2 shows performances of the countries in 2012 and 2014. The global ranks based on the EGDI, OSI and ePI are shown in Table 3. There is no direct relation between these indicators and it reflects it in Figure 3.

EGD Scenarios in Vulnerable Countries

A vulnerable country (developing country with very large population and low economy) has to face many constraints in their EGD journey. Comparative analysis of countries having population larger than 100 million and income per capita lower than world average (except China) based on the EGDI ranks in four surveys are shown in Table 4. The population and GNI were collected from the web sources of World Bank reports as on 2013. The e-services maturity in 2012 and 2014 are shows in Table 5 and a comparison of world ranks on EGDI, OSI and ePI of the above countries are presented in Table 6.

Table 2. The e-service performance of top ranked countries

Countries	% of e-services utilization in 2014					% of e-services utilization in 2012				
	Stages of e-service				Total Usage	Stages of e-service				Total Usage
	I	II	III	IV		I	II	III	IV	
Republic of Korea	100	82	77	88	86	100	79	92	87	87
Australia	100	75	88	65	82	100	74	79	70	75
Singapore	100	89	88	71	87	100	79	94	86	87
France	100	73	91	91	88	100	79	85	65	77
Netherlands	100	75	70	88	82	100	88	71	88	85
Japan	97	73	79	88	83	100	79	75	70	75
United States	100	68	77	94	83	100	90	88	83	87
United Kingdom	100	73	63	88	79	100	95	79	81	84
New Zealand	97	66	84	53	75	100	79	69	57	69
Finland	100	70	47	65	69	100	90	75	67	77

Table 3. Comparison of top ranked countries based on OSI, EGDI and Epi

Countries	2014					2012				
	OSI		EGDI Ranks	ePI		OSI		EGDI Ranks	ePI	
	Index	Rank		Ranks	Index	Index	Rank		Ranks	Index
Republic of Korea	0.9764	3	1	1	1.0000	0.0000	1	1	1	1.0000
Australia	0.9291	6	2	7	0.9412	0.8627	7	12	7	0.7632
Singapore	0.9921	2	3	10	0.9020	1.0000	1	10	3	0.9474
France	1.0000	1	4	4	0.9608	0.8758	6	6	25	0.5789
Netherlands	0.9291	6	5	1	1.0000	0.9608	3	2	1	1.0000
Japan	0.9449	4	6	4	0.9608	0.8627	7	18	11	0.7368
United States	0.9449	4	7	9	0.9216	1.0000	1	5	5	0.9211
United Kingdom	0.8976	8	8	4	0.9608	0.9739	2	3	5	0.9211
New Zealand	0.8425	12	9	19	0.7843	0.7843	14	13	25	0.5789
Finland	0.7717	15	10	24	0.7059	0.8824	5	9	11	0.7368

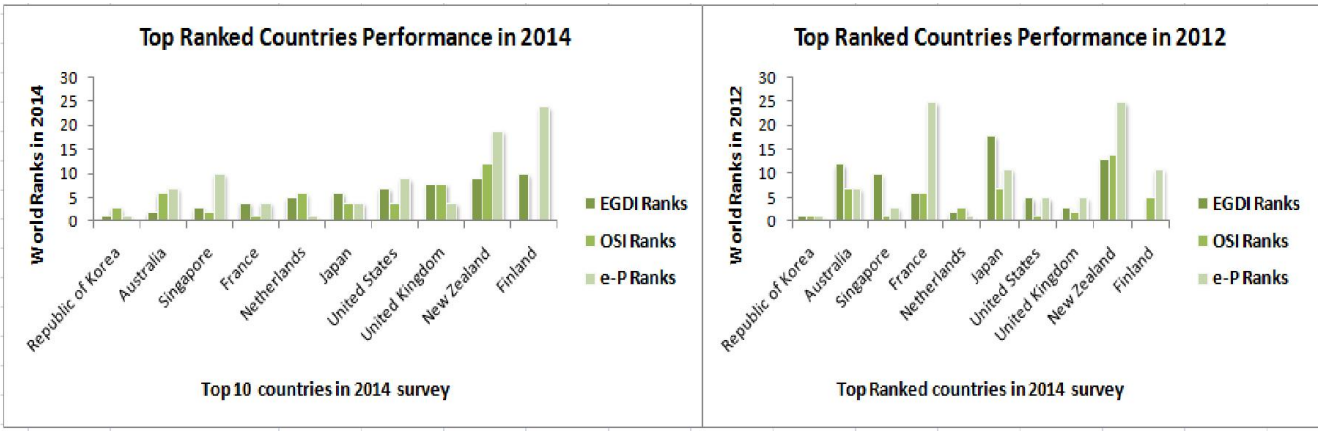

Figure 3. Comparative picture of top ranked countries on EGDI, OSI and ePI

Table 4. Performance of vulnerable countries on EGDI

Country	Population in Millions	GNI per Capita in US $	UN EGD Surveys							
			2014		2012		2010		2008	
			World Ranks	Index Value	World Ranks	Index Value	World Ranks	Index Value	World Ranks	Index Value
China	1,359	11850	70	0.5450	78	0.5359	72	0.4700	65	0.5017
India	1,252	5350	118	0.3834	125	0.3829	119	0.3567	113	0.3814
Indonesia	249	9260	106	0.4487	97	0.4949	109	0.4026	106	0.4107
Pakistan	182	4920	158	0.2580	156	0.2823	146	0.2755	131	0.3160
Nigeria	173	5600	141	0.2929	162	0.2676	150	0.2687	136	0.3063
Bangladesh	156	2810	148	0.2757	150	0.2991	134	0.3028	142	0.2936

Table 5. The e-service utilization of vulnerable countries

Countries	% of e-services Utilization in 2012					% of e-services Utilization in 2014				
	Stages of e-service				Total Usage	Stages of e-service				Total Usage
	I	II	III	IV		I	II	III	IV	
China	92	55	40	38	46	100	57	37	32	55
India	100	64	33	38	47	97	59	21	29	50
Indonesia	92	60	23	41	43	69	34	9	35	35
Pakistan	83	45	6	35	32	78	25	14	18	31
Nigeria	58	12	10	25	19	56	36	14	18	30
Bangladesh	100	60	21	29	39	75	34	14	18	33

Table 6. Comparison of vulnerable countries on OSI, EGDI and ePI

Countries	2012					2014				
	OSI		EGD Ranks	e- participation		OSI		EGD Ranks	e- participation	
	Index	Ranks		Ranks	Index	Index	Ranks		Ranks	Index
China	0.5294	62	78	66	0.2105	0.6063	30	70	33	0.6471
India	0.5359	58	125	75	0.1842	0.5433	36	118	40	0.6275
Indonesia	0.4967	74	97	66	0.2105	0.3622	57	106	110	0.2941
Pakistan	0.3660	110	156	89	0.1316	0.3228	62	158	97	0.3333
Nigeria	0.2222	155	162	75	0.1842	0.3071	64	141	97	0.3333
Bangladesh	0.4444	92	150	109	0.0789	0.3465	59	148	84	0.3922

Table 7. Comparison of India and China on EGDI, OSI and ePI

UN Survey Years	EGDI				OSI				e-participation			
	India		China		India		China		India		China	
	Index	Rank	Rank	Index	Index	Rank	Rank	Index	Index	Rank	Rank	Index
2003	0.373	87	74	0.4159	0.5218	29	50	0.3320	0.2586	41	84	0.0690
2004	0.3879	86	67	0.4356	0.5676	27	46	0.4054	0.1311	59	69	0.0820
2005	0.4001	87	57	0.5078	0.5827	35	38	0.5692	0.1587	57	50	0.1905
2008	0.3814	113	65	0.5017	0.4783	54	47	0.5084	0.2500	49	20	0.4773
2010	0.3567	119	72	0.4700	0.3683	55	55	0.3683	0.2000	58	32	0.3714
2012	0.3829	125	78	0.5359	0.5359	58	62	0.5294	0.1842	75	66	0.2105
2014	0.3834	118	70	0.5450	0.5433	36	30	0.6063	0.6275	40	33	0.6471

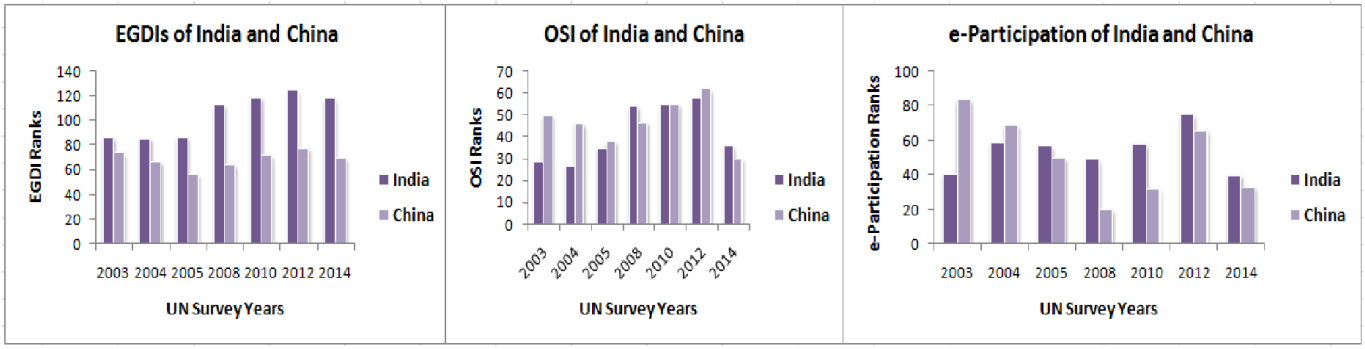

Figure 4. Comparative pictures of India and China based on EGDI, OSI and ePI

Table 8. Comparison of India and China on EGDI components

UN Survey Years	EGDI Components					
	OSI		TII		HCI	
	India	China	India	China	India	China
2003	0.5218	0.3319	0.0274	0.1160	0.5700	0.800
2004	0.5676	0.4054	0.0261	0.1113	0.5700	0.790
2005	0.5827	0.5692	0.0277	0.1241	0.5900	0.8300
2008	0.4783	0.5084	0.0435	0.1600	0.6195	0.8366
2010	0.3683	0.3683	0.0583	0.1913	0.6433	0.8535
2012	0.5359	0.5294	0.1102	0.3039	0.5025	0.7745
2014	0.5433	0.6063	0.1372	0.3554	0.4698	0.6734

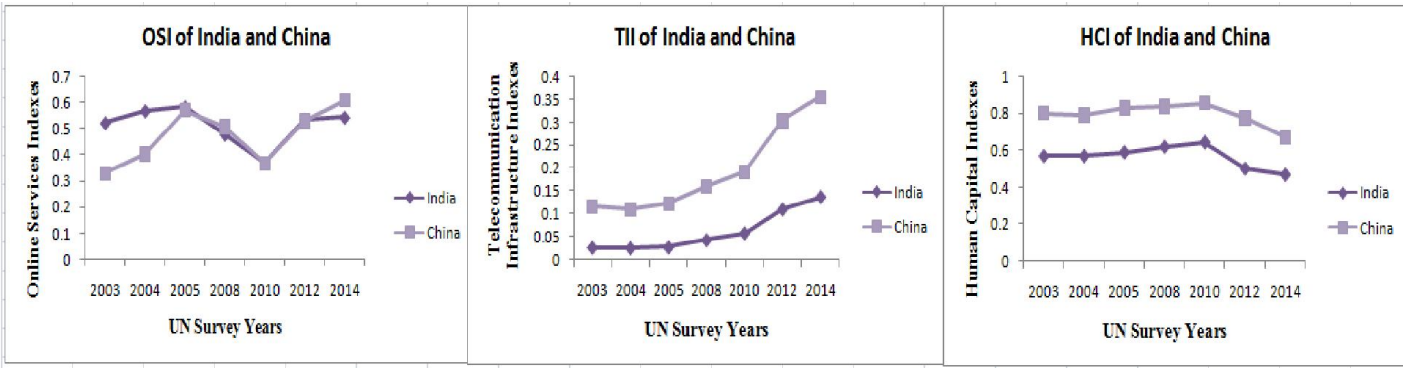

Figure 5. Comparative pictures of India and China on EGDI Components

This section benchmarked India with the similar country China based on the indices EGDI, OSI, ePI, and e-service delivery performance using the data from 2003 to 2014 surveys. A comparative analysis of the EDGI components and their subcomponents were accomplished to evaluate performance variations of India.

Based on EGDI, OSI and e-participation

Comparison of India and China on EGDI, OSI and ePI are presented in Table 7 and the rank variations are shown in figure 4. China always retained its top spot in their EGDI.

Based on EGDI Components

Relative analysis of the EDGI components such as OSI, TII and HCI of India and China are shown in Table 8. The disparities in the growth of EGDI components are shown in Figure 5.

In the above analysis, China has firm leads in its TII and HCI components. Thus this study scrutinized the deprivation of India by a close exploration of its subcomponents. UN surveys from 2008 to 2014 were considered for this investigation and are presented in Table 9. A comparison on these subcomponents of India and China are shown in Figure 6.

Subscribers, Fixed (wired)-broadband subscriptions, and Wireless broadband subscriptions.

Fixed Internet subscriptions and Fixed broadband connections were used instead of wired and wireless broadband subscriptions in 2012. The surveys in 2008 and 2010 were assessed the PC users instead of internet subscriptions. Prior to 2008, it was calculated based on the overall infrastructure of a country such as PC's/persons; Internet users, Telephone Lines, Online population; Mobile phones/persons, and TV's/ persons. The HCI elements of countries were calculated based on Adult Literacy and gross enrolment ratio which depends on the per capita income of persons. In 2014 survey, Expected years of schooling and Mean years of schooling were also considered for measuring HCI.

Based on e-service performance

The e-service concerts of India and China are shown in table 10 and comparison of the performances in 2012 and 2014 are presented in the Figure 7. Prior to 2010 surveys were considered five e-service maturity stages such as Emerging, Enhanced, Interactive, Transactional, and Networked. Surveys from 2010 to 2014 were excluded interactive stage and measured performances in four stages.

Table 9. Comparison of India and China on subcomponents of TII and HCI

UN Survey Years	Components of TII										Components of HCI			
	Estimated Internet users per 100 inhabitants [1]		Main fixed phone lines Per100 inhabitants [2]		Mobile subscribers per 100 inhabitants [3]		Fixed wired broadband subscriptions per 100 inhabs[4]		Wireless broadband subscriptions per 100 inhabs [5]		Adult Literacy (%)		Enrolment (%)	
	India	China	India	China	India	China	India	China	India	China	India	China	India	China
2014	12.58	42.30	2.51	20.25	69.92	79.88	1.16	12.75	4.99	16.95	62.75	95.12	65.07	70.39
2012	7.50	34.30	2.87	21.95	61.42	64.04	1.53	8.35	0.90	9.42	62.75	93.98	62.61	68.74
2010	6.95	22.28	3.21	27.51	29.36	47.41	3.18	5.61	0.45	6.23	66.00	93.30	60.98	69.46
2008	5.44	10.35	3.64	27.79	14.83	34.83	1.54	4.22	0.21	3.85	61.0	90.9	63.82	69.13

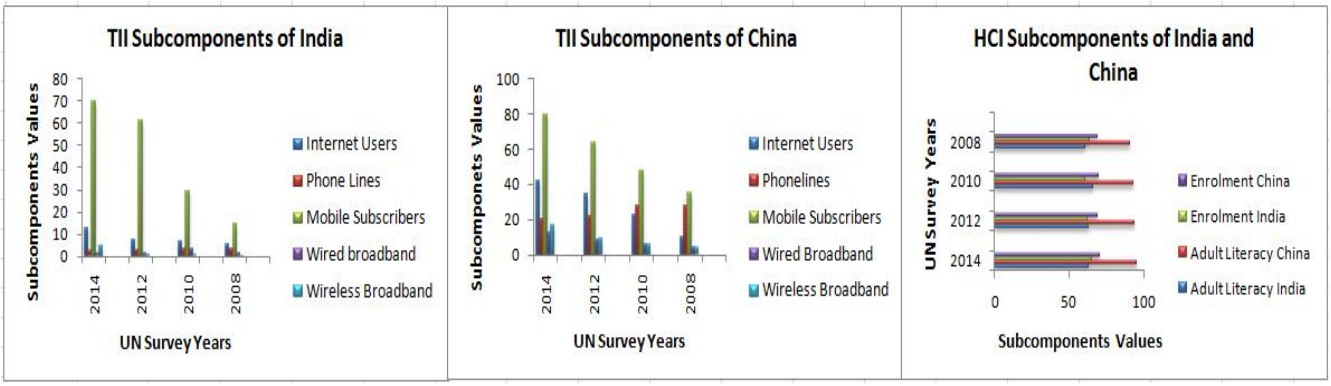

Figure 6. Comparison between India and China based on Subcomponents of TII and HCI

As per the technological revolution, UN surveys altered the subcomponents of ICT infrastructure capacity of countries and were assessed per 100 inhabitants. In 2014, TII was calculated based on the Internet Users, Main fixed telephone lines, Mobile

DISCUSSION

National EGD of a country extremely depends on the income level and education facilities. Thus the ICT infrastructure and

literacy influenced on these factors and the lack of these hinders the eGovt progress. Globally there is a wide-range of inequalities among the countries in their economic capacity and obviously economically wealth countries were the top scores with high EGDIs.

appreciably advanced their EGD ranks even though their moderate low national income. In the comparison of countries on national income, population and progress in EGD presented in Table 4, India is the best performer.

Table 10. The e-service utilization of India and China

Years	Utilization of e-services in different Stages									
	Emergence		Enhanced		Interactive		Transactional		Connected	
	India	China	India	China	India	China	India	China	India	China
2014	97	100	59	57	-	-	21	37	29	32
2012	100	92	64	55	-	-	33	40	38	38
2010	66	79	35	34	-	-	13	2	16	36
2008	100	100	62	76	45	52	21	4	15	26
2005	100	100	77	75	72	71	17	5	17	24
2004	100	75	74	66	70	46	17	0	17	6
2003	100	100	63	47	64	32	2	0	5	0

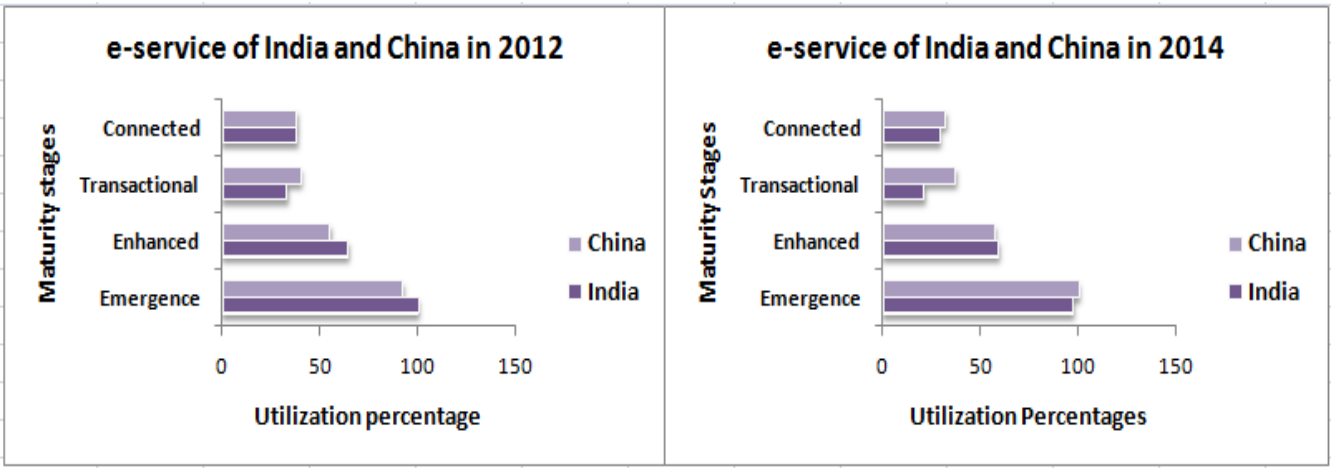

Figure 7. The e-service performance Comparison of India and China

However there are many countries which are lagging their EGD performance despite they have comparatively high income and thereby excellent openings for future improvement. Worldwide there are broad disparities among regions due to a number of factors in their eGovt progress. Europe continuously led with top region followed by the America and then Asia. The Asian country, Republic of Korea was the top scorer in the latest three surveys. The incessant efforts and adoption of technological switch over caused this country as top performer.

As per table1, Republic of Korea has retained the top spot in 2014 who continued its leadership from 2010 ahead of many other developed nations. It has many supporting situations for their EGD. An advanced fully digitized public administration delivered e-service to citizen and business in multi-channel communication and transactions. Its high education and economic capacity, developed TI, strong national policies, and eGovt strategies leads to the top performance. By analysing the rank changes of other countries presented in table1, Singapore changed its 23rd position in 2008 to 3rd in 2014. The first three ranked countries in 2008 such as Sweden, Denmark and Norway lesser its ranks to 14, 16 and 13 respectively in 2014. The full potential in EGD of lower-middle income and low income countries is far from being totally realized despite copious efforts in some countries. It is evidenced by their poor EGDI performance as shown in table 4. Some countries have

High score of OSI indicates the best current practice rather than perfection. As per the comparison of 2014 and 2012 OSI scores of top ten countries presented in Table 3, France raised its 6th position in 2012 to first in 2014, followed by Singapore and the Republic of Korea. In 2012 Republic of Korea, Singapore and United States shared the first rank, followed by United Kingdom and Netherlands. Republic of Korea decreased its top score in prior 3 surveys to 3rd position in 2014. Leaders in 2012 such as Denmark, Norway, Sweden and Malaysia were pushed out in 2014. As in 2012, Bahrain, United Arab Emirates and Saudi Arabia retained its positions in first 20 and positioned as 7th, 12th, and 18th respectively. The vulnerable countries were also radiant in their online services. They magically competed with the high income, less populated developed countries. As per 2014 survey, the OSI among low-income countries tend to be below 0.2, in upper middle income countries followed 0.4 to 0.8, and high income countries scored above 0.9. But some countries remarkably did well and it is factual, while comparing table 3 and table 6. All of the countries (except China) in table 6 are lower-middle-income countries and achieved more than 0.3 in 2014. Among these, India is exceptionally advanced with its OSI score of 0.54 which was 43 percentages of global average in 2014.

The performance of each stages of e-services demands a higher level of complexity and increased obligation of resources, thus

the country scores are varying. Since each country faces different situation and constraints, the e-service performance and the type of services provided is directly related to the national income. Low-income countries focused on information services at the emerging and enhanced stages while high-income countries are proficient in transactional and connected features. This is obvious while comparing the table 2 and table 5. The final stages required advanced infrastructures for government departments/ministries cooperation. Still in 2014 only a few countries have transactional e-services. Global mean scores in first, second and fourth stages were 64, 40 and 27 percent respectively. In third stage the mean score was only 22. This gap may be because of the natural confronts in ensuring online security, payment systems, coordination of multiple channels and also the identity management (Klischewski, 2011). In the comparison of e-service utilization percentages of top ranked countries in 2012 and 2014 surveys presented in table 2, France ranked first with 100 percent in Emergence, 79 in Enhanced, 85 in Transactional and 65 in Connected with an overall score of 77 in 2012. But in 2014, it gained 100, 73, 91 and 91 in respective stages with an overall score of 88. The vulnerable countries also had sound performance. In comparison of these countries different e-service stages in table 5, India performed far better than other similar countries with 33 percentage of transactional stage in 2012 and 21 in 2014. Indonesia is economically wealth and having less than $1/4^{th}$ population than India, scored only 23 in 2012 and 9 in 2014.

The e-participation assesses the way in which governments create an environment through ICT in policy and decision-making for citizen's active participation in political processes (Astrom, 2012). These were based on the passive receivers of information through web based services and also the active partners who were engaged and supported to interact with the government through disseminated relevant information using ICT. So that the resources in the eGovt obliged to addresses the needs and concerns of the citizenry so as to promote the user uptake. It makes inherent and active governments by public administration as participatory, inclusive, collaborative and deliberative. In the comparison of ePI ranks in 2014 and 2012 of top ten countries presented in Table 3, Republic of Korea and Netherlands were the top rankers in both of the surveys. Obviously the high income countries were the best players on this indicator also. As per table 6, among the selected six vulnerable countries India and China were the best performers. The top list of 50 countries based on the ePI in 2014 survey, 14 upper middle income and seven lower middle income countries were included. India and China were included in this global top list of 50.

The countries were prominent in their e-services integration and extended mobile applications. The dominant factor of service delivery is the ease access in 24x7 and saving travel. The usages of e-services have been increased as they can be accessed and used by citizens everywhere and at all times. Multichannel approach is a solution to increase usage of e-services and rising user demands to access public services from anywhere, anytime. The mobile channel, web portal, and social media channels are the main moves to reach a wider user. The mobile channels boost up the new users and are pervasive one that is close to its users. It improves the service delivery to large swathes of the populations in a largely populated country. A key reason for continued leadership of Republic of Korea is the noteworthy development and provision of downloadable mobile applications available from its national portal. The analysis indicated that global infrastructure access has improved with an increase in mobile penetration. Mobile based technologies have become the most rapidly adapted technologies to provide e-services.

EGD Scenario in India

India started using ICT during seventies in government applications related to elections, census, tax administration etc. (Guptha, M. P., 2010). GOI started its EGD journey with important policy initiatives in 1999 and then initiated the national strategy as National e-Governance Plan (NeGP) in 2006 and progressed towards the technological infrastructure for delivering the services and information (Mahapatra, 2007). There were various interoperability initiatives in India to provide an integrated service delivery (Paul, A. 2014). The EGD in India has a vision of inexpensive public service delivery with higher level of comfort and stakeholders satisfaction in dealing with the government. This envisages 24x7 service availability in a single window and can access at anytime from anywhere (homes, offices or public places) using multiple channels like home PCs, tablets, mobile phones, kiosks, etc. is a reality (GoI, 2010). As an extremely populated developing country with low level of income and education, India faces many constraints in their EGD. India demands more online access points and infrastructure since the e-inclusion is available to all. This grounds greater investment in ICT and connectivity remains a major challenge for rural areas. Another main barrier to Internet access is the language, the majority of rural people in India cannot handle the global language English. Since the majority of Indian citizens reside in rural areas, public services delivery with citizen's convenience accesses in 24x7 for saving of travel and cost is another challenge. These factors hinder its overall progress while competing with the developed, less populated wealth countries. The key challenges (UN, 2012; Shah, 2007; Mahapatra, 2007) are as follows:

- Lack of access to ICT infrastructure in rural areas
- Low Income-per-capita causes higher marginal cost by dollar spent
- Need to provide many more online access points to its large citizens
- Lack of resources for EGD

India is a land of diversity by its assorted culture, languages, education, productive nature of soil, living areas in states, landscape, regional climate, and also the attitude towards the acceptance nature of citizenry. Its liberal democracy is based on the political and social order that integrates different castes, religions and tribes. India is a union of 29 states and 7 union territories. Globally each one of these administrative divisions is comparable to a country. This leads India to diverse political administration in 36 states/UTs with districts in states, corporations/municipalities in districts, and panchayats in municipalities. Hence, eGovt is initiated in three levels at states, district and local. India has embraced states with high

density in less land area like Kerala by 100% literate people earning income by their high educational qualifications within the country or abroad, to large state with 64% literates like Bihar. Thus more powerful and tactic directions has required in the EGD of India.

The GoI have embarked a comprehensive program NeGP to overcome the challenges. India provided Rural Broadband Connectivity in local level to its 70% of rural population in 250,000 Panchayats via kiosks, mobile phones, or other means (GoI, 2010). Then it aimed to stimulate women, the poor, and people in the remote rural areas to use technology to their own advantage. India initiated more than 5,000 internet kiosks all over the country to offer public services to its rural citizens and named as Common Service Centers (CSCs). Many of the rural people in India are using CSCs to access e-services. Then GoI built-up a multilingual knowledge portal 'Vikaspedia' to overcome the language barriers of rural people for access Internet. It is a single-window access to information, products and services, with specific objective of reaching the 'unreached' rural and poor people. Information is presently provided in five Indian languages such as Hindi, Tamil, Telugu, Marathi and Bengali to begin with, apart from English.

India expected to overcome the 24x7 public services delivery in rural areas by the M-Governance and initiated as 'Mobile Seva'. It is a realistic chance of accessing government/ public services to millions of less-privileged individuals without access to the Internet. It aimed to provide government services at "Anytime, Anywhere" in handheld devices such as mobile phones and tablets. The mobile phone users are drastically increasing in India during the past few years and has become second largest telephone network in the world, only after China. The country is now benefited from mobile and broadband services to access services even in rural areas with very little access to telephony. Mobiles are now being used to deliver services like health, education, banking, and commercial services. Currently some of the administrative units of India are providing value services eg. e-Passport, e-Tax, etc. that trend has to be extended for all the public services.

Implication of the Analysis

The diversity of India associated with the limitations in the ICT infrastructure and human capacity pushed down the EGD indices. China is also a most populated and large country likes India. Its constitution provides for three de jure levels and five practical (de facto) levels of local government such as province, prefecture, county, township, and village. Though, it is a single-party socialist state plus economically wealth and fast-growing. China has all the favorable situations for their EGD. Since China is a single-party socialist state, it is easy to manage the eGovt initiatives. While there is a strong correlation between the EGD indices and economic prosperity of a country, the wealthy China logically conquered India.

In UN surveys, EGDI was constructed using the components OSI, TII and HCI on a comparative basis that rates each country relative to all other member countries. The high literate states of India rapidly adopt ICT revolutions and obviously boost the indices of TII subcomponents. But the disparities of states averaged to the country's indices that were naturally led to low rates of indices. The comparison of India and China as presented in table 7 and figure 4, China leads with a high level of EGDI than India. As per the components of EGDI presented in table 8, India always has low values in the TII and HCI. Its subcomponent presented in table 9, all the indices of India squatter, except the mobile subscribers. The CSCs increases the internet users and e-service users that is not considered in UN surveys and caused to get low indices than the actual TII values. The disparate growth of China in TII and HCI were revealed in figure 3. By this investigation it is clear that the richest country China has more resources for their EGD than the low income country India.

India is one of the top performers in e-service delivery. By comparing the OSI of top ranked countries in Table 3 and vulnerable countries in table 6 indicated that India has a sound achievement at global level. The high indexes of India in the earlier surveys turn around in 2008, 2012 and 2014 with slight changes by the fast developing country China as shown in table 7 and figure 4. As per the e-service concert of India and China in different stages presented in table 10, India has better performance in the emergence and enhanced stages, but China is better in transactional and connected stages. By this it is evidenced that low-income country focused on information services and high-income country is proficient in transactional and connected features of e-service delivery. The democracy of India witnessed in the sound performances of ePI in all the UN surveys apart from the first two surveys. It is exposed in the comparison of India and China in their ePI presented in Table 7 and Figure 4.

GOI have made incredible efforts in their EGD despite many challenges they faces than developed, less populated, rich countries globally. India has made unique efforts for e-service delivery, still squatter the indices. Thus India has to develop effusively. The desirable approach is a right mix of mobile technology and broadband Internet connectivity. The mobile broadband technology is in early stages and tablets may become the primary connection tool to the Internet. The potential of mobile devices in India is still largely untapped.

Conclusion

Globally most of the countries continue their EGD for efficient e-service delivery to its citizenry. The most populated, developing country with low economy like India has to face many constraints. Even though, they have made tremendous efforts to provide public services to their stakeholders. These countries must exert more effort to achieve a given level of EGD than other countries. So that the efforts for providing eGovt services by these countries are far greater than that of developed countries. The UN surveys ranked the member countries on the basis of their EGDI. The survey measured the indices based on different parameters intended for the utilization of ICT in government system. Since India has constraints by their population, economy, democracy and diversity, the EGD initiatives are better than others. India is one of the best performers in e-services, though India has low EGDIs. Based on the analysis made, this work drives

conclusion that the exerted efforts by India for conquering the challenges in the alleyway of EGD journey is far greater than other countries even the similar country China.

India envisages one-stop solution to address all transactional procedures of the citizens with the government departments. Facilitate citizen navigation and content disseminations are the key objectives of such portals. Still, more integration strategies are needed for the further improvement in Indian eGovt system. As per UN surveys no country's portal completely integrated all information, services, and features assessed, but several came close. India can achieve phenomenal growth by multi-channels in near future. Thus India can fulfil her eGovt vision and turn into one of the best performers by improving the essentials for interoperability and integration issues.

REFERENCES

Abebe Rorissa, Dawit Demissie and Theresa Pardo, 2011. Benchmarking e-Government: A comparison of frameworks for computing e-Government index and ranking. *Government Information Quarterly, 28*, 354–362.

Andrew Whitmore, 2012. A statistical analysis of the construction of the United Nations E-Government Development Index. *Government Information Quarterly,* 29, 68–75.

Anil Monga, 2008. E-government in India: Opportunities and challenges. *JOAAG, 3(2),* 52-61.

Anteneh Ayanso, Dipanjan Chatterjee and Danny, I., Cho. 2011. E-Government readiness index: A methodology and analysis. *Government Information Quarterly, 28,* 522–532.

Anu Paul and Varghese Paul, 2011a. The Implementation issues of e-Governance in India. In the Proceedings of the *National Seminar on Modern Trends in Electronic Communication and Signal Processing* (pp: 43-48). Kerala, India.

Anu Paul and Varghese Paul, 2012. The e-Government Interoperability through Enterprise Architecture in Indian Perspective. In IEEE Proceedings of *WCICT,* 645-650.

Anu Paul and Varghese Paul, 2014. A Framework for e-Government Interoperability in Indian Perspective. *International Journal of Computer Information Systems and Industrial Management Applications, 6*, 582-591.

Anu Paul and Varghese Paul. 2011b. The Project Management Model for e-Governance in the Context of Kerala State. Springer Proceedings of *CCIS II (191)*, 201-209.

Anu Paul, 2010. e-Governance a Paradigm shift in India. *International Journal of Interdisciplinary Studies and Research: Baselius Researcher, 11(1),* 63-73.

Berntzen, L. and Olsen, M.G. 2009. Benchmarking e-government: A Comparative Review of three International benchmarking Studies. In the Proceedings of the *3rd International Conference on Digital Society* (pp: 77-82).

Daniela Fogli and L. P. Provenza, 2012. A meta-design approach to the development of e-government services. *Journal of Visual Languages and Computing, 23,* 47- 62.

Debjani Bhattacharya, Umesh Gulla and M.P. Gupta, 2012. E-service quality model for Indian government portals: citizen's perspective. *Journal of Enterprise Information Management, 25(3)*, 246-271.

Devendra D. Potnis, 2010. Measuring e-Governance as an innovation in the public sector. *Government Information Quarterly,* 27, 41–48.

Dimitris Gouscos *et al.* 2007. A general model of performance and quality for one-stop e-Government service offerings. *Government Information Quarterly, 24*, 860–885.

Elsa Estevez, Pablo Fillottrani and Tomasz Janowski, 2007. From e-Government to Seamless Government. In Proceedings of the *Conference on Collaborative Electronic Commerce Technology and Research* (pp. 269-280). Iberoamerica, Argentina.

Emmanuel, C., Lallana 2007. *e-Government Interoperability: Guide*. United Nations Development Programme, ISBN: 978-974-13-1616-8.

GoI, 2010. *National e-Governance Plan, Background Papers*. Department of Electronics and Information Technology (DeitY), Govt of India.

Gupta, M.P. 2010. Tracking the Evolution of E-Governance in India. *International Journal of Electronic Government Research (IJEGR),* 6(1), 46-58.

Hafedh Chourabi and Sehl Mellouli, 2011. E-government: Integrated Services Framework. In ACM Proceedings of *12th Annual International Conference on Digital Government Research (Dg.o'11*) (pp.36-44). USA.

IDABC 2010. *European Interoperability Framework for Pan-European e-Government Services, Version 2.0*. http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf.

Joachim Astrom, *et al*. 2012. Understanding the rise of e-participation in non-democracies: Domestic and international factors. *Government Information Quarterly, 29*, 142–150.

Kulshrestha S P. 2013. Public Service Delivery System & E-governance. *CSI Communications,* 37(4), 18-20.

Luis Guijarro, 2007. Interoperability frameworks and enterprise architectures in e-government initiatives in Europe and the United States. *Government Information Quarterly, 24*, 89–101.

Marijn Janssen *et al.* 2011. E-government Interoperability, Infrastructure and Architecture: State-of-the-art and Challenges. *Journal of Theoretical and Applied Electronic Commerce Research,* 6(1), 1-8.

Mrinalini Shah, 2007. E-Governance in India: Dream or reality?. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 3(2),* 125-137.

Pallaba Saha, 2010. *Enterprise Architecture as Platform for Connected Government*. Report of Government Enterprise Architecture Research Project. NUS Institute of Systems Science.

Petter Gottschalk, 2009. Maturity levels for interoperability in digital government. *Government Information Quarterly,* 26, 75–81.

Raghunath Mahapatra and Sinnakkrishnan Perumal, 2007. Enterprise Architecture as an Enabler for E-Governance: An Indian Perspective. In Pallab Saha (Eds.), *Handbook of Enterprise Systems Architecture in Practice (*pp: 272-289). IGI Global Publications.

Rajat, K., Baisya and Siddhartha Paul Tiwari, 2008. E-governance Challenges and Strategies for Better-managed Projects, In G.P Sahu (Edn.), *Emerging Technologies in E-Government* (pp. 203-208). CSI-SIGeGov Publications.

Rakhi Tripathi, M.P. Gupta and Jaijit Bhattacharya, 2012. Interoperability adoption among government and corporate portals in India: a study. *Journal of Enterprise Information Management,* 25(2), 98-122.

Ralf Klischewski and Askar, E. 2012. Linking service development methods to interoperability governance: The case of Egypt. *Government Information Quarterly,* 29, 22-31.

Ralf Klischewski, 2011. Architectures for Tinkering? Contextual Strategies towards Interoperability in E-government. *Journal of Theoretical and Applied Electronic Commerce Research,* 6(1), 26-42.

Sarikas, O. D. and Weerakkody, V. 2007. Realising integrated e-government services: a UK local government perspective. *Transforming Government: People, Process and Policy,* 1(2), 153-173.

Shailendra, C., Jain Palvia and Sushil, S. Sharma, 2008. E-government and e-governance: definitions/domain framework and status around the world. In A.Agarwal et.al (Edn.), *Foundations of E-government* (pp. 1-12). CSI-SIGeGov Publications.

United Nations, 2001. *Benchmarking E-Government: A Global Perspective 2001*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2003. *United Nations Global E-Government Survey 2003*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2004. *United Nations Global E-Government Readiness Report 2004: Towards Access for opportunity*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2005. *United Nations Global E-Government Readiness Report 2005: From E-Government to E-Inclusion*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2008. *United Nations E-Government Survey 2008: From E-Government to Connected Governance*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2010. *United Nations E-Government Survey 2010: Leveraging E-Government at a time of Financial and Economic Crises*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2012. *United Nations E-Government Survey 2012: E-Government for the People*. United Nations Department of Economic and Social Affairs (UNDESA), New York.

United Nations, 2014. *United Nations E-Government Survey 2014: E-Government for the Future we Want.* United Nations Department of Economic and Social Affairs (UNDESA), New York.

Valdes G. *et al.* 2011. Conception, development and implementation of an e-Government maturity model in public agencies. *Government Information Quarterly, 28,* 176–187.

Veljkovic, N. *et al.* 2014. Benchmarking open government: An open data perspective. *Government Information Quarterly,* 31(2), 278-290.

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