

An Integrated Approach to Design an EAF for the CCS of ICDS in India

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Abstract: E-government is getting a positive thrust in view of 'Digital India Project' initiatives by the current government in India. At present, information and communication technology (ICT) has become an essential prerequisite in all government's service delivery mechanisms and the idea of governance becomes 24x7 phenomenon. E-governance tools facilitate citizens an efficient, transparent, flexible and comprehensive service delivery platform. The success of any CCS (Citizen Centric System) is now largely dependent on the implementation of an integrated EAF or web based service delivery model specifically. New technologies influenced the innovations in governance at large scale. The ICDS (Integrated Child Development Services/Schemes) is a very diverse program implemented throughout the country with some specified goals regarding child/woman welfare. At present almost every state of India implements the different programs of ICDS. There are two important instigations of this research paper, first is to study and analyze all short comings of the current and previous works regarding e-governance initiatives taken in implementation of service delivery process in CCS of ICDS throughout the country and second is to explore and outline/design an effective integrated EAF or a web based service delivery model (WBSDM) for the CCS of ICDS in India.

Keywords: E-Governance, E-Governance Tools, CCS, ICDS, EAF, Web Quality Characteristics.

I. Introduction

In a developing country like India the transformation of simple governance into the e-governance is very much essential and growth oriented activity. In this context there are many initiatives taken by the Indian government in its different departments to provide e-governance to its citizen. Electronic governance will be the integral part of life in near future. All the government departments are shifting their working methodology towards electronic governance. ICDS project is one of the biggest and important departments after railway in India in terms of human resource involvement and utility towards society. In present scenario all the states of India are initiating their means of e governance in this particular program via some projects or some kind of EAF or web based service delivery model. All states are facilitating ICDS services to its natives. This paper is written to analyze the current and previous works regarding e governance initiatives in the ICDS program execution and to propose an approach to design an integrated EAF or web based service delivery model for the CCS of ICDS for the whole country. This paper is structured as follows. Related literatures is presented in section 2 which includes introduction of ICDS program, E-governance definitions and tools, Web quality characteristics, Page Ranking and EAF in brief. In section 3 all the related works in context of e governance initiatives in ICDS is presented like MCTS [8], e-Mamta [9], ChildNet [10] and individual state web portals. Section 4 deals with critical analysis of all previous works and assessment of the quality and scope of future e governance work in ICDS. Section 5 is written to list the result of section 4 which includes listing of positive and negative trends of all e governance initiatives in ICDS. In section 6 an integrated approach to resolve all negative trends via EAF[5] or web based service delivery model is presented. Finally section 7 shows some of our conclusions and proposed future works.

II. Related Literature

2.1 ICDS

The ICDS (Integrated Child Development Services/Schemes) [1] is a program in execution throughout the country with its stakeholders as child/woman .To ensure that all young children from all sections of society have access to their basic rights, the integrated child development services scheme was launched on 2nd October, 1975(5th five year plan) in pursuance of the national policy. Realization of e-governance in ICDS can be a potential solution to some basic problems iterated in the current CCS [2] (Citizen Centric System-Systems designed to facilitates citizens of country for getting government services without any delay with transparency) of ICDS. Some states have well equipped Web based Service Delivery Model to facilitate services of ICDS to its social groups.ICDS is a nationwide program under the governance/guidance of central ministry; hence it should be the prime target of Digital India project.

Today in India, about 2 million Aanganwadi workers are reaching out to a population of 70 million women, children and sick people, helping them stay healthy. Aanganwadi workers are the most important and essential link of Indian health care. The main beneficiaries of the program was aimed to be the girl child up to her adolescence, all children below 6 years of age, pregnant and lactating mothers. The gender promotion of the girl child by trying to bring her at par with the male child is a key component of the scheme. Majority of children in India have underprivileged childhoods starting from birth. The infant mortality rate of Indian children is 44 and the less than five mortality rate is 93 and 25 nutritional, immunization and educational deficiencies of children in India. Figures for India are substantially worse than the developing country average. Given its effectiveness over the last few decades, Government of India has committed towards ensuring universal availability of the program. The concept of providing a package of services to children below 6 years of age and pregnant and nursing mothers is based primarily on the consideration that the overall impact will be much larger if the different services develop in an integrated manner as the efficiency of a particular service depends upon the support it receives from related services. These services are provided by Aanganwadi Worker (AWW) and Aanganwadi Helper (AWH) with Auxiliary Nurse Mid-wife (ANM), Medical Officer (MO) and Accredited Social Health Activist (ASHA) of Ministry of Health and Family Welfare.

ICDS environment

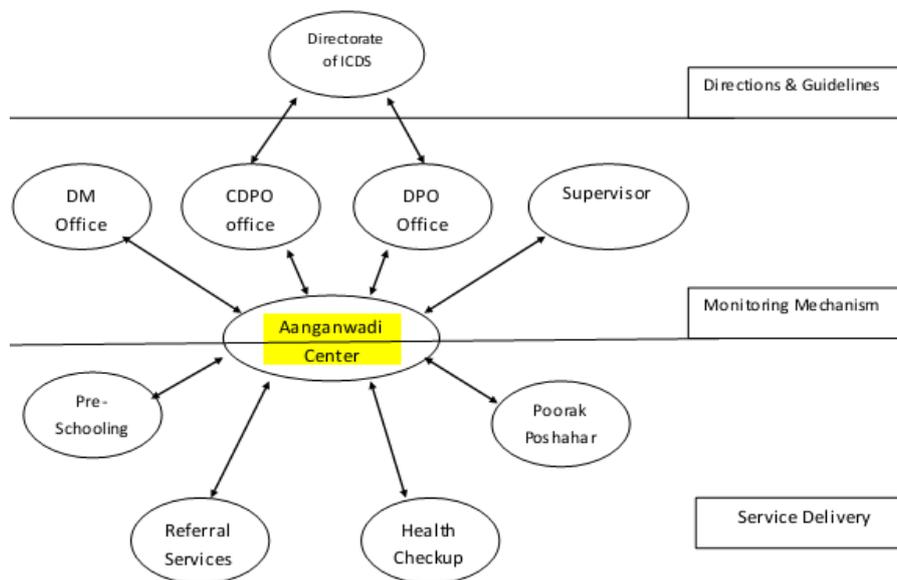


Figure-1: ICDS environments

CDS-Services are Immunization, Supplementary nutrition, Health checkup, Referral services, Pre-school non formal education, and Nutrition information.

2.2 E-Governance

E-governance may be defined as the delivery of the government services and information to the public using electronic means [3]. In other words definition may be “E-Governance means Innovation in Management Quality in customer oriented services deliver at lower cost with best effective and efficient way by using : $E = M C^3$ Where $E = e$ -Governance, $M =$ Mass (people), 1st $C =$ Computers, 2nd $C =$ Connectivity, 3rd $C =$ Content/ Information.[4]

2.3 Web Quality Characteristics

The quality in use model for web portals proposed in this study are specified below, where all the definitions of the characteristics and sub-characteristics of the model have been defined. The quality assessment characteristics [11] for web portals can be listed as-

1. Usability: The extent to which a web portal can be used by specific users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. For example **Ease of Use and scheduled Updation.**

2. Safety: The degree, to which the web portal does not, under specified conditions, lead to a state in which the personal security of its users is endangered and economic damage is caused.

3. Flexibility: the degree to which the quality in use requirements for web portals can be achieved in different contexts of use and for as many users as possible. Flexibility can be achieved by adapting the web portal to additional user groups or cultures. Flexibility enables portals to consider circumstances, opportunities and individual preferences. Personalization: the degree the portal to suit their specific preferences and needs. For example- **Online transaction support and interaction capability.**

4. PageRank-

PageRank [12] is one of the methods Google uses to determine a page's relevance or importance. In short PageRank is a "vote" •, by all the other pages on the Web, about how important a page is. A link to a page counts as a vote of support. If there's no link there's no support (but it's only an abstention from voting rather than a vote against the page). Quoting from the original Google paper, PageRank is defined like this:

We assume page A has pages $T_1 \dots T_n$ which point to it (i.e., are citations). The parameter d is a damping factor which can be set between 0 and 1. We usually set d to 0.85. There are more details about d in the next section. Also $C(A)$ is defined as the number of links going out of page A. The PageRank of a page A is given as follows:

$$PR(A) = (1-d) + d (PR(T_1)/C(T_1) + \dots + PR(T_n)/C(T_n))$$

Note that the PageRanks form a probability distribution over web pages, so the sum of all web pages/ PageRanks will be one.

2.4 EAF

An Enterprise Architecture Framework is designed to assist with the implementation and utilization of Enterprise Architecture in a variety of ways. In context of developing any web based service model there should be very clear outlines regarding focused organization, enterprise its architecture and overall framework.

Some Basic Definitions [5]

Architecture : Zachman defines architecture as a distinct set of producible artifacts or representations that describe an object so that it can be developed and produced to tangible, quality-based requirements and standards, and also so that it can be maintained throughout the lifecycle of the object; i.e., from inception to decommission.

Enterprise Architecture: Although there is no single agreed definition of EA, Gartner defines EA as: "a set of business processes that help an organization transform its business vision and mission into effective enterprise-wide change through a clear understanding of its current (as-is) state and progressing towards attaining a better future (to-be) state". In other words EA as a knowledge base used to provide a blueprint of the current state of an organization that can be used to support decision-making in the development of strategy regarding the future state of an organization.

Framework: The term framework is a: "logical structure for classifying and organizing complex information".

Enterprise Architecture Framework (EAF): An EAF comprises a set of models, principles, and methods that are used to implement EA. The framework provides a means to communicate information about architectural artifacts, their relationships to each other, and to their stakeholders using a common vocabulary.

While exploring various feasible architectural frameworks for government portal, it is observed that there is a need for a paradigm shift from 'Isolated Approach' of individual government departments to a 'Integrated Approach' comprising all the collaborative departments. This is possible because despite the isolated approach, the government departments have a number of things in common like standard procedures, work practices, rules and regulations. While designing a common enterprise architecture framework(EAF), it is very important to identify the design considerations. Some of the design considerations [6] identified are Scalability, Security, Manageability, Application Performance Management and Service Level Agreement ,Reusability , Interoperability

The portal should be comprehensive, ubiquitous, transparent, easily accessible and interoperable also[7].The functionalities [6] of the integrated EAF should lies in the categories of : Informational Services ,Transactional Services, Social Networking Services, Push Services ,Management Information System (MIS), Usability Perspective Features ,Government Service Gateway

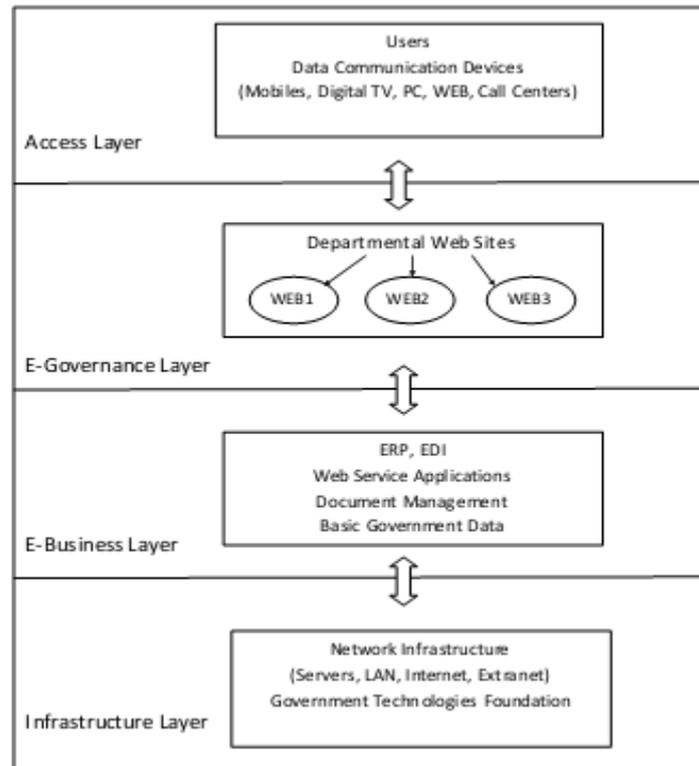


Figure 2: An integrated EAF for government services

III. Related works

Projects like MCTS [8], e-Mamta [9], ChildNet [10] are working in this context.

3.1 MCTS

The broad objectives of the program through the software is to reduce infant mortality rate (IMR), to improve the nutritional level of the child, to ensure completion of immunization in children by tracking the proper growth of the individual child, and to reduce mother mortality rate (MMR) and MCTS reduce total fertility rate (TFR). It is an innovative web-based application to facilitate and monitor service delivery as well as establish a two way communication between service providers and beneficiaries.

3.2 e-Mamta

As a major initiative, the Health and Family Welfare Department of the Government of Gujarat, has introduced a name based mother and child tracking information management system called "e-Mamta", in collaboration with NIC, Gujarat.

3.3 Child Net

The System is designed to address Child Vulnerability Issues like Abuse and Violence, child Tracking, Child Labor, child in Conflict with Law, Child Marriage, Child Sexual Abuse, Child with-out Parental Care, Street Children (without Shelter), Disabilities, Health issues, Drug Abuse, Gender bias (Girl Child), HIV-AIDS, Missing Children.

3.3 Other works that belongs to practices of E-governance in ICDS -

Mostly all states of India have some means of web service implementation related with ICDS working. Some states are very active in implementation while some are very ignorant in this aspect.

IV. Critical Analysis of Related works

In this section there is a detailed analysis (shown in table) of different e governance initiatives regarding the EAF for CCS of ICDS on the basis of web quality characteristics (Section 1.3).

S.No	Name of State	Address of Web Portal	EAF/Web Portal Quality Assessment Characteristics[11]						Total (15)
			Importance		Usability		Flexibility		
			Page Ranking [12,13] (x/10)	Hit Counter (1/0)	Regular Updation (1/0)	Ease of Use (1/0)	Inter Departmental functionality (1/0)	User Interaction (1/0)	
1	Andhra Pradesh	wdcw.ap.nic.in	3	0	1	1	0	0	3
2	Arunachal Pradesh	arunachalswcd.gov.in	3	0	0	0	0	0	3
3	Assam	socialwelfareassam.com	2	0	0	1	0	0	3
4	Bihar	icdsbih.gov.in	3	0	1	1	0	1	6
5	Chhattisgarh	NA	NA	NA	NA	NA	NA	NA	NA
6	Gujarat	wcd.gujarat.gov.in	4	70839/1	1	1	0	1	8
7	Haryana	wcdhry.gov.in	0	0	0	0	0	0	0
8	Himachal Pradesh	himachal.gov.in	0	42592/1	1	1	0	0	3
9	Jammu & Kashmir	jksocialwelfare.nic.in	4	22807/1	1	1	0	0	7
10	Jharkhand	socialwelfarejhar.com	0	0	1	1	0	0	2
11	Karnataka	dwcdkar.gov.in	4	42147/1	1	1	0	0	7
12	Kerala	old.kerala.gov.in	0	0	0	0	0	0	0
13	Madhya Pradesh	mpwcd.nic.in	4	842627/1	1	1	1	0	8
14	Maharashtra	NA	NA	NA	NA	NA	NA	NA	NA
15	Manipur	socialwelfaremanipur.nic.in	0	0	0	1	0	0	1
16	Meghalaya	megsocialwelfare.gov.in	3	0	1	1	0	0	5
17	Mizoram	socialwelfare.mizoram.gov.in	2	0	1	1	0	1	5
18	Nagaland	nagalnd.nic.in	4	0	0	0	0	0	4
19	Odisha	wcdodisha.gov.in	0	0	1	1	0	0	2
20	Punjab	psocialsecurity.gov.in	4	0	0	1	0	0	5
21	Rajasthan	wcd.rajasthan.gov.in	4	0	1	1	0	1	7
22	Sikkim	sikkimsocialwelfare.in	0	0	1	1	0	0	2
23	Tamil Nadu	icds.tn.nic.in	4	0	1	1	0	0	6
24	Telangana	wcdsc.tg.nic.in	0	13847/1	1	1	0	0	3
25	Tripura	tripurawelfare.nic.in	4	621233/1	1	1	0	1	8
26	Uttar Pradesh	icdsupweb.org	3	0	1	1	0	0	5
27	Uttarakhand	wcd.uk.gov.in	4	198917/1	1	1	0	0	7
28	West Bengal	wbwcdsw.gov.in	4	0	0	1	0	0	5
29	Andaman & Nicobar	NA	NA	NA	NA	NA	NA	NA	NA
30	Chandigarh	NA	NA	NA	NA	NA	NA	NA	NA
31	Dadra and Nagar	NA	NA	NA	NA	NA	NA	NA	NA
32	Daman and Diu	NA	NA	NA	NA	NA	NA	NA	NA
33	Lakshadweep	lakshadweep.nic.in	4	0	0	1	0	0	5
34	Delhi (NCT)	wcd.dl.in	3	0	1	1	0	0	5
35	Puducherry	wcd.puducherry.gov.in	0	0	0	1	0	0	1

V. Result of Analysis

From the analysis of quality characteristics table following results can be listed-

Negative Trends-

1. Some states do not have a web interface to execute the ICDS services.
2. User interactions on existing web portals are negligible.
3. Most of the current portals are not following the primary web quality characteristics.
4. Cross departmental activities are missing in almost all the web interfaces.
5. Lack of integrated approach in implementing ICDS program via EAF/web based service delivery model.
6. PageRank and Hit counter performance of all the existing web portals are below average.
7. Regular Updation of web portals is a major concern.

VI. Proposed Approach to tackle negative trends

Integrated EAF /web based service delivery model specifically for the ICDS programs could be the best relevant solution to the all negative trends identified in the analysis of all related previous works.

In the proposed approach –

1. Every Indian state will have their individual web interface regarding ICDS embedded in the integrated EAF.

2. All individual users will have a way to interact and manage their own ICDS account strengthening the CCS.
3. Design of Integrated EAF will address the all desirable web quality characteristics accepted universally.
4. Health department initiatives can be embedded in proposed EAF.

Expected Outcome:

1. An integrated EAF for the CCS of ICDS in India.
2. Application software tools for language interpretation to cover all the states of India..
3. Application software tools for mobile telecommunication.
4. An integrated data base of its beneficiaries (Infants, children, women).
5. Facility of automated Case generation scenarios for policy making.

Proposed approach will also provide a way –

1. To register new beneficiaries and to know current state/previous history of health of beneficiaries.
2. To solve queries of beneficiaries via mobile communication innovation.
3. Tools to monitor the ICDS program.
4. To cover all the areas of country irrespective of their language.
5. To manage ICDS management information system and to support policy makers via case generation.

The detailed environment of proposed integrated EAF can be seen in figure 3.

It will have **3 layer architecture** for central level/ state level, district level and village level. At every level there will be a specific interface facilitating monitoring, service delivery and mobile technology involvement.

Layer 1 involves an integrated web portal for central government to distribute guidelines, directions and government orders related to the ICDS to the states head quarters. It will also have a provision to monitor all the activities of ICDS throughout the country. The proposed system will have a unique utility to generate case studies for the ICDS to frame new policies for its beneficiaries.

Layer 2 will involve district level interfaces. The interfaces will facilitate district level monitoring, MIS generation and administrative procedures accomplishment. Uniqueness of this layer is development of some software tools to monitor events of corruption.

Layer 3 will be designed to cover actual service delivery mechanisms for the services of ICDS. Sub activities of this level will be development of AWC level interface, Establishment of call centers and training for innovative working methodology.

Existing Service Delivery Structure of ICDS

Proposed Integrated EAF Aspects

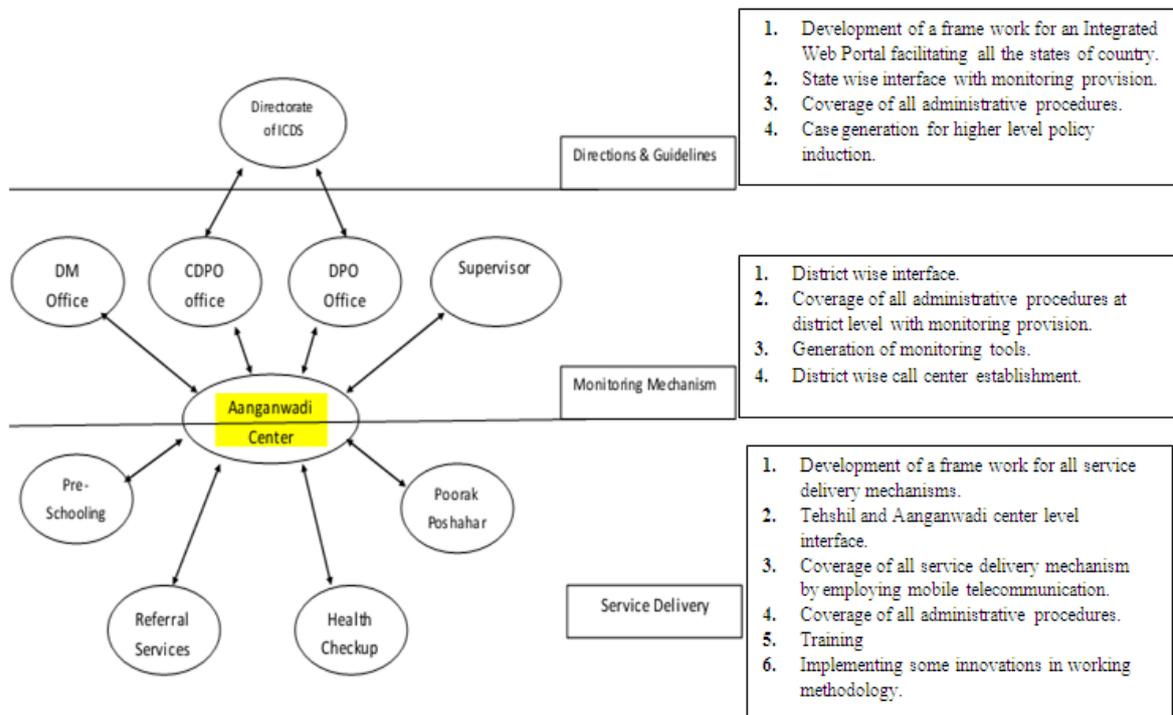


Figure-3 - Proposed integrated EAF to support CCS of ICDS

VII. Conclusion And Future Scope

This research work is based on the study of all online existing works in context of ICDS program execution at present. The paper presents the result of analysis performed to assess (based on web quality characteristics) the quality and utility of all the works related with the execution of web based service delivery of ICDS program. Analysis metrics shows lots of negative trends. It is believed that proposed EAF for ICDS will resolve all the negative trends identified in detailed analysis. However at implementation level lots of issues to be addressed.

References

- [1]. Gupta A., Gupta S.K., Baridalyne N., "ICDS: A journey of 37 years", Indian Journal of Community Health, Vol. 25, Jan-Mar 2013
- [2]. Bhudeb Charavarti, M.Venugopal, "Citizen Centric Service Delivery through E- government Portal-Present scenario in India", White Paper NiSG, 2008.
- [3]. E-Governance: <http://www.iadb.org/ict4dev/Governance.html>
- [4]. Marawar, T. Kale, S. Araspure, K. "E Governance": IEEE Data Storage and Data Engineering (DSDE)", 2010 International Conference on : 9-10 Feb. 2010 Dept. of Computer . Technology. RTM Nagpur Univ.Nagpur, India.
- [5]. Brian H. Cameron and Eric McMillan "Analyzing the Current Trends in Enterprise Architecture Frameworks " Journal of Enterprise Architecture – February 2013
- [6]. Bhudeb Chakravarti, Senior Member IEEE and Vasudeva Varma, Member, IEEE "An Enterprise Architecture Framework for Building Service Oriented e-Governance Portal"
- [7]. Zhiyuan Fang, "E-Government in Digital Era: Concept, Practice, and Development", International Journal of The Computer, The Internet and Management, Vol. 10, No.2, 2002, pp 1-22.
- [8]. MCTS: informatics.nic.in April 2012
- [9]. E-Mamta: informatics.nic.in April 2011
- [10]. Keyur Dhaky , Mehernosh Bulsara "Software for Tracking Vulnerable Children " 2012 IEEE Global Humanitarian Technology Conference
- [11]. Mayte Herrera, M^a Ángeles Moraga, Ismael Caballero and Coral Calero, "Quality in Use Model for Web Portals (QiUWeP)" Alarcos Research Group, Department of Technologies and Information Systems University of Castilla – La Mancha , Spain.
- [12]. The Google PageRank Algorithm and How It Works Copyright Ian Rogers, 2002
- [13]. <http://www.instantpagerankchecker.com/>