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Topic of the dissertation

A QUANTITATIVE FRAMEWORK FOR ASSESSING E-GOVERNANCE READINESS OF INDIAN STATES

Master's Dissertation
Submitted to
O.P. Jindal Global University, Sonipat
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23May 2014   Prateek D Pathak

Jindal School of Government and Public Policy

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CERTIFICATE

This is to certify that the Master's Dissertation entitled **"A Quantitative Framework for Assessing E-Governance Readiness of Indian States"** submitted by **Mr Prateek D Pathak** to O.P. Jindal Global University, Sonipat has been completed under my guidance and supervision.

Rajeev Malhotra

Professor and Executive Director,

Centre for Development and Finance.

Place: Sonipat, Haryana   Date: 23May2014

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CERTIFICATE

This is to certify that the Master's Dissertation entitled "**A Quantitative Framework for Assessing E-Governance Readiness of Indian States"** submitted by **Mr Prateek D Pathak** to O.P. Jindal Global University, Sonipat has been completed satisfactorily under the supervision of **Professor Rajeev Malhotra**. All the necessary ethical committee clearances and relevant consents have been duly obtained.

Prof. R. Sudarshan

Dean

Place: Sonipat, Haryana   Dated: 23 May 2014

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Jindal School of Government and Public Policy   Prateek Pathak

ABSTRACT

The existing definition of governance as adopted by the international agencies like World Bank fails to adequately capture some aspects of the concept of governance especially the nature of the communication medium through which governance is influenced by citizens. It also does not promote deliberations on whether it is actually promoting outcomes which are desirable for a society.

In this context, e-governance (i.e. ICT mediated governance) has shown the potential to transform the relations between citizen and state in India as elsewhere in the world. Accordingly, The Government of India has launched a National E-Governance Plan (NeGP) which is a 'centralised initiative with decentralised implementation' model. Accordingly, states are required to be e-governance ready to realise the vision of NeGP which is to provide high quality, reliable and timely online public services to all citizens at affordable costs.

This study outlines a quantitative framework for assessing e-governance readiness of Indian states with an emphasis on user centricity. Each state is ranked as per its composite user centric e-governance readiness score. The e-governance readiness score is a composite of three sub-indices which are User Readiness Index, Network and Infrastructure Readiness score and a first of its kind State Government Online Readiness Score. Higher the composite user centric e-governance readiness score of a state, the more e-governance ready it is.

However, a high user centric e-governance readiness will not always translate into desirable outcomes for any e-governance policy i.e. it will not lead to user centric e-governance outcomes which will positively transform the relations between state governments and their residents. Indeed, there is a need to explore the missing link between e-governance readiness and 'desirable' e-governance outcomes. This requires initiation of a multi-stakeholder dialogue to define, monitor and attain these desirable, user centric e-governance outcomes. For this purpose, the study provides a way forward through a theory of change in form of an interactive training course which can be developed by academia in collaboration with government and business to inform citizens about existing e-governance ideas and practises. This interactive course could be designed in a manner that it provides opportunities to citizens to give their feedback for designing appropriate user centric e-governance policies.

LIST OF FIGURES

I. INTRODUCTION

E-government refers to use of ICT technologies by government agencies to transform their relations with other stakeholders in society including citizens, business and other government agencies[1] [World Bank: 2011]. These technologies can act as catalyst to meet different governance outcomes via better delivery of government services to citizens, improved interactions with business and industry, efficient access to information and promotion of more efficient government management. And the resulting benefits of e-governance can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reduction eventually leading to citizen empowerment!

Realising this potential of e-governance[2], governments across the globe are rolling out different e-governance initiatives at different levels of governance- local, subnational as well as national level. Indeed, the ultimate objective of these initiatives is to provide high quality, reliable and timely online public services to all citizens at affordable costs.

The purpose of this study is to develop a framework for an index to measure a user-centric e-governance readiness across different Indian states. This index will serve as a starting point to measure the potential for e-governance to transform state-citizen relationship

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[1] Available at:
http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOL
OGIES/EXTEGOVERNMENT/0,,contentMDK:20507153~menuPK:702592~pagePK:148956~piPK:216618~theSite
PK:702586,00.html
Accessed on:10:35 hours, 10/09/2013
[2] For further clarification of difference between e-government and e-governance, please refer
Available at: http://www.cips.org.in/public-sector-systems-government-
innovations/documents/E_Governance_vs_E_Government.pdf
Accessed on:16:15 hours,10/02/2014

1 | P a g e

within different Indian states. We shall implement the proposed index to evaluate e-governance readiness for sixteen most populous Indian states[3].

The study is structured as follows-The introductory section justifies the need to measure e-governance readiness at subnational level. This is followed by an assessment of various indices used to measure e-governance readiness at national and international level as well as understand their limitations to measure user centric e-governance readiness for Indian states. Section II outlines the objectives as well as research methodology for our study on proposed framework for an e-governance readiness index. Section III then discusses the inclusion of variables for the proposed index followed by Section IV wherein we implement our proposed index and analyse our observations. The concluding Section V provides certain recommendations for better e-governance practises for Indian states as well as suggests the way forward by emphasising the need for a multi-stakeholder dialogue to understand the missing link between e-governance readiness and desired outcomes of any e-governance policy. This will help in improving the efficacy of any e-governance policy.

1. **The need for a framework to measure e-governance readiness at subnational level**.

Governance refers to the process by which authority is conferred on rulers, by which they make the rules, and by which those rules are enforced and modified. Thus, understanding governance requires an identification of both the rulers and the rules, as well as the various processes by which they are selected, defined, and linked together and with the society

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[3] These states include Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerela, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Union Territories, small states like Delhi, Goa etc. are automatically excluded by this definition whereas newly formed states like Uttarakhand, Chhatisgarh, Jharkhand or even some old states like Jammu& Kashmir were not considered in the study as pertinent data was not available.

generally[World Bank:2013][4].Alternatively, governance is also defined as 'the exercise of economic, political, and administrative authority to manage a country's affairs at all levels. It comprises mechanisms, processes, and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences.[5]'

A suitable analysis of both these definitions of governance brings to light the following limitations:

(a)   These definitions don't specifically substantiate on the importance of communication medium through which rules are made, enforced and modified or through which citizens engage with relevant authorities.

(b)   There is lack of deliberation on whether the communication medium and its corresponding process, mechanism and institutions through which rules are made, enforced and modified or even through which citizens and their groups engage with pertinent authorities are actually leading to desirable outcomes or not (specifically whether they have the potential to positively transform relationships between citizen and state).

In India, it has been observed that traditional (i.e. non IT mediated) media of governance policies and practises like PDS distribution have raised important questions of transparency, accountability, efficiency as well overall accessibility. Further, they don't

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[4] Available at:
http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/EXTMNAREGTOPGOVERNANCE/0,,contentMDK:20513159~pagePK:34004173~piPK:34003707~theSitePK:497024,00.html
Accessed on: 14:25 hours,10/04/2014
[5] Committee of Experts on Public Administration, Definition of basic concepts and terminologies in governance and public administration (E/C.16/2006/4) (New York, 2006)

provide enough space for citizens to engage with concerned authorities over issues which affect them. For example, the earlier PDS system didn't have an independent, effective and timely grievance redressel mechanism for its intended beneficiaries.

Moreover, these media and its corresponding processes, mechanism and institutions have also not yielded desirable outcomes i.e. India still faces issues of food insecurity. In this context, e-governance (i.e. ICT mediated governance) has the potential to transform the overall process of public service delivery as well as provide a platform for better citizen engagement which will eventually lead to desirable outcomes. For example, the Unique Identification Project aims to provide unique identity to every individual in the country and would be used primarily as basis for efficient delivery of services. This will help in effective targeting and monitoring of various schemes and programs of the government[6].

Ideally, e-governance (specifically e-government services) is a public good as it is non- rivalrous (i.e. one person's utilization of unit of a service doesn't diminish the amount of service available to others) and non- excludable (i.e. it is not feasible and practical to selectively allow citizens to utilize a particular service).Thus, markets alone will be inefficient in provision of e-government services. Hence, there is need for effective and impactful government intervention in provision of e-government services[7].

Keeping this in mind, the National E-governance Plan (NeGP) was developed by the Government of India to take a holistic view of e-governance initiatives across the country, integrating them into collective vision for India[8]. Even though it is a centralised initiative to

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[6] Available at: http://uidai.gov.in/all-about-uidai/uidai-background.html
Accessed on: 02:25 hours,17/05/2014
[7] This does not imply that government intervention will always guarantee better outcomes. For further elaboration refer: http://www.ilovemaths.com/rajesh/egov.pdf
[8] The NeGP aims at improving delivery of Government services to citizens and businesses with the following vision:
"Make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realise the basic needs of the common man."

the extent of ensuring citizen centric orientation, it still specifically allows for a decentralised implementation model. Such a *centralised initiative, decentralised implementation*[9] model will lead to effective realisation of twin objectives of inter-operability of various e-governance applications at different levels of governance as well as ensure optimal utilisation of ICT infrastructure and resources.

However, it is important to note that a suitable implementation of this model requires Indian state governments to play an active role in implementing e-governance. Indeed, there is a need to evaluate whether Indian states are ready or not to realise the vision of NeGP. Apart from evaluation of the existing state of requisite human capital and suitable ICT infrastructure in states, a thorough audit and review of state government portal (or main website) can be an important starting point in this regard.

In this context, this study proposes a quantitative framework for a user centric[10] e-governance readiness index which will serve as a starting point to measure the potential of e-government to transform state-citizen relationship at sub-national level. The study implements this framework for sixteen most populous Indian states. While doing so, it is completely cognizant of the difficulties in rolling out e-governance initiatives in states with larger population and land area e.g. the need to provide more ICT infrastructure for more people lie laying out more optical fibres etc.

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[9] Available at: https://www.negp.gov.in/index.php?option=com_content&view=article&id=77&Itemid=464 Accessed on:10th May 2014

[10] User centricity refers to conceptualising, designing and implementing public policy incorporating the expectations and feedback of online users as well as keeping the interests of end users [i.e. citizens] in mind. These policies require an emphasis and firm commitment to principles of citizen centricity, transparency, accountability and service orientation.

Indeed, the study wishes to serve as a policy advocacy tool for promoting innovation in e-governance in future with emphasis on citizen centricity, transparency and service orientation within governments which will help in positively transforming the lives of ordinary Indian citizens. Further, it wishes to suggest a viable way forward to explore the missing link between e-governance readiness and transformative e-governance outcomes which has the potential to transform the state citizen relationship.

2. Existing indices to measure e-governance readiness and their limitations: Review of literature

Various indices have been developed to measure e-governance readiness in some form or the other at international as well as national level. In this section, we review some of these important indices as well as highlight their conceptual limitation which makes it inappropriate to use them directly to measure user centric e-governance readiness of different Indian states.

(a)   International Cross Country indices:

(i)   *The UNDESA's Division for Public Administration and Development Management's E-Governance Development Index (EGDI[11])*:

The EGDI is a part of larger annual UN E-government Survey report with a focus to promote transparent, participatory and inclusive governance. It is used to compare the state of e-readiness across different countries of the world. Each year the report is based on a theme.

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[11] Available at: http://www.un.org/en/development/desa/publications/connecting-governments-to-citizens.html
Accessed on:15:32 hours,13/05/2014

For the year 2012, the report shows that with right institutional framework, policies and capacity building efforts, progress in enhancing contribution of e-government to underlying theme (i.e. sustainable development for 2012) is within reach.

The EGDI is a weighted average of three normalized scores on the most important dimensions of e-government as shown in Figure 1:- scope and quality of online services, development status of telecommunication infrastructure, and inherent human capital.

Figure 1: UN E-Government Development Index
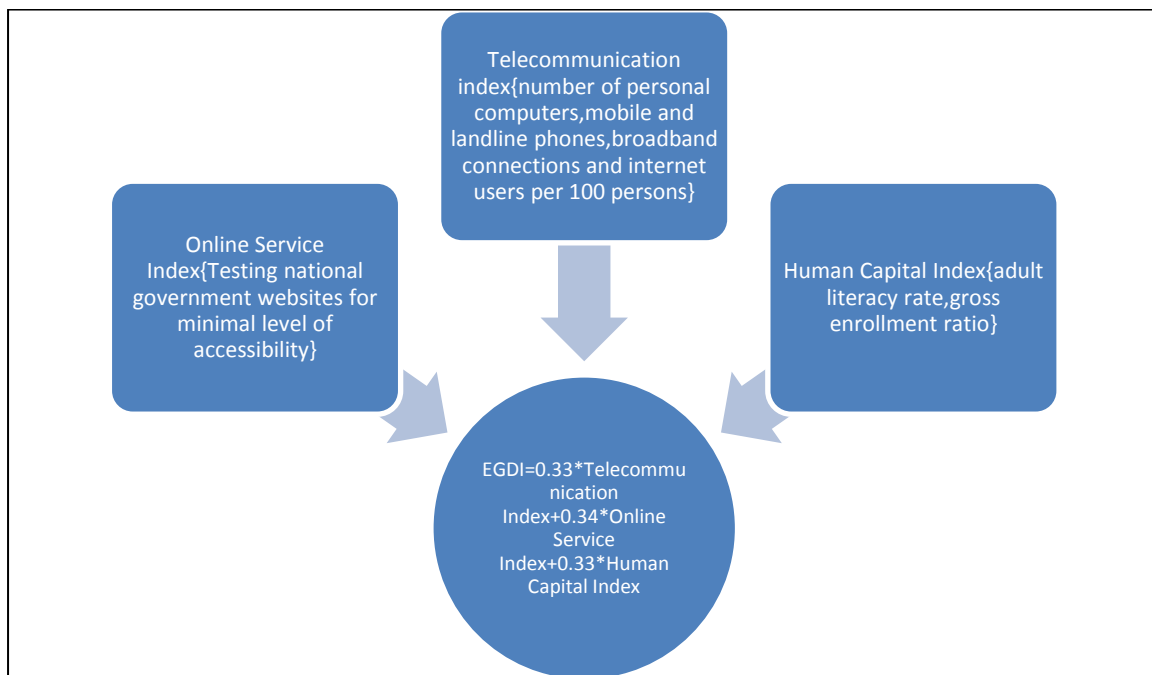
Source: Adapted from UN E-Government Survey 2012

There are however some limitations. First, the inherent human capital component consists of adult literacy rate and gross enrolment ratio i.e. it focusses only on educational criteria for determining whether an individual is ready to effectively use e-government

services to improve his well-being which might not be a comprehensive measure of individual readiness .In context of developing country like India where there is high digital divide due to high cost of accessibility, difference in exposure to computer usage in rural and urban areas as well as variation in capability to utilize e-governance services for different age groups of citizens, educational criteria itself will be insufficient.

Second, the online service index doesn't capture availability of information about important indicators like availability of e-governance vision statement on website, cost effectiveness (i.e. bang for the buck of e-governance initiative) etc. which compromise the transparency of any e-governance initiative.

Third, lack of suitable IT infrastructure is an important constraint which inhibits e-governance readiness and development in developing countries like India. Indeed, effective government intervention is essential as conditions for perfect market competition don't exist .However, there is no indicator which directly measures any government's effort to build and develop relevant IT infrastructure like gateways, LAN's etc which will be useful for its citizens

(ii) *Waseda University International E-Government Ranking*[12]

The Waseda University Institute of E-governance releases its Waseda University International E-Government Ranking every year. In co-ordination with APEC (Asia Pacific Economic Co-operation), the Institute has been continuously monitoring and researching the e-government strategies of APEC member economies through a survey since 2004 as part of activities of e-APEC initiative.

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[12] Available at: http://www.e-gov.waseda.ac.jp/images/Press%20Released%20on%20e-Gov%20ranking%202012.pdf
Accessed on:02:32 hours,10th May 2014

The survey aims to advance the state of e-government practise by identifying and facilitating policies for development of best practises which will contribute to better quality of life in digital society[13].

These rankings are based on 7 main indicators (diagram below) and 32 sub indicators or dimensions[14] which are comprehensive in nature as shown in Figure 2. New sub- indicators are not only added but existing sub-indicators are significantly restructured and redefined every year[15]

Figure 2: Indicators for Waseda University E-Government ranking 2012
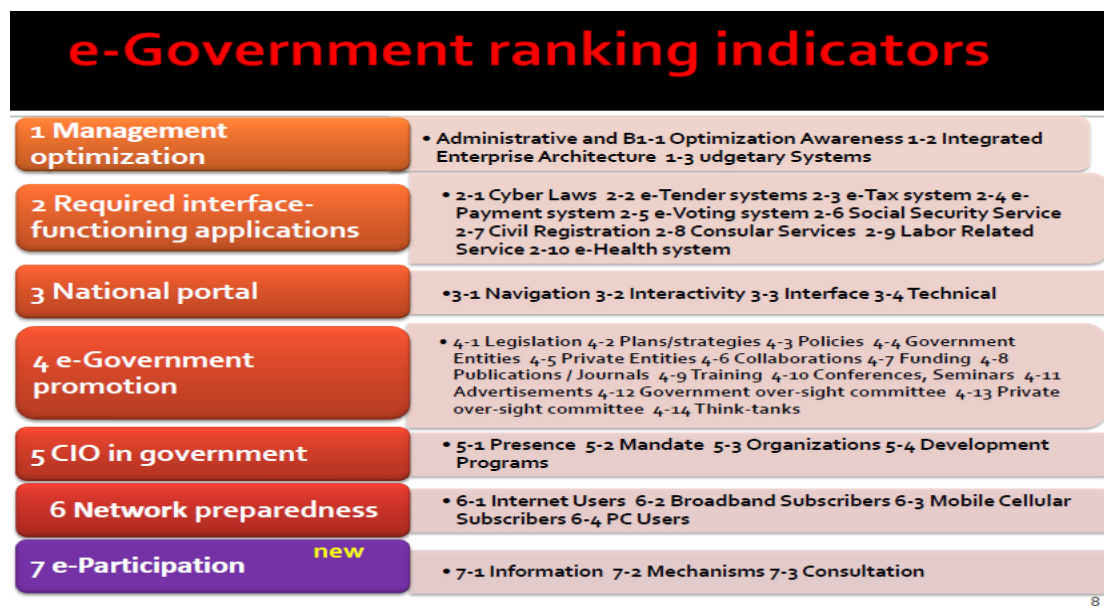
Source: Organisation for Economic Co-operation and Development (OECD)[16]

However, there are some limitations with this index. First, the survey ignores individual readiness parameters like literacy, difference in exposure to computer usage in

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[13] Available at: http://www.oecd.org/gov/public-innovation/45072025.pdf
Accessed on: 04:32 hours,10th May 2014
[14]Available at: http://www.e-gov.waseda.ac.jp/images/Press%20Released%20on%20e-Gov%20ranking%202012.pdf
Accessed on:02:32 hours,10th May 2014
[15] Available at: http://www.oecd.org/gov/public-innovation/45072025.pdf
Accessed on: 04:32 hours,10th May 2014
[16] Available at: http://www.oecd.org/gov/public-innovation/45072025.pdf
Accessed on: 04:32 hours,10th May 2014

rural and urban areas and variation in ability to use e-government for different age groups. Further exploration of these parameters will help Indian states to design effective e-governance strategies which will improve the quality of life of citizens in digital society.

Second, like the EGDI, it doesn't capture the role of government in provision of ICT infrastructure like WAN's, gateways etc. to ensure better network preparedness and provide more effective e-governance services.

Third, unlike the EGDI report [UN E-government Survey (2012):12], the survey report doesn't explicitly acknowledge the difficulties faced by states with larger population for implementing e-governance projects.

Fourth, there is insufficient information about exact methodology of the index and how weights are assigned to different indicators.

(b)   National and Sub-National Level Indices:

(i)   Department of Electronics and Information Technology [DeitY]of the Government of India and the National Council of Applied Economic Research[NCAER]'s E-Readiness Assessment Report[17]

The Department of Electronics and Information Technology (DeitY) of the Government of India and the National Council for Applied Economic Research (NCAER) have collaborated in producing the India e-Readiness Reports since 2003.The focus of these reports is to evaluate the ability of state governments and union territories to pursue value creation opportunities and accompanying inclusive economic development facilitated by ICT[18].

[17] Available at: https://www.negp.gov.in/index.php?option=com_content&view=article&id=336&Itemid=661
Accessed on:01:32 hours,10th May 2014
[18] ibid

Indeed, one such important application of ICT is in transforming the governance process by acting as a tool for improving the public services delivery mechanism .For 2008, NCAER's e-Readiness report provides an assessment and ranking of Indian states and union territories in area of e-governance.

The e-Readiness index is a Relative Index includes three sub-components as shown in figure 3 which are then conceptually elaborated.

Figure3: The framework for e-readiness index(NeGP).
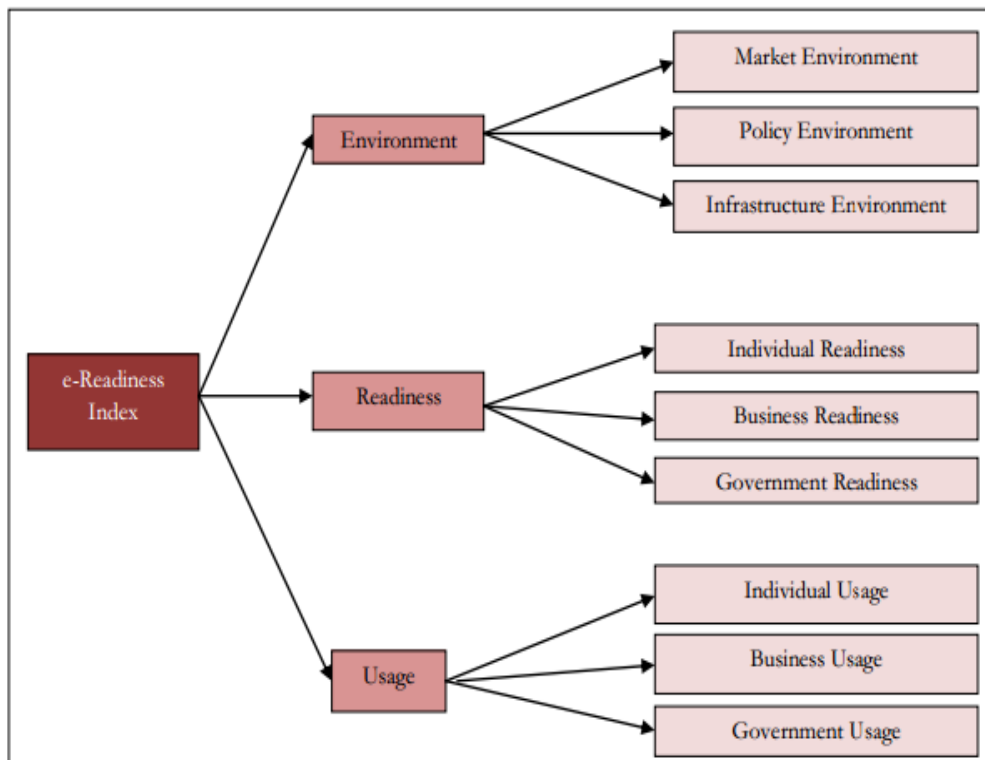
Source:National E-Governance Plan(NEGP)[19]

- The ICT environment of a given state or community.

Effective use of ICT requires strong enabling environment at initial stages which will promote its spread and usage. This environment includes policy environment, market environment and infrastructural environment.

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[19] Available at: https://www.negp.gov.in/pdfs/eReadiness%20Assessment%20Framework.pdf
Accessed on: 04:32 hours,12th May 2014

- The readiness of the community's key stakeholders to use ICT.

Readiness deals with development of certain capabilities within different stakeholders which will enable them to utilise the environment for attaining their desirable objectives. It includes capacity building, skill formation within different stakeholders as well as enhancing their access to infrastructure put in place either by public or private sector.

- The actual usage of ICT among these stakeholders.

Given a conducive environment and positive readiness, it refers to the actual utilization of ICT by relevant stakeholders.

The indicators and final weights for the e-readiness index are calculated on the basis of aggregate Principal Component Analysis[20] as shown in Figure 4.
Additionally,the e-readiness report uses a combination of hierarchic analysis for selecting variables and determining weights for e-governance ranking.

The hierarchy for 2008 report was established on the basis of the following five indicators:

- Institutional mechanism to promote e-Governance such as a separate e-Governance department, separate agency for overseeing the e-Governance initiatives, etc.

- Web presence of the institutional mechanism for promoting e-Governance initiatives; interactive portal with web links to individual e-Governance projects.

- Documented policy or road map for e-Governance.

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[20] Principal component analysis is appropriate when you have obtained measures on a number of observed variables and wish to develop a smaller number of artificial variables (called principal components) that will account for most of the variance in the observed variables. For further information, please refer: http://support.sas.com/publishing/pubcat/chaps/55129.pdf

- Establishment of State e-Governance Mission Team (SeMT) or separate task force for e-Governance.

- Separate e-Governance budget.

Figure 4: Indicators for measuring readiness of different stakeholders.

Major category	Minor category	Minor category: Indicators of significance
2 Readiness	2.1 Individual Readiness	2.1.1 Percentage households with PCs
		2.1.2 Percentage of household with internet connection
		2.1.3 Percentage of household with cell phone
		2.1.4 Percentage of household with telephone
	2.2 Business Readiness	2.2.1 IT Park density
		2.2.2 Employment per IT park
		2.2.3 IT jobs per million population
	2.3 Government Readiness	2.3.1 Officials trained in ICT • *Percentage of top government officials trained in ICT* • *Percentage of total government Officials trained in ICT*

		2.3.2 Website
		• *Whether website available in local language*
		• *Website content*
		  ○ *Information about the government, its mandate, its structure*
		  ○ *Information about government activities, schemes, projects etc.*
		  ○ *Information about all government departments*
		  ○ *A site meter*
		• *Website portal*
		  ○ *Citizen portal*
		  ○ *Private firm portal*
		  ○ *Government official portals*
		  ○ *Non-profit organisation portal*

		2.3.3 ICT use by Panchayati Raj institutions (PRIs) • *Are PRIs equipped with intranet?* • *Plans to install the intranet application for PRIs in the next year?* • *Training programmes for the PRI members*

Source: India E-Readiness Report 2008(2010): 40

Along with hierarchic analysis,the following indicators were determined by Principal Component Analysis for ranking states on e-governance as shown in Figure 5. Still,the comprehensive India E-readiness Assessment Report suffers from following limitations which makes it inapprorpriate to measure e-governance readiness for Indian states

First,the e-readiness index is a broad index which measures e-readiness of different stakeholders-individual,business and government. Both e-readiness index as well as e-

government ranking ignore pertinent individual readiness parameters like literacy, difference in exposure to computer usage in rural and urban areas and variation in ability to use e-government for different age groups. Further exploration of these parameters will help Indian states to design effective e-governance strategies which will improve the quality of life of citizens in digital society.

Figure 5: Indicators which are used for e-governance ranking

Major category	Minor category	Minor category Indicators of significance
e-Governance	e-Governance projects	No. of e-Governance projects
	Age	Age of the oldest e-Governance project in the state
	BPR	Percentage of e-Governance projects with BPR
	Spread of e-Governance projects	Percentage of programs having entire state coverage as per plan
		Percentage of projects having infrastructure set up in entire state to total projects having entire state coverage as per plan
		Percentage of projects active in entire state to total projects having infrastructure set up in entire state
		Percentage of projects focusing on marginalised target groups
	Application in Services	Percentage of Services where changes have been implemented
		Percentage of Services which are transforming and transaction based
		No. of Services for which citizen charter provided
		Percentage of Services for which trips to the dealing office by user's availing the service has been completely eliminated
	Policy and Institutional Environment	Separate institutional mechanism to promote e-Governance
		Documented policy for e-Governance activities
		e-Governance road map document
		State e-Governance mission team (SeMT) set up for e-Governance projects
		Separate task force been set up for e-Governance projects
		Separate ICT budget
		Separate e-Governance budget
		Percentage of e-Governance projects to total number of departments
		Dissemination Instruments 1. Radio 2. Print 3. Television 4. Street Shows 5. Any Other

Source: India E-Readiness Assessment Report 2008(2010): 57

Second, the e-governance ranking doesn't substantially differentiate the concept of e-governance from e-government.Indeed,e- governance is a process unlike e- government which is a stakeholder in that process.

Third,it is a relative index and not an absolute index i.e.it cannot be used for measuring a state's e-governance readiness over time.

Fourth, it uses Principal Component Analysis which makes it sensitive to modifications in basic data,outliers,small sample problems.

(ii)   *Dataquest CMR e-Readiness Assessment of Indian States*[21]

The Dataquest-CMR e-Readiness Assessment of Indian States 2013 focused on four key parameters of assessment whose weights were determined by Principal Component Analysis. They are as follows[22]:

- Availability of electronic infrastructure, and the means and capacity of the state's residents to access e-Gov services, schemes and programmes;

- Status of implementation of e-Gov Mission Mode Projects and programmes, enabling policies, rules and administrative reforms, as well as communication and popularisation initiatives of the government;

- Indicators of actual e-Gov or m-Gov service utilisation by the target beneficiaries, and

- PESTLE Analysis: HDI ranking of states and viewpoints of a panel of experts.

The study ran over four months (April-July 2013) and analysed feedback collected from in depth interviews with nearly 120 key stakeholders across 29 states of India. This included state IT secretaries, state e-Governance / Nodal Agency directors, SeMT project

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[21] Available at: http://cmrindia.com/delhi-kerala-goa-gujarat-and-andhra-pradesh-top-rankings-in-the-dataquest-cmr-e-readiness-assessment-of-indian-states-2013/
Accessed on:02:32 hours,14th May 2014
[22] Ibid.

managers, DeitY (Department of Electronics and IT) and NIC (National Informatics Centre) technical directors and other government IT purchase decision makers and influencers. The survey was capped off with a focus group discussion involving government sector experts, senior ICT industry executives, Dataquest editors and CMR analysts[23].

Figure 6: Study framework for assessment of Indian states
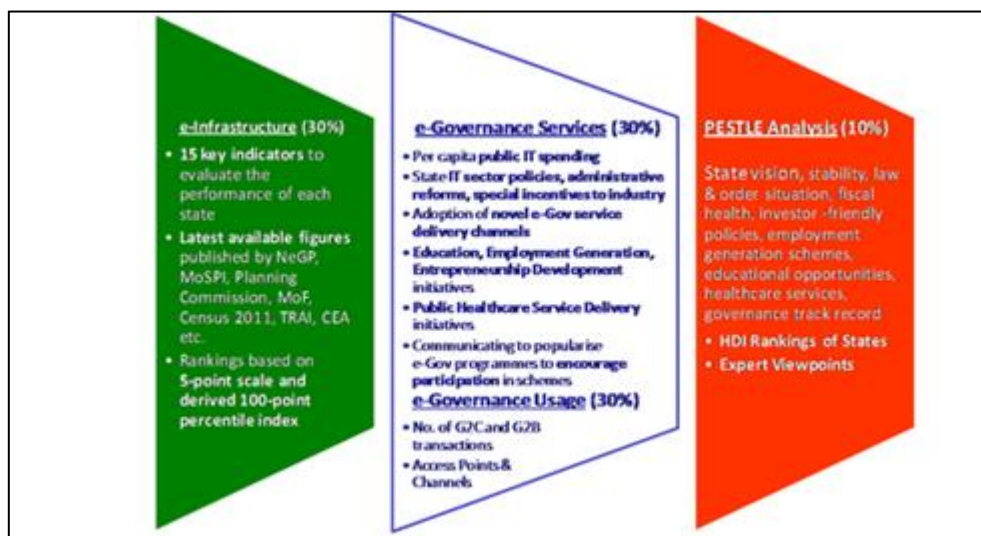
Source: DataQuest -Cyber Media Research,2013

Some of the limitations of the proposed index are as follows. First, E –readiness is a broader concept than e-governance readiness. It measures ICT readiness for different process including governance.

Second, it doesn't incorporate any form of extensive website audit and review which is crucial to measure online service delivery of e-government initiatives.

Third, the entire survey process including focus group discussions didn't evaluate e-readiness of states in terms of availability of opportunities for citizens to give their feedback directly.

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[23] Ibid.

II.   OBJECTIVE OF THE STUDY AND RESEARCH METHODOLOGY.

Indeed, a review of existing indices which are used to measure e-governance readiness in some form or the other leads us to a conclusion that they are inappropriate to measure and compare e-governance readiness of India. All of these indices have a broader scope than measuring e-governance readiness for state level. Most of them don't use open data[24] which makes it difficult to publically replicate and verify them .Further, none of these indices have stressed specifically on user centricity [i.e. firm commitment to principles of citizen centricity, transparency, accountability and service orientation] which places user[25] at the centre of e-governance.

Accordingly, the study proposes a quantitative framework for formulating a user centric e-governance readiness index.This study has four primary objectives

(1)   Present a framework for objective assessment of e-governance readiness related policy making at sub-national and national level with emphasis on user centricity [i.e. citizen centricity, transparency, accountability and service orientation].

(2)   Present a methodology for periodic assessment and analysis of e-governance readiness related policy options, choices exercised and performance at state level in India, with a view to improve outcomes like a more engaged citizenry.

(3)   Focus on strengthening a culture of evidence based policy making for e-governance readiness anchored in rigorous research.

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[24] For more information, please refer Open Data Handbook
Available at: http://opendatahandbook.org/en/what-is-open-data/
Accessed on: 16:22 hours,16/05/2014.
[25] Here, user primarily refers to citizens who use internet as medium to influence governance but also includes offline citizens who are end users for any e-governance service.

(4)   To provide a way forward to determine the missing link between e-governance readiness and desirable e-governance outcomes which will actually transform relationship between citizens and state

In the context of this study, user centric e-governance readiness refers to development of capabilities among different stakeholders in the society (especially online users), which will enable them to positively influence the governance process through an online medium. This should transform relationships between citizens and state by leading to outcomes which are desirable for the society. The basic framework for the proposed user centric e-governance index is presented in figure 7.

Figure 7: Framework for proposed User centric E-Governance Readiness Index
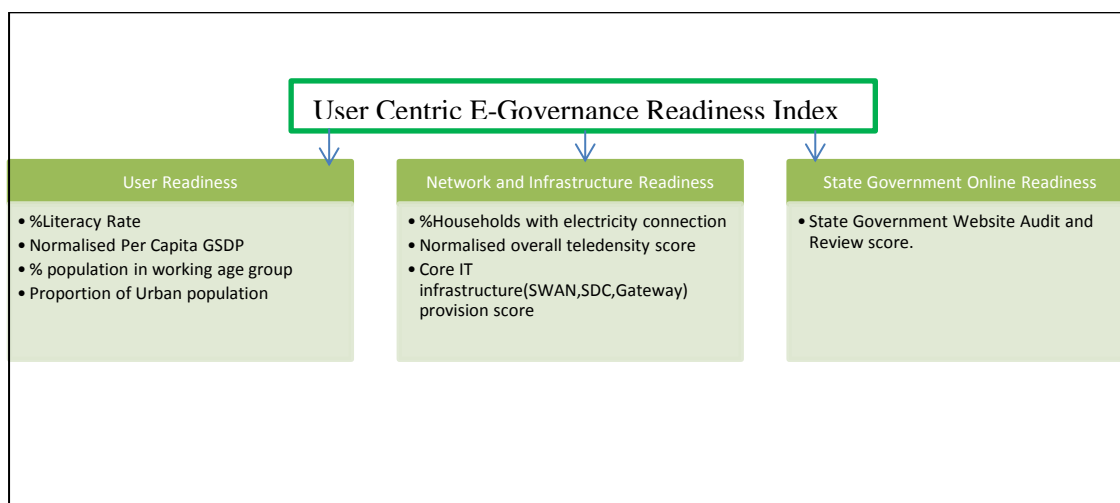
Source: Conceptualised from study

The study is quantitative in nature and uses primary as well as secondary data. With regards to methodology, the proposed user centric E-Governance Readiness Index[EGRI$_u$] rates   the performance of state governments relative to one other by averaging three sub-indices:- Individual Readiness Index, Infrastructure & Network readiness index and State government online readiness index. Each of these set of indices is itself a composite measure

that can be extracted and analysed independently. The state government online readiness index is calculated on basis of primary research whereas the other two sub- indices are calculated on basis of secondary research .It is important to note that these indices are strictly developed from open data i.e. data which is easily available online and can be freely downloaded, used, reused and redistributed by anyone[26].

Mathematically, $EGRI_u$ is the weighted average of three normalised[27] scores on the most important dimensions of e-government, namely:- vision, scope & quality of online services, infrastructure connectivity & network readiness and human capital.

$EGRI_u = (0.34 *SGORIS) + (0.33 *NIRIS)+(0.33*URIS)$…………………(1)

where,

SGORIS= State Government Online Readiness Index Score

NIRIS= Network and Infrastructure Readiness Index Score

URIS=User Readiness Index Score

Further each sub index of $EGRI_u$ includes

(i) User readiness index which is average of four important sub dimensions-literacy rate, normalised per capita GSDP, proportion of urban population in state and proportion of population in the working age group[15-59 years].

URIS= 0.25*(LR+NPCGSDP+PUPISP+PPWAG)…………(2)

where,

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[26] For further elaboration on open data; kindly refer the *Open Data Handbook*
Available at: http://opendatahandbook.org/en/what-is-open-data/
Accessed on:16:22 hours,16/05/2014
[27] All the values of variables are in the scale between 0 and 100.If a particular variable has a value which is not in the scale of 0-100,then it is normalised to include it in that range.

URIS=User Readiness Index Score

LR= percentage of literacy rate (above age of 7years).

NPCGSDP= normalised per capita GSDP.

PUPISP= proportion of urban population in state population.

PPWAG= proportion of population in working age group.

For per capita GSDP, normalisation is performed to get NPCGSDP. The study normatively assumes that Max=70,000 and Min=10,000 to ensure that scales are comparable.

NPCGSDP= 100- [{(Max-PCGSDP)/(Max-Min) }]…………(3)

where,

PCGSDP=per capita GSDP

(ii)   Network and Infrastructure readiness index is the average of three important sub dimensions- percentage of households with electricity connection, normalised overall teledensity of state and core IT infrastructure score.

NIRIS= 0.33*(NIRI+PHEC+NOTS+CITIPS)……………………(4)

Where,

NIRIS= Network and Infrastructure Readiness Index Score.

PHEC= Percentage of Households with Electricity Connection.

NOTS= Normalised Overall Teledensity Score

CITIPS= Core IT infrastructure provision score

The overall teledensity score are obtained from press release on Telecom Subscription Data, TRAI (Telecom Regulatory Authority of India) [28] wherein teledensity figures are

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[28] Available at: http://www.trai.gov.in/WriteReadData/WhatsNew/Documents/PR-TSD-Jan2013.pdf
Accessed on:02:32 hours,17th May 2014

derived from the subscriber data provided by the operators and the population projections published by the Office of the Registrar General & Census Commissioner, India. The methodology and data for the same are provided at the end of TRAI study.

On the overall teledensity score, normalisation is performed. The study normatively assumes that Max=140 and Min=100 to ensure that scales are comparable.

NOTS=120- [{(Max-OT)/ (Max-Min)}*100]……………………………(5)

NOTS=Normalised overall teledensity.

OT=Overall Teledensity.

The core IT infrastructure provision score is calculated as percentage of sum of individual scores of two further sub parameters (implementation status of NeGP i.e. SDC, SWAN, CSC, SSDG, E-district status and overall capacity building progress status) with respect to maximum possible score. The individual scores for each parameter are derived from a presentation titled 'Implementing NeGP' by Rajiv Gauba.

CITIPS= [{SDCISS+SWANISS +CSCISS + SSDGISS +EDISS +OCBSS} /17] * 100

…………….(6)

Where,

CITIPS= Core IT Infrastructure provision score.
SDCISS= SDC implementation status score
SWANISS= SWAN implementation status score
CSCISS= CSC implementation status score
SSDGISS=SSDG implementation status score
EDISS= E-district implementation status score
OCBSS= Overall Capacity Building status score

(iii)   The state government online readiness score consists of first of its kind, website audit and review score for each Indian state. This score is calculated as a percentage of total score a website gets on five sub parameters (information presentation and dissemination, navigation and usability, trust and online service delivery capability, value addition and citizen participation) with respect to maximum possible score.

SGORIS= [{(0.2* (IPD+NU+TOSDC+VA+CP)}/50]*100………………(7)

where,

SGORS= State Government Online Readiness Index score.

IPD=Information Presentation and Dissemination.

NU= Navigation and Usability

TOSDC= Trust and Online Service Delivery Capability

VA= Value Addition

CP= Citizen Participation

Thus, $EGRI_u$ is a composite indicator which measures the willingness and capacity of Indian state governments to deliver online services as well as the capabilities of its citizens to effectively utilize ICT to influence the governance process.

Although the basic framework of the $EGRI_u$ score remains consistent, the precise interpretation of these indicators (e.g. especially the state government website audit and review score) as well as the meaning attached to their values will change from one survey to other as the understanding of potential of e-governance changes and underlying technology evolves. This implies that   framework of study is comparative which seeks to incorporate various approaches that evolve over time rather than advocating a linear path with absolute

goal. All this augurs well for NeGP's vision of a centralised initiative with decentralised implementation.

However, the study suffers from some limitations. To begin with, the proposed model might suffer from some statistical limitations. For example, some pair of variables might have high value of correlation coefficient and this is not always desirable. Still, the study has included both these variable in our proposed index because of conceptual relevance and lack of alternative variables which will act as a proxy but still satisfy the required statistical rigor. With more open data available on internet in future, the study hopes to overcome this limitation in future.

Second, the study doesn't differentiate between a user who uses e-government services on his own and user who visits CSC (Customer Service Centre) to avail an e-governance service through a designated computer operator. In long run, a user centric e-governance readiness framework should accord higher uEGRI score to states wherein a larger number of citizens are able to utilize e-governance services on their own.

Third, as the proposed index is being created for the first time, it is not possible to perform a time series analysis of the variables of the proposed index i.e. studying trends of individual variables might not give valuable insights at this stage

Fourth, the study is purely based on open data from authentic sources which is easily available on internet. However, not all data is easily available for all Indian states. As result, we have implemented our index only for 16 most populous states for whom pertinent data is easily available online. This doesn't mean that data for other populous states like Jharkhand etc. is not available even offline.

Fifth, the State government website audit and review score is based on providing binary scores for different sub-parameters of the survey. A binary representation (0 or 1) reduces the actual reality in black and white but ignores the shades of grey i.e. it will ignore different level of implementation. Also, it is subjective .For example, two websites which follow different level of data security mechanism-very strong and strong will still be given the same binary score i.e. 1 by same evaluator but a different score by other evaluator. This limitation can be overcome in future by performing a suitable peer review.

III.   COMPONENTS AND INDICATORS OF THE PROPOSED INDEX.

A proposed quantitative framework to measure e-governance readiness should substantiate the components and indicators of the proposed index, their influence on the e-governance process and the subsequent logic behind their inclusion in the framework.

The indicators for each sub-index are as follows:-

(1)   User Readiness Index

It has been observed that young, educated, urban and economically better off citizens are more comfortable in using technology compared to other sections of   population. They will be able to readily utilize these IT initiatives for a more informed interaction with government agencies. States with higher proportion of people belonging to the above categories will be more user ready than other.

Accordingly, states are evaluated on their user readiness based on the following parameters literacy rate, normalised per capita GSDP, proportion of urban population in state and proportion of population in the working age group [15-59 years].

With respect to this study, literacy rate refers to the percentage of literates in total population wherein a literate is defined as a person equal to or above the age of 7 who can both read and write with understanding in any language[29]

Similarly, per capita state income at constant prices is obtained by dividing the NSDP (State Income) at constant prices by mid-year projected population of the state and is in contrast to the Per Capita National Income which is obtained by dividing the Net national Product (NNP) by the mid-year population of the country. One must note that compilation of

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[29] Available at: http://www.censusindia.gov.in/2011-prov-results/paper2-vol2/data_files/AP/Chapter_VI.pdf (Page 1).
Accessed on: 16:00 hours,18th May 2014

per capita state Income is based on income originating approach unlike compilation of per capita national Income is based on income accruing approach[30].

For this study, proportion of urban population in state refers to proportion of total population which lives in urban areas of state. An urban area is either a statuatory town or a census town[31].It has been observed that urban population has more exposure to ICT and high ICT skill sets and can readily avail of amenities like more cyber cafes, more IT kiosks to utilize e-governance for improving their well-being.

Proportion of population in working age group is proportion of population which is within age group of 15 to 59 years[32]. This population is considered as independent workforce who has the capability to utilize their time productively to add value to any work which enhances their well- being. High magnitude of independent work force implies that most people in state can utilise e-governance for attaining their desired objectives.

(2) Network and Infrastructure Readiness Index

For E-government initiatives to be functional at the citizen end, network elements like electricity connection and telephone connection should be present for appropriate functioning of internet. Considering the advent of mobile phones, telephonic connection can be broadly measured through teledensity i.e. number of phones (fixed lines plus mobile) per 100 users.

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[30] Available at: http://mospi.nic.in/mospi_new/upload/national_accounta.pdf (Page 30).
Accessed on: 23:35,15th May 2014
[31] Available at: http://www.censusindia.gov.in/2011-prov-results/paper2-vol2/data_files/goa/Chapter_I.pdf (Page 4)
Accessed on: 14:25,17th May 2014
[32]Available at: http://www.censusindia.gov.in/vital_statistics/SRS_Report/9Chap%202%20-%202011.pdf
Accessed on: 03:35,18th May 2014

With advent of m-governance, number of phones will also be an important indicator on whether states are m –ready or not.[33] Apart from this basic network infrastructure, the state governments under the NeGP (National E-governance Plan), have undertaken initiatives which aim to ensure that suitable IT related infrastructure should reach even the remotest of these villages. Thus, individuals will be able to access services through CSC's (Customer Service Centre) connected to each other in SWAN (State Wide Area Network) via relevant SSDG(State Service Delivery Gateway). The subsequent governance related data will then be stored in a centralised repository of data at state level i.e. SDC (State Data Centre).

Further, it is necessary to evaluate the implementation status of local e-governance projects (e-district) and the overall capacity building status at state level. This will help us determine whether e-governance projects of a state are scalable which will have important implications on inter-operability of e-governance projects at different levels of governance.

(3)   State government online readiness index

There has been an increasing emphasis on the whole of government[34]approach of late. With regards to e-governance process, a well maintained state portal can be an important starting point in this regard .Subsequently, the study carries out website audit and review for state government websites.

<u>State government website audit and review</u>

Website presence is the starting point for facilitating state-citizen interaction. Suitable online presence can effectively contribute to transforming relationships between government and other stakeholders in the society. Accordingly, the study consists of a government website

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[33] Available at: http://www.livemint.com/Industry/jWDiYp3DwJzvLQpIe8wVKI/A-single-number-to-access-all-mgovernance-services.html Accessed on: 04:25,19th May 2014
[34] Available at: http://iist.unu.edu/www/homepage/tj/tj-pub-76.pdf
Accessed on: 05:26 hours,12 May 2014.

review and audit survey based on a heuristic website review framework outlined below in Figure 8.

Figure 8: State Government Website Review and Audit Survey Framework
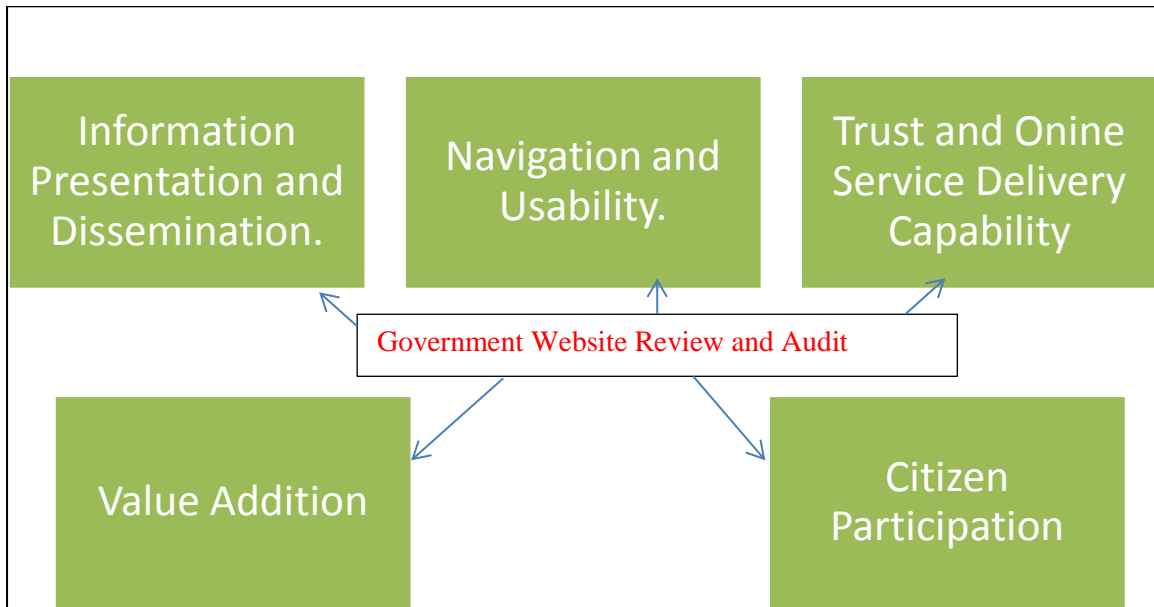
Source: Conceptualised from study.

Availability of relevant information at appropriate time in a presentable manner is extremely important for efficient and uniform interaction/transactions between government and citizens. Thus, it is crucial to evaluate how websites present available information and disseminate it to a large number of citizens. Moreover, websites should be evaluated and designed to facilitate ease of use and navigation for better interaction and execution of transactions. This is extremely crucial in countries like India where the magnitude of digital divide[35] is high.

Apart from information dissemination and accessibility, government websites also serve as a human interface for online service delivery. Hence, there is a need to evaluate the

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[35] In context of the study, it refers to difference in access as well as difference capabilities of individuals to utilize ICT for their empowerment.

quality of online government services and how they deal with corresponding issues of privacy, digital security and trust. Most importantly, websites need to be evaluated for *bang for their buck* and relevant information must be displayed highlighting the value added by these e-government initiatives. In our capital constrained country, this will help in fine tuning our website policies based on ballpark quantitative estimates of value added. Finally, any e-government initiative including websites should be evaluated on how it facilitates deliberative decision making by providing online space for citizens to voice their opinions on issues which affect them.

(4)   Relationships between different indicators.

Some pair of indicators which we are using in our study to calculate our proposed e-governance will have a strong influence on each other i.e. they might be statistically correlated(correlation coefficient > 0.6) resulting into multi-collinearity. Yet, the study shall include them in our proposed index for conceptual relevance and lack of alternative variables which will act as a suitable proxy. The correlation table which states correlation between different indicators of our proposed index[36] is shown in Figure 9.

Figure 9: Correlation matrix of indicators of the proposed index.

	Literacy	Normalised per capita income	Working age group population	Urban population	Households with electricity connection	Normalized Tele density	IT infra provision score	State govt audit and website review
Literacy	1							
Normalised per capita income	0.71	1						
Working age group population	0.58	0.7	1					
Urban population	0.54	0.71	0.6	1				
Households with electricity connection	0.6	0.84	0.77	0.68	1			
Normalized Tele density	0.71	0.8	0.75	0.64	0.87	1		
IT infra provision score	0.47	0.2	0.17	0.25	0.22	0.22	1	
State govt audit and website review	0.13	0.24	0.43	0.28	0.39	0.24	0.2	1

Source: Derived from the study

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[36] Please note that the variable names have been kept deliberately short in Figure 9 for a better screen shot.

With respect to *User Readiness Index*, normalised per capita income has a strong influence on other variables of the index. However, it is difficult to determine the direction of influence e.g. whether rich states (state with high per capita income) have more literate people (high literacy rate) or literate people tend to stay in richer states?

With respect to *Network and Infrastructure Readiness Index* , states with higher teledensity and households with electricity connection should be more user ready. This confirms a well-known hypothesis that physical and human capital always complement each other.

Interestingly, Network and IT infrastructure provision score ('IT infrastructure provision score' in the correlation matrix) and state government website and audit review score have low correlation with any other variables. This implies that they are not statistically significantly influenced by other variables in the proposed index. These scores were derived by author on basis of secondary research as well as primary research respectively and can be considered as statistically important components of the proposed index.

IV. TOWARDS A USER CENTRIC E-GOVERNANCE READINESS INDEX.

The proposed index is implemented for 16 states as well as its observations are analysed.

(1)   User Readiness Index

The User Readiness Index shown in Figure 10 gives us an insight as to whether expected users of e-governance in particular state have the capability to utilize e-governance for improving the quality of their lives.

Figure 10:   User Readiness Score

State	1.1.Literacy Rate	1.2.Normalised Per capita income(2010-11) at constant prices	1.3.Proportion of population in the working group (15-59 years)	1.4 Percentage of urban population of total state population share	User Readiness Score
Maharashtra	82.91	87.881	63.3	45.23	64.927
Tamil Nadu	80.33	69.88	66	48.45	62.582
Kerala	93.91	66.455	64.2	47.72	60.643
Haryana	76.64	82.035	63.3	34.79	60.856
Gujarat	79.31	71.18	63.4	42.58	60.14
Punjab	76.68	57.92	65.1	37.49	56.402
Karnataka	75.6	48.835	65.5	38.57	54.601
Andhra Pradesh	67.66	50.61	65.8	33.49	53.325
Himachal Pradesh	83.78	61.843	63.9	10.04	49.92
West Bengal	77.08	37.046	65.2	31.89	49.834
Rajasthan	67.06	26.026	59.6	24.89	42.529
Madhya Pradesh	70.63	20.636	59.7	27.63	41.966
Orissa	73.45	26.18	61.9	16.68	41.665
Assam	73.18	19.01	62.2	14.08	39.632
Uttar Pradesh	69.72	12.248	58	22.28	37.632
Bihar	63.82	6.053	54.3	11.3	31.488

Source: Census 2011, All India Central Statistical Office and respective state Department of Economics and Statistics.

States like Maharashtra which have been traditionally considered as prosperous have performed well on user readiness whereas less developed states like Bihar, Uttar Pradesh etc. have to do a lot of catching up. Considering other genuine pressing problems faced by these

less developed states, developing user centric e-governance policies which will facilitate citizen readiness will take some time.

(2)   Network and Infrastructure Readiness Index

The Network and Infrastructure Readiness Score shown in Figure 11 informs us about the current state of physical infrastructure which will enable citizens to use e-governance more effectively.

Figure 11: Network and Infrastructure Readiness Score

State	2.1.Households with electrictity connections	2.2. Normalised Overall Teledensity	2.3. Core IT infrastructure provision score	Network and Infrastructure Readiness Score
Kerala	94.4	77.14	76.47	82.67
Himachal Pradesh	96.8	82.53	64.71	81.346
Tamil Nadu	93.4	87.97	58.83	80.066
Gujarat	90.4	65.88	70.59	75.623
Maharashtra	83.9	68.4	64.71	72.336
Punjab	96.6	81.81	35.29	71.233
Andhra Pradesh	92.2	56.63	64.71	71.18
Karnataka	90.6	70.72	41.18	67.5
Haryana	90.5	55.78	29.42	58.566
Rajasthan	67	48.73	47.06	54.263
West Bengal	54.5	53.32	52.95	53.59
Madhya Pradesh	67.1	32.35	58.83	52.76
Uttar Pradesh	36.8	36.3	58.83	43.976
Orissa	43	40.03	47.06	43.363
Assam	37	26.24	52.94	38.726
Bihar	16.4	26	41.17	27.856

Source: Census 2011, TRAI 2013, Rajiv Gauba(2013)

Kerala, Himachal Pradesh and Tamil Nadu have performed well in this regard. With respect to IT infrastructure provision score, Kerala and Gujarat have high scores. This implies that

both Kerela and Gujarat governments [irrespective of their 'development models' or supposed 'Bhagwati-Sen' debate] have played an active role in providing relevant ICT infrastructure to leverage the potential of e-governance. Unfortunately, eastern states continue to lag in provision of requisite ICT infrastructure which raises questions about the efficacy of their government initiatives with regards to ICT infrastructure provision.

(3)   State government online readiness index

The state government online readiness index shown in Figure 12 is based on first of its kind, website audit and review of Indian state government websites. Considering the recent emphasis on the whole of government approach, it is important to note that state portals should provide a single point of contact between online users and state governments.

Most of state government websites in India are still interactive in nature. Only a few websites allow users to carry out some basic transactions. If e-governance has to transform the relations between citizen and state in India, more websites have to provide facilities to its online users to engage in basic online transactions such as facilitating citizens to pay their electricity bills from any location.

Figure 12: State Government Online Readiness Score

State	3.1. State government website audit and review score	State government online readiness score
Maharashtra	60	60
Rajasthan	60	60
Madhya Pradesh	60	60
Assam	58	58
Gujarat	54	54
Punjab	54	54
Karnataka	52	52
Himachal Pradesh	50	50
Andhra Pradesh	50	50
Tamil Nadu	48	48
Kerala	40	40
Haryana	36	36
Orissa	30	30
Uttar Pradesh	28	28
Bihar	28	28

Source: Website Review and Audit carried out as primary research

Maharashtra and Rajasthan state websites perform better than other states on this front. An important distinction factor between the leaders and laggards on this front is due to effective articulation of various disclaimers and policies on the website itself as well as use of social media(see figure 13) to enhance citizen participation and collect citizen feedback.

It is important to note that Rajasthan website is the only portal which provides the name and designation of the link officer who is a single point of contact for mantaining the website which fosters accountability as shown in Figure 14.

Figure 13: Government of Maharashtra(Screenshot)
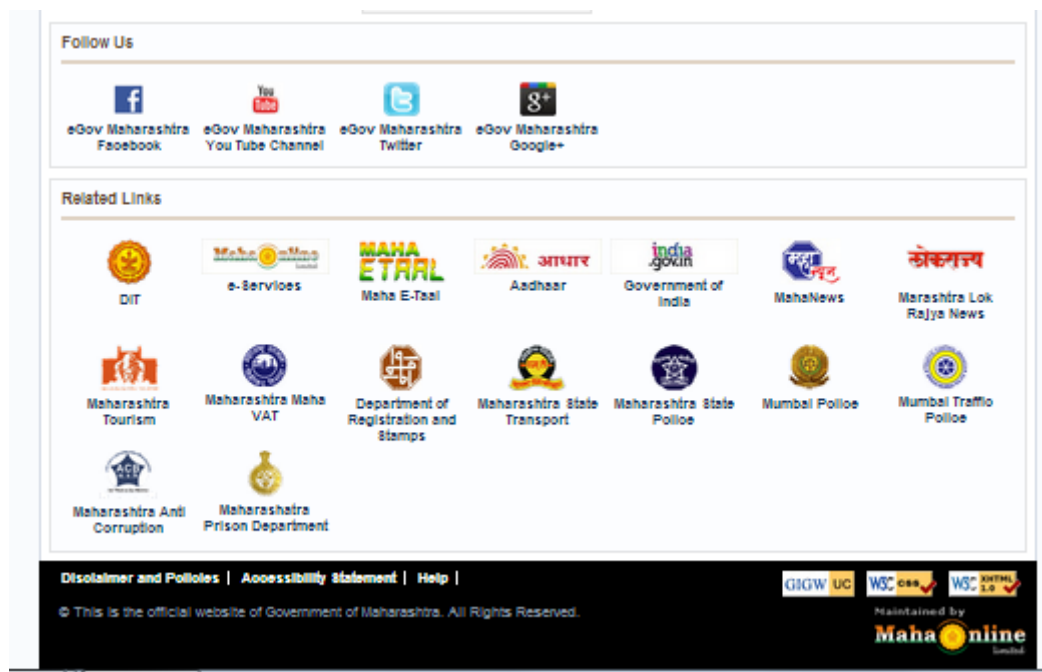
Note: Government of Maharashtra has active online web presence through social media as well as well articulated policies with respect to website usage[37]

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[37] Available at:
https://www.maharashtra.gov.in/1125/%E0%A4%AE%E0%A5%81%E0%A4%96%E0%A5%8D%E0%A4%AF-%E0%A4%AA%E0%A5%83%E0%A4%B7%E0%A5%8D%E0%A4%A0

Accessed on: 06:30 hours,20/05/2014

Although some states like Haryana, Uttar Pradesh, Orissa and Bihar might be laggard with respect to the overall score, they still hold some valuable lessons for other states. For example, Haryana has a separate citizen service delivery system titled Jansahayak which commits to time bound delivery of online services and has a separate workflow diagram for each online service as shown in Figure 15.

Figure 14: Government of Rajasthan (Screenshot)

Note: Details of Mr Ashish Khandelwal are given at the bottom of the link[38]

Similarly, Bihar has developed a decent online grievance redressel system which can be accessed through main website as shown in Figure 16. Unfortunately some states like Uttar Pradesh and Bihar comparitively suffer on all components of survey. Websites of both these governments suffer from lack of basic yet important functionalities which reduces their score. For example, the Uttar Pradesh government website has no specific 'Feedback' option

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[38] Available at: http://www.rajasthan.gov.in/Pages/Rajasthan-StatePortal.aspx
Accessed on: 06:30 hours,20/05/2014

which raises questions as to whether the state government is too complacent with respect to its IT initiatives as shown in Figure 17.

Figure 15: Government of Haryana (Screenshot)
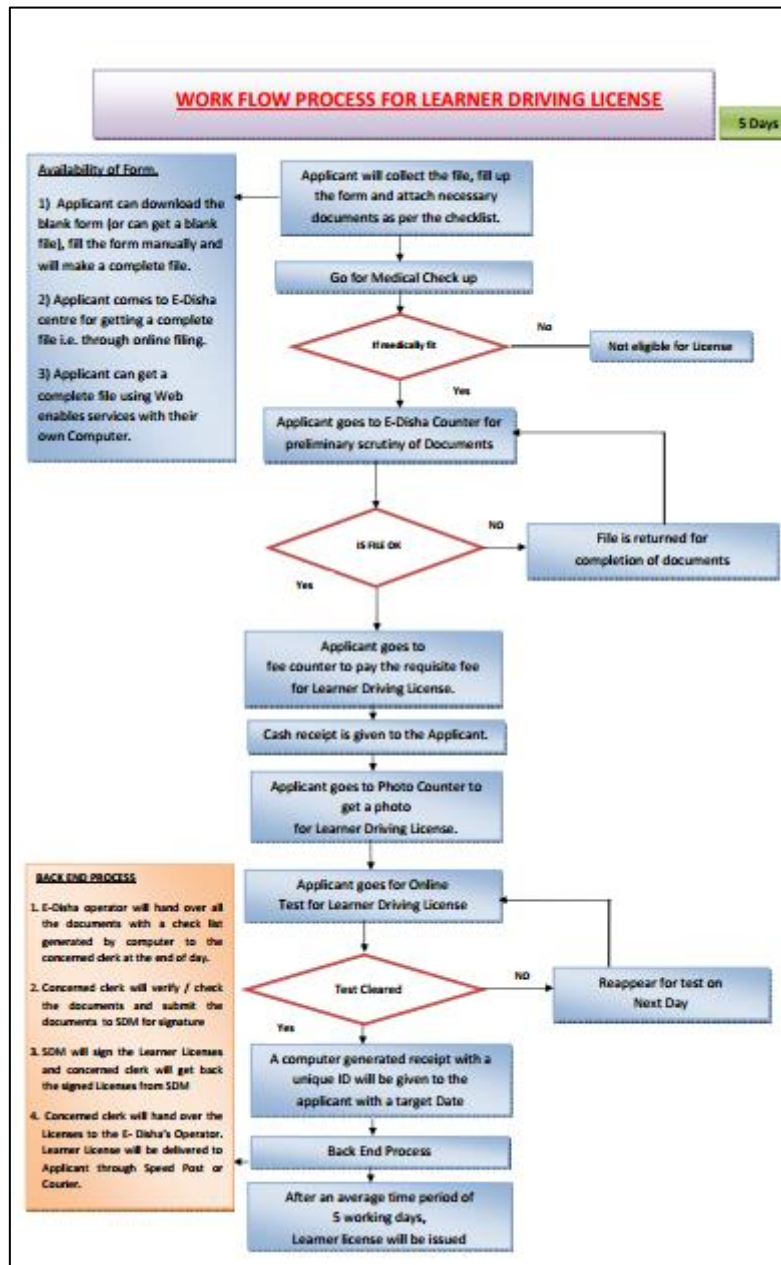
Note: Haryana's unique workflow diagram which aids citizens through different steps for applying to learner's driving license[39]

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[39] Available at: http://haryanaforms.nic.in/dwd/Wf/19.pdf
Accessed on: 06:30 hours,20/05/2014

Figure 16: Government of Bihar (Screenshot)

Note: Bihar Public Grievance Redressel System[40]

Figure 17: Government of Uttar Pradesh(Screenshot).

Note: The website doesn't have a feedback option.

(4)   User Centric E-Governance Readiness Index

The study calculates the user centric e-governance score based on above three scores and the results are tabulated as follows in Figure 18

Figure 18: Composite User Centric E-governance Readiness Score

State	User Readiness Score	Network and Infrastructure Readiness Score	State government online readiness score	Composite User Centric E-governance Readiness Score	Rank
Maharashtra	64.927	72.336	60	65.697	1
Tamil Nadu	62.582	80.066	48	63.394	2
Gujarat	60.14	75.623	54	63.161	3
Kerala	60.643	82.67	40	60.893	4
Punjab	56.402	71.233	54	60.479	5
Himachal Pradesh	49.92	81.346	50	60.318	6
Andhra Pradesh	53.925	71.18	50	58.284	7
Karnataka	54.601	67.5	52	57.973	8
West Bengal	49.834	53.59	58	53.849	9
Rajasthan	42.529	54.263	60	52.341	10
Haryana	60.856	58.566	36	51.649	11
Madhya Pradesh	41.916	52.76	60	51.643	12
Assam	39.372	38.726	58	45.492	13
Orissa	41.665	43.363	30	38.259	14
Uttar Pradesh	37.632	43.976	28	36.45	15
Bihar	31.488	27.856	28	29.103	16

Source: Derived from study

Maharashtra tops our index with highest user readiness and state government online readiness score coupled with decent infrastructure provision score. From the index, we can infer that Maharashtra government and its residents are most ready among concerned 16 states for effectively utilizing e-governance to attain their policy objectives which can transform the state citizen relationship.

Interestingly, the Tamil Nadu vs. Gujarat and Kerala v Himachal Pradesh v Punjab are pretty close as well. All these state governments have to work on their online readiness to improvise their state government online readiness score

Inspite of emergence of Bengaluru and Hyderabad as IT hubs, it seems that there is no spillover effect to other parts of these states and these states are still not sufficiently e-governance ready to unleash their true potential of e-governance.

39 | P a g e

Electronic copy available at: https://ssrn.com/abstract=2533072

West Bengal, Rajasthan and Assam state governments have decent online presence. However, their residents are still not ready to fully exploit the digital opportunity.

Further, less developed states like Orissa, Bihar and Uttar Pradesh should focus on all indicators of proposed framework for user centric e-governance index to fully leverage its potential to solve different public policy problems facing its residents.

V. SOME OBSERVATIONS AND THE WAY FORWARD

On the basis of analysis of the implementation of the proposed framework for e-governance readiness, the study wishes to highlight some observations

First, each state government must conceptualise and formulate their own strategies for a more user centric e-governance considering their unique context. These policies should be synchronised with e-governance initiatives of central government to facilitate inter-operability at various levels of governance.

Second, each state government should be aware that E-governance readiness is not only about providing relevant ICT infrastructure as well as developing and maintaining a state-of- art web portal. In addition to providing desired exposure to ICT, strategies to enhance e-governance readiness must also promote human development (specifically education and per capita income) of its citizens.

Third, most Indian websites are good at information presentation and dissemination. Some of them even have transactional capabilities. Still, even the best of state government websites have a lot of potential for improvement in domain of value addition. Accordingly, state governments must state their vision with respect to e-governance, should leverage disruptive technologies like social media, mobile internet, Big Data, Cloud Computing with due diligence to human rights and must be transparent about expenditure on their e-governance activities. All these initiatives have the potential to transform relations between citizen and government.

Most importantly, there is need to explore the missing link between e-governance readiness and e-governance outcomes. In fact, there is a need for dialogue on how to define,

attain and monitor transformative e-governance outcomes. This will help us determine the efficacy of any e-governance policy.

A Theory of Change to promote dialogue between e-governance readiness and e-governance outcomes.

The $EGRI_u$ score will inform us about status of user centric e-governance readiness of different states. However, a high e-readiness will not always translate into desirable user centric outcomes for any e-governance policy i.e. it will not always positively transform the relations between state governments and their residents.

Number of e-transactions per person, e transaction per service[41] etc. are some of the existing indicators which are used to measure transactional outcomes of e-governance. Still, there is need to develop more tangible parameters which will help us define and monitor transformative outcomes of e-governance like more engaged citizenry. This will help us in further exploration in missing link between e-governance readiness and e-governance outcomes.

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[41] Available at: http://etaal.gov.in/etaal/PopReportCustom.aspx
Accessed on:14:25,22/05/2014

Figure 19: Service wise analysis of e-services
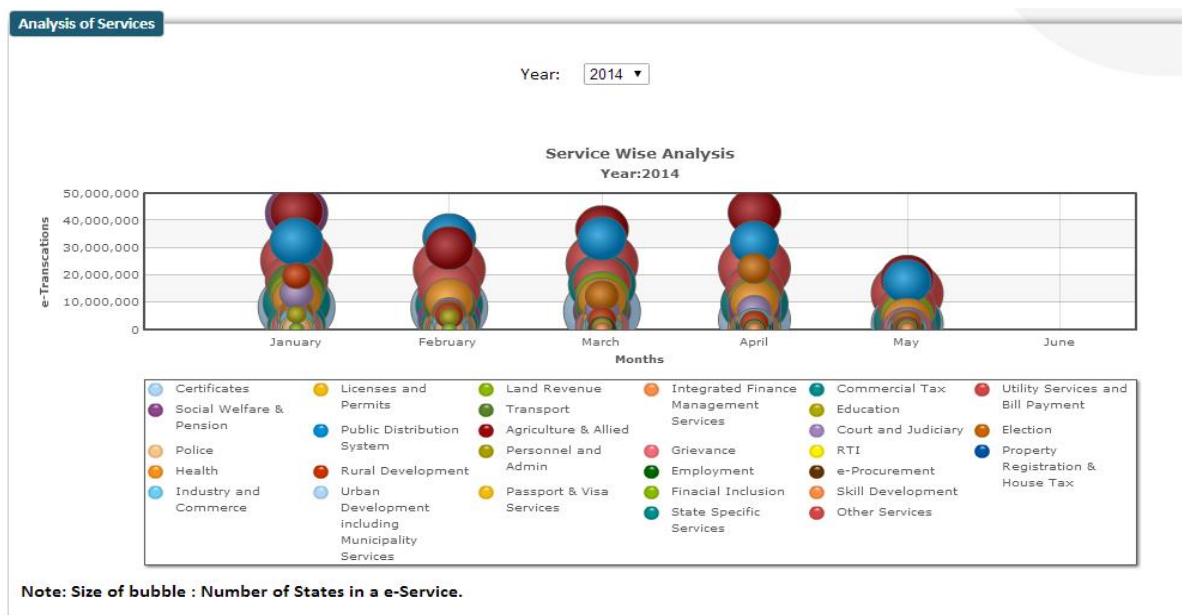
Source: E-Taal Website

[The analysis of service again gives no information about the quality of service and other pertinent indicators for each state[42]]

Accordingly, there is a need for multi stakeholder forum to initiate a dialogue on formulating these parameters which will help us to measure transformative outcomes of any e-governance policies. This dialogue can also serve as a starting point to understand the missing link between e-governance readiness and its transformative outcomes.

In this context, we propose a theory of change[43] which can be used to facilitate increased dialogue between government and other stakeholders especially its online citizens/users for better articulation and monitoring of the transformative outcomes of these e-governance initiative. The proposed theory of change includes an interactive course (online

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[42] Available at: http://etaal.gov.in/etaal/ServiceWiseBubble.aspx
Accessed on: 16:15 hours,20/05/2014.
[43] http://blogs.worldbank.org/publicsphere/what-theory-change-and-how-do-we-use-it

as well as offline) which can be used to actively inform and engage online users with respect to the benefits of e-governance and how to utilize e-governance for attaining their desired outcomes. This course can be developed by academia (like O.P. Jindal Global University) in collaboration with business representatives (like Nasscom, FICCI) and government departments/agencies(like DeitY, state DIT's). The course should be designed to communicate user feedback and expectations to respective government (state as well as central) with regard to their perceived progress on e-governance policies.

An ideal theory of change generally consists of atleast the following three elements[44]

- Coming up with a change hypothesis or an objective

- Identification of all relevant stakeholders and understanding their relations.

- Shaping up a change strategy by allocating roles to people

We shall contextualise this theory of change for our study and provide a change strategy (see figure 20)

The objective of theory of change proposed in the study is to facilitate a multi-stakeholder dialogue on defining, attaining and monitoring transformative outcomes of any e-government policy through an interactive course. The proposed interactive course will serve as a starting point to determine the missing link between e-governance readiness and desirable e-governance outcomes which is crucial for determining the efficacy of any e-governance policy.

Further, this theory of change should promote awareness and deliberation on best practises of user centric e-governance in national context. This theory of change should be based on principles of citizen centricity, transparency, accountability and service orientation.

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[44] Vegard Iversen's Lecture Notes for Impact Evaluation.

Figure 20: The Change Strategy for the proposed theory of change
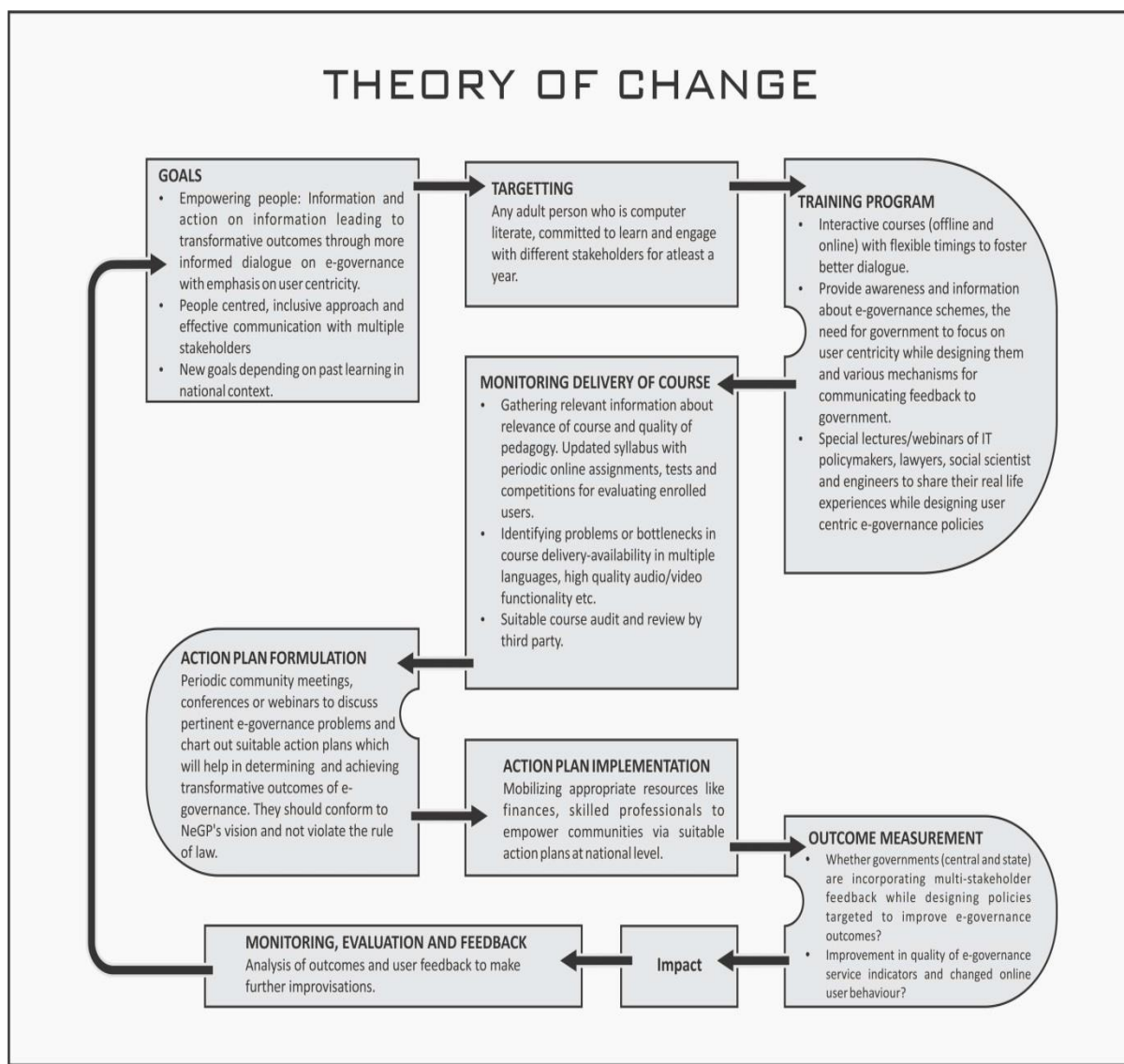
Source: Conceptualised from the study.

(a)   TARGETTING:

Any adult Indian who is computer literate and willing to commit around 5hrs a week for one year will be allowed to participate. There are no restrictions with respect to caste, class,

educational status, gender etc. of participants. The program will be targeted to closed user group to minimize spillover effects.

(b) TRAINING PROGRAM:

An interactive course (online and offline) will commence upon enrolment of suitable number of adults. The training program shall be of duration of not more than 40 weeks/2-3 hours per week. It can be conducted in local languages, with flexible timings .The pedagogy will be application oriented with suitable emphasis on relevant legal, policy and business theories which influence e-governance in our country.

Participants will be requested to discuss and explain how e-governance has the potential to transform their daily lives and what should be the ideal parameters to measure any e-governance outcomes .They will be asked to critique and redefine proposed e-governance readiness framework so that missing link between e-governance readiness and transformative outcomes can be eventually determined.

IT policymakers, computer engineers, social scientists and cyber lawyers will be specially invited to participate in discussions, apart from regular academics. This is because they are generally more aware of real time bottlenecks experienced during formulating and implementing e-governance policies and can provide useful insights in online discussions. Additionally, their experience and contacts will help in effective implementation of ideas proposed during the discussion.

An application oriented training program also requires an understanding of policy debates on existing e-governance practises at national level. Accordingly, participants will be asked to identify problems in existing e-governance practises (e.g. lack of judicial oversight to monitor

actions of government in e-governance, whether laws and policies for e-governance are reasonable or not, how poorly maintained government websites contributes to lack of transparency and accountability) and will also be tested on their consequent actions (e.g. whether they actually lodge a complaint against relevant cyber tribunal or provide feedback to government through various means).

Information collected by participants in this stage may be useful for further interventions. For example, the fact that government engineers are not properly trained in ethics of privacy should explain poor quality of data security practises. Accordingly, participants of this interactive course can advocate for e-governance policies requiring various state DIT's(Department of Information Technology) or their concerned PPP's (Public Private Partnership) to suitably train their engineers as well as provide them incentives for safeguarding user privacy.

(c) MONITORING DELIVERY OF COURSE:

The course should be continuously updated to keep pace with rapidly changing nature of e-governance. It should test user's understanding and learning outcomes through assignments, tests and competitions like debating, group discussion, quiz, mooting, JINDAL -ELP COASE BRIEF COMPETITION etc .Apart from participant feedback, course delivery should also be evaluated on technological parameters (quality of service like good audio/video, functionality of high speed internet etc.)

(d) ACTION PLAN FORMULATION:

Virtual community meetings or physical group meetings of around 1hr each can be designed starting from 5th week to collectively deliberate on problems, brainstorm possible solutions

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and formulate suitable action plans, based on issues identified by the participants. An effort should be made to synchronise these plans with the National E-Governance Plan.

(e)   ACTION PLAN IMPLEMENTATION:

Once an action plan is formulated, all the available stakeholders and resources should be mobilized to implement it. Tools like online advocacy through social network, RTI, PIL's etc. and various fora like meetings with entrusted decision makers (government officials. policy makers) are strategically used to push pertinent demands for attaining desired e-governance outcomes.

(f)   OUTCOME MEASUREMENT:

Conformance to proposed framework on e-readiness->

Assess whether governments are designing policies which are synchronised to proposed framework on e-governance readiness and as mentioned in National E-Governance Plan based on participant survey and feedback.

Change in online user behaviour ->

* Increased alertness

* Increased number of feedback (or even complaints) and eventual evolution of framework and parameters for determining transformative outcomes for e-governance.

* Increased participation in community mobilization activities.

(g)   IMPACT:

* Better e- governance with emphasis on efficacy and innovation.

- Proportional, desirable balance between human rights like online privacy and opportunities offered by digital economy at national level.

- Empowerment of individuals in the online community at national level.

(h) MONITORING, EVALUATION and FEEDBACK:

Analysis of existing strategies to learn valuable lessons that contribute to more effective further actions at national level .This is important because it is necessary to combine creativity with lessons learnt as it might help us to proactively tackle potential pitfalls.

The proposed theory of change is based on certain assumptions- enrolled users will actually stay committed for atleast one year, change in behaviour of users is only due to active participation in course, technology facilities like high speed internet connection will not fail anytime, the media of e-governance i.e. internet is a global public good whose governance can be effectively influenced by national governments etc. These might not always hold true and expected outcomes might be very different. Still, the study firmly asserts that the proposed theory of change can be a viable way forward for promoting a more impactful and informed dialogue on transformative nature of e-governance services within online user community which will allow evolution of a framework for defining, attaining and monitoring parameters to measure e-governance outcomes. This will eventually help in determining the missing link between e-governance readiness and desired e-governance outcomes in India.

Appendix

1.   State Government Website Audit and Review Questionnaire.

A.   <u>Information presentation and dissemination</u>

1.   Existence of a website.

2.   Effective utilization of space in web layout leading to its aesthetic appeal.

3.   Existence of a separate e-government section and About Us section.

4.   Sources of archived information (laws, policy documents, priorities, etc.)

5.   News and/or updates on government policies.

6.   Existence of IT Secretary, CIO (Chief Information Officer) or similar other position to manage state cross-agency e-government programmes/projects.

7.   Information concerning government officials responsible for the provision of specific online services/queries.

8.   Personal account/profile of citizens, with the objective of enhancing dialogue between government and citizens.

9.   Information to citizens about the usage of the website (Accessibility Statement).

10.   Symbols, graphics and icons are easy to use and understand.

11.   Interactive elements (like menu in XHTML) are recognisable.

12.   Last date of update is visible.

B.   <u>Navigation and Usability</u>

1.   Keyword based Search feature is comprehensive and precise and server is up.

2.   Wordings in hyperlinks and controls are clear and informative.

3. Existence of hyperlink policy.

4. Menu categories immediately expose or describe their sub categories.

5. 'How to use website' policy.

6. "Contact us" feature with appropriate e-mail.

7. Audio and video features.

8. Multiple languages availability (at least English, Hindi and Marathi).

9. Use of wireless technology to send messages to mobile phones or devices.

10. Security (secure link) feature available/indicated

11. Electronic signature feature.

12. Online payment by credit, debit, or other card methods.

13. E-mail sign-up option, either as a formal list-serv or simply for news items.

14. Existence of features like screen-readers to enable access for people with disabilities.

C. Trust and Online Service Delivery Capability

1. Availability of privacy and security policies on website.

2. Website helps users to avoid and recover from their own errors.

3. Site functionality provides clear feedback in response to users actions.

4. One-stop-window for all relevant online services.

5. Downloadable/printable forms and availability of online forms.

6. Updates with respect to job opportunities.

7. Facilities for Online transactions.

8. Timely e-mail alerts, reminders and notifications about different process.

9. Use of social media and/or RSS feeds for e-participation by providing timely feeds.

10. Specific information with regards to set turnaround time for government to respond to submitted forms/e-mails.

D. Value Addition.

  1. Specific vision and mission statement with regards to e-governance

  2. Essential content and function is available on website and is given priority.

  3. Explicit conformance to technical standards stated under GIGW (Guidelines for Indian Government websites) and other open standards (e.g. those notified by W3 schools and demonstrated by logo on the website).

  4. Suitable web analytics like number of views etc. are collected and displayed.

  5. Use of disruptive technologies in SMAC (social media, mobility, analytics and cloud)

  6. Information about relevant amount spent on website development and other e-governance activities, sources of funding and rupee saved per e- transaction on website.

  E. Citizen participation.

  1. Existence of E-participation policy and/or mission statement.

  2. Calendar listings and notifications about upcoming e-participation activities.

  3. Archived information about e-participation activities.

  4. Specific off-line initiatives, programs launched for better online citizen participation.

  5. Use of E-participation tools to obtain public opinion (polls, surveys, bulletin

boards, chat room, blogs, web casting, and discussion forums, social media etc.)

6. Facilities for accepting citizen feedback on the strategy, policies and e-services.

7. Provision for publishing the results of citizen feedback.

8. Archive on responses by government to citizen's questions, queries and inputs.

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