Information Technology & its role in the society—A case study of two southern States of India

Author's Name : Dr. (Ms.) Ch. Radhakumari, Ph.D
Institution Affiliation : Sri Satya Sai Institute of Higher Learning

Abstract

In the fast changing competitive environment the mind set of citizens is changing equally fast. Citizens seek more convenience and freedom from cumbersome procedures. Under such scenario, decision-makers in government are incorporating Information and communication Technology, to meet the aspirations of the citizens with regard to service delivery. This has resulted in IT revolution leading to governance revolution giving birth to Electronic governance.

Various governments are searching for different ways to bring about effective electronic governance by investing huge sums of money in Information and Communication Technology (ICT). Governments are Incorporating ICT in governance for delivering government services to the convenience and comfort of citizens. A field study was conducted during June 2004 in two Southern States of India i.e. Andhra Pradesh and Kerala, for making a comparative study of two models of e-governance under implementation. For the purpose of the study, the State Capitals and one district each of comparable nature were selected. The results of the study highlighted that incorporation of Information Technology in governance has contributed to the transformation of government from the one which was' procedure and power centered'[1] to' citizen & service centered' one.

Key words: Information & Communication Technology; E-governance; On-line services; Societal application; citizen & service centered, e-services, FRIENDS.

1. Introduction

In the fast changing competitive environment, the mind set of citizens is changing equally fast. People seek more convenience, lower cost and time expenditures and freedom from cumbersome and problematic official procedures.

As citizens of the state, people are becoming more conscious of their rights. The capacity of citizens is also widening in assessing and accepting new mechanisms that deliver them the maximum benefit. The breath taking pace of technological change is transforming every institution. Human knowledge is doubling every five to seven years. These changes are causing staggering upheaval in the familiar systems including governance.

That "governance is too costly, too inefficient and too ineffective, too self-serving, too inconvenient and to insular" is a perception, firmly and widely held across the world. More and more people are becoming, less and less inclined, to be bullied by petty bureaucrats [1]. "Right now, right here" is the expectation.

1. Procedure and Power-centered:

It implies long procedures involved in government related activities that were traditionally performed by people representing government, who were only conscious of retaining the political power, irrespective of how much is done by them. People in solving their problems [2]. Public expects government services to be comparable with the best services available from the private sector in terms of quality, accuracy, timeliness and user-friendliness. They no longer tolerate delays, bureaucratic mistakes or excessively time-consuming difficult procedures.

Under such scenario, driven by Information and Communication Technologies (ICTs), decision-makers in government today are confronted with proposals for reinventing, reengineering, redesigning, downsizing or outsourcing the processes of their organizations. This has resulted in Information & Technological revolution and governance revolution. The net result is the birth of "Electronic Governance [6].

In this context, various governments are vying with each other in creating new and efficient models of electronic governance for taking the benefits of their administration to the doorstep of the citizens and to reduce the multiple point of contact between government and citizens [5, 7, 9, and 13].

2. Need and significance of the study

While governments all over the world are still experimenting with the methods and procedures that will improve the interface of citizens with the government, the governments of Andhra Pradesh and Kerala have taken a vital leap in providing its citizens with convenience and comfort in all their transactions with the government through one-stop services called as "eSeva" in Andhra Pradesh and "FRIENDS" (fast, reliable, instant, efficient network for disbursement of service) in Kerala [3, 4].

The concepts besides being new and exclusive in their implementation, involve huge sum of expenditure. A research study is necessary to identify and bring to the forefront, the functioning of eSeva and FRIENDS schemes, in their entirety. A study of this kind is also necessary to analyse, how far the huge investments made in incorporating the ICT in delivering the fruits of development to citizens, have fructified.

3. Objectives of the study

The e-governance projects, eSeva and FRIENDS have been introduced initially, in the capital cities of the respective states, to enhance the performance of public departments and increase their efficiency in delivering the services to match the expectations of the citizens. Now these projects are extended to 23 districts in Andhra Pradesh and 14 districts in Kerala [8,12]. In the light of the above background, the project was undertaken with the following objectives.

1. To make a comparative analysis of the projects in terms of the purpose of their implementation, functioning, services availability and features of the schemes.

2. To analyse the Hardware and Software architectures of the schemes independently and draw out a comparative picture to highlight their significant contribution.

3. To gauge the perception on the existing system of government services provided on-line, to determine their usage patterns.

4. To assess the general satisfaction levels of the citizens on the basis of factors like the infrastructure, Manpower, efficiency of the centers in their functioning, universal acceptability of the transactions etc.

5. To arrive at the possible views of citizens of both the states, on their expectations of e-services, given the current provision for services.

4. Data Sources

The study is based on primary data collection. Since the project is new in its application, no secondary researched data is available. Customers of the four selected areas constitute the source for the collection of information.

5. Scope of the study

1. Since the main aim of introducing the concept of e-governance is to render convenient and comfortable services to all the citizens, the study is restricted to analyzing the value of the services from the citizen's point of view.

2. Those citizens who are the customers at the center and who were willing to fill the questionnaires on their own constituted the subject matter of the study.

6. Methodology

For making a comparative analysis of both the states, one district each and the capital cities are selected. Accordingly, Anantapur district of the Rayalaseema region and Hyderabad, the state capital, for Andhra Pradesh and Kozhikode district of similar region and Tiruvanantapuram, the state capital, for Kerala, are chosen on random basis. A random sample of 100 customers was selected from each of the selected areas. Customers of eSeva in Andhra Pradesh and FRIENDS in Kerala belonged to various age groups ranging from less than 20 years, 20-30 years, 30-40 years, 40-50 years, and 50-60 years and above 65 years. A questionnaire was administered for collecting information from the sample customers [9, 10].

The questionnaire [Annex III] was divided into IV sections. Section I was aimed at personal information of the customers. Section II was designed to gauge the opinion of e-service customers on their perception on the whole issue of e-government/services provided by the government on-line or through internet. Section III was divided onto two divisions as Section III-A and Section III B. Section III A has been structured to assess citizen's views on the existing system of government services provided on-line or through the internet and to determine their usage patterns of the services provided.

Section III B was designed to determine the level of satisfaction from the users of on-line government services being provided.

Section IV was introduced to arrive at the possible expectations of the citizens of the two states, given the current level services.

7. Statistical Tools Used

A five point scale was used indicating -2 for absolutely disagree, -1 for disagree, 0 for not sure, 1 for agree and 2 for absolutely agree. Weighted average, standard deviation, variance and coefficient of variation were used.

8. E-governance projects:

E-seva of Andhra Pradesh and FRIENDS of Kerala Motive of the models: The States of Andhra Pradesh and Kerala have devoted themselves to leveraging the Information Technology to attain a position of leadership and excellence in the information age and to transform themselves into knowledge based societies.

Overview of the models:

These models are one of the e-governance initiatives of the Governments of the state, offering a wide spectrum of citizen-friendly services to save citizens the bother of running around various departments. They provide a one-stop venue for services of various state and central government departments and private businesses in an efficient, reliable, transparent and integrated manner through a chain of computerized Integrated Citizen Service Centers (ICSCs). These projects render service to citizens, through ICSCs and Internet.

Scope of the models:

These models, a new paradigm in citizen services, provide the facility of on-line transaction processing of various payments to government agencies and the issue of certificates needed by citizens and businesses. They connect the citizens to departments and agencies like the electricity, water, and telephone utilities, passport, Municipal Corporation, transport, tourism and health. At present there are 46 ICSCs across the state of Andhra Pradesh and 14 across the state of Kerala covering a more than 10 million. The citizens can access any of the more than 400 counters at any of the 46 ICSCs in the state of Andhra Pradesh, irrespective of where they reside.
Background of the models:

E-seva of Andhra Pradesh:

This Model has been implemented building upon the success of the pilot project, which was initially launched at one of the pilot site in December 1999. The 46 Integrated Citizen Service Centers have been set up on the PPP Model – Private Public Partnership, i.e. between the Government and Private sector as the partners. The Government provided the premises along with the furniture and the counter staff, while the private sector took the responsibility of designing and implementing the software, procuring and installing the hardware, networking and also have the responsibility of meeting all the recurring costs at the service centers on account of power, consumables, stationery, security, etc.

FRIENDS of Kerala:

FRIENDS is a Janaseva kendram, a citizen friendly service center. In order to ensure that a one-stop shop for payment of services for citizens, IT (Information Technology) incorporated, government related agencies called as FRIENDS centers were set up. The FRIENDS project has been implemented by the IT department, government of Kerala in collaboration with various departments like the Kerala State Electricity Board, Kerala Water

Authority, BSNL, Revenue department, Civil Supplies department, Motor vehicles department, universities and the other Local Bodies of the state. The entire technical support for the functioning of the FRIENDS model is provided by the center for development of Imaging Technology (C-DIT).

Salient Features:

E-seva of A.P

1. Provides real time on-line transactions.
2. ICSCs operate from 8.00 A.M. to 8.00 P.M. on all working days and are also open on Sundays and Second Saturdays from 9.00 A.M. to 3.00 P.M.
3. Automatic electronic queuing system and efficient transaction of business reduces waiting time.
4. Any service at any counter in any center.
5. Any service at any center at any place in the capital., resulting in saving of time and money to citizens
6. Location of ICSCs in all major areas of the capital.
7. Similar implementation of the Model at the District level connecting all the Major municipalities of the district, with the district head quarters as the central point, all over the state.

FRIENDS of Kerala: The unique features of the FRIENDS centres are:

1. FRIENDS Janasevanakendram is a one-stop Service Centre where remittances can be effected quickly and various other services received.
2. The Centre works from 9 am to 7 pm (in two shifts) on all days including Sundays. The Centre will be closed on other public holidays including Second Saturdays.
3. A computer controlled queue and token management system eliminates the queue and avoids long waiting time.
4. Help Desks for some departments such as Universities and Regional Transport Office have been set up, which would provide information on the remittances, fee details, examination details etc for University/s and License information,
5. Vehicle Tax (only private non-transport vehicles such as self-owned cars etc)
6. In areas which are considered remote from the purview of railways (that is the nearest railway station of railways booking counter being a minimum of one plus hours journey from the district headquarters) a railways booking counter is also located in the premises of FRIENDS. However, it must be pointed out here that this counter is exclusively a Railway counter and the space is provided to the railways.
7. Facility to record suggestions/complaints which will be reviewed on a regular basis for taking corrective action.

Services Available: E-services of A.P:

Acceptance of Utility Bills Payment, Registration and Issue of Certificates. (Vis-à-vis: Birth and Death Certificates), Permits and Licenses, Reservations (Road Transport), B2C Services. (Private telecom bills, sale of Cinema Tickets, etc.) and Other Services. (Sale of Passport forms, non- judicial stamps, etc.)

E-services of Kerala: FRIENDS centers are presently intended to function as per the principle of "collect and Remit" and "Receive and Forward" methods and offer the following services: Water charges, telephone bills, electricity charges, payments to civil supplies department, Revenue department, professional tax, local body in the form of land, building and property tax, Motor Vehicles department, post paid BSNL mobile collection etc.

Implementation:

Eseva of A.P

The e-governance project of A.P has been implemented on the basis of Build Own Operate and Transfer (BOOT) Model where in, the technology partners will provide the necessary hardware, software, connectivity and maintenance for the ICSC's. The same equipment will be transferred to the government after the completion of the contract period [5, 11].

The technology is based on 3-tier architecture. The transactions are performed on a real-time basis. The servers of different departments are connected to the Data Center, which in turn is connected to the ICSC's. Connectivity is provided through leased lines with Integrated Switched Digital Network (ISDN) as backup. Transactions conducted at the ICSC's are recorded directly on the server of the department concerned, after duly accrediting the same in the central server of the Data Center.

Each ICSC has 8-10 computerized manned counters with one PC, Printer and Bar-Code reader per counter to handle the services. The scalable architecture of the Model provides a strong opportunity to turn this platform as a one-stop for all G2C and B2C services, thus enhancing the convenience of the citizens considerably.

FRIENDS of Kerala: The e-governance project of Kerala is under implementation in fourteen districts of the state as one in each district covering the entire state. Each center in independent of each other and is not linked up to any other centers or the departments. There is no single back up data server. The project is run and managed entirely by the government. Each center is managed by a project officer" and a person is chosen from one of the government departments to manage the center.

The technology is based on single-tier architecture. Since there is no network connectivity between the departments and the FRIENDS centers the system still depends on the laborious manual method of updating the records in the individual departments using the scroll sent from the centers.

COST OF SETTING UP OF EACH CENTER BOTH IN A.P AND KERALA:
Building Cost of eSeva of A.P:

The PPP (Public Private Partnership) model was formulated in the manner that the civil infrastructure would be provided by the Public Body including the furniture, the Hardware and the software installation and maintenance would be taken up by the Private partners. The Municipal Administration, within the available Municipal Property, provided the space for each ICSC (Integrated Citizen Service Center). Then the building for the ICSC was taken up for construction at the cost of Rs. 6 lakhs each plus the furniture for Rs.2 lakhs, that rounds up the infrastructure cost to Rs. 8 lakhs for each ICSC. This PPP functioning model of eSeva of A.P has reduced the financial burden on the Government simultaneously leading to efficient implementation of the system.

Building cost of FRIENDS center of Kerala: Since the responsibility for implementing has been taken by the state government, the financial burden for implementation is totally accepted by the government. The technical cost of setting up each center has worked out to an average of Rs. 13.5 lakhs per center. This cost includes the cost of branded computer (all H.P), HP servers, Software for systems, servers including the back-up servers, printers, fax machines, fake note detectors, electronic and all proof safe for keeping money, initial stationery, furniture, wood work for terminals and counters, cabins for managers and other related items. [C-DIT]

Table-1:The cost of running, maintenance and the data center relating to eSeva & FRIENDS

Sl. No.	Particulars	Maintenance cost (Rs.)				Data center cost (Rs.)			
		Per Month		Per Annum		Per Month		Per Annum	
		A.P	Kerala	A.P	Kerala	A.P	Kerala	A.P	Kerala
1	Salaries of employees	35,000	Paid by the government	4,20,000	-----	20,000	------	2,40,000	-----
2	Statutory bill payment Stationery	5,000	--	60,000	-----	10,000	------	1,20,000	-----
3	Other expenses	1,000	----	12,000	------	1,000	-----	12,000	-----
4	Other expenses	1,000	35,714	12,000	4,28,570	------	35,714	-------	4,28,570
	Total	42,000	35,714	5,04,000	4,28,570	31,000	35,714	3,72,000	4,28,570

Source: Technical Engineers of CMS Ltd. – A private partner for eSeva project and C-DIT

Running and maintenance cost of each e-services center: Running costs of include Statutory Bill Payments (Telephones, ISDN, Electricity, etc.), Stationery (Receipts, Cut-sheets, etc.), other expenses (House-keeping, Diesel, Postal charges, etc.). Maintenance cost of center, include salaries, building and furniture maintenance etc. The table below gives a bird's eye view of the cost incurred for running and maintenance cost of e-services centers in both the states including the data center cost.

Cost recovery Procedure :

Every participating department is entered into an agreement, on a per transaction basis charge. The transactions are classified into different categories and the charge is levied on the respective department according to the category in which the department falls. The categorization is done on the basis of number of transactions that are to be generated, type of transaction, etc.

Table 2: Cost Recovery Procedure for private partners of eSeva of A.P

Sl. No.	Nature of the Transaction	Department	Cost per transaction (in Rs.)	
			A.P	Kerala
1.	Utility Bills	Payment of Telephone bills	5.00	6.00
		Payment of Electricity Bills	5.00	---
		Payment of Property tax	5.00	----
		Payment of Vehicle tax	5.00	----
		Filing of commercial tax returns*	5.00	----
2	Paper based work	Issue of Birth and Death Certificates	9.00	----
3	PVC	Issue of Licenses on PVC cards	63.00	----
4	Tickets	Reservation of Tickets (RTC)	9.00	----

Source: Technical Engineers of CMS Ltd. – A private partner for eSeva project and C-DIT
*Applicable only to state capital of A.P

Technical Setup: eSeva center of A.P:

The setup for providing the services depends mainly on the interconnectivity of all the ICSCs and the participating departments with the Data Center. The network bandwidth, which is the most important factor in the setup, has to be very carefully calculated keeping in view the expected load on the network for each ICSC or participating department. Every Data Center is equipped with a 2 MBPS (Mega Bytes Per Second) channelized E1 Leased Line with the facility have up to 32 channels of 64 KBPS (Kilo Bytes Per Second) each. Each of the channels is utilized to connect either the ICSC or a department, which houses a 64 KBPS Leased Circuit and a 64 KBPS ISDN (Integrated Switched Digital Network) BRI (Basic Rate Interface) Circuit as a backup line. More than one channel can be utilized to establish a multilink connection, making a 64 KBPS connection into a 128 KBPS connection and so on, depending upon the expected amount of data to be transferred. Also an emergency backup line of another 2 MBPS E1 ISDN PRI (Primary Rate Interface) Line with the setup similar to above 2 MBPS channelized E1 Leased Line to support any breakdown in the primary leased line connectivity.

Another backup feature of the uninterrupted service is the provision of an OFFLINE SERVER AT each ICSC. This offline server facilitates the transactions to be performed without the need for the customer to wait for the communication links to be restored. The transactions are recorded in the offline server and whenever the communication links are restored, the updating scripts are executed to update any pending transactions performed during the link failures, to the respective departmental servers. This type of setup enables

ICSC's to give uninterrupted and unparallel service to the citizen, drastically reducing the wait time.

Hardware and Software for eSeva of A.P:

With the communication links in place, now is the need for the main servers at the Data Center to be installed along with the Routers, which form the backbone for the entire setup. The routers used in the setup are the prescribed High End Cisco 3600 / 3700 series modular routers at the Data Center and Cisco 1700 series modular routers both at the ICSC and the department ends.

The servers basically perform the task of data processing between the departmental servers and the ICSC's. Every Data Center is provided with a Database server, an Application server and a Backup server. Oracle ® is used as the standard in all the servers. Oracle ® 9i Database and Oracle ® 9iAS are the software's installed in the database server and the application server respectively. The Backup server has both Oracle ® 9i Database and Oracle ® 9iAS. This server is again the backup feature within the setup, just in case any one or both of the main servers requires any maintenance or is subjected to any unexpected breakdown.

The database tables are so designed that there is scope for further enhancement of the application and with the addition of more tables, additional services can be added as and when required, without disturbing the original initial configuration. Materialized views, a feature of Oracle ® Database, are used for fast and accurate reports for the transactions, in accordance with the prescribed formats of the respective departments. Reports are required for reconciliation and consolidation of transactions at the ICSC's and the respective postings of the transactions in the departmental servers.

Finally, keeping in view the constant power failures, measures are taken for redundant power supply to be provided by installing UPS (Uninterrupted Power Supply) Systems at all the ICSC's including the Data Center. Generators are also provided to support the UPS Systems, in case of unexpected, major and long-time power failures.

In this way, every possible chance of interruption in the services is taken care of. After installations of the hardware and software, the ICSC are initially tested for consistency and accuracy on a trial-run basis for a day or two, by performing dummy transactions. If any discrepancies are noticed, corrections are made immediately with a view to providing a fault free setup.

Automatic electronic queuing system is also provided at all the ICSC's for generation of tokens, which enable the customers to obtain a token at the entrance of each ICSC and wait for his turn to complete his/her transaction. The token numbers are generated automatically at the reception, where the Computerized Queue Management System software is installed in the PC with a token printer, connected to the machine. When a computer operator completes any transaction, he/she presses a button provided near his/her counter, for the next customer. Then the next token number, which was already obtained by any one of the consumers, is displayed at the Main Display Unit along with the counter number, where the consumer has to proceed for the transaction. The Main Display Unit is installed at a location, from where it is visible to all the customers. Also a Counter Display Unit is placed at each counter, for easy location of the counter and the corresponding number. This type of setup formulates a smooth movement of customers in and out of the centers, eliminating the untidy and unorganized queues, generally seen at manual counters.

This sort of setup needs constant monitoring and regular maintenance. As there is lot of electronic gadgetry involved, failures are obvious. So, to avoid inconvenience, additional measures are also taken to keep fault tolerance and emergency spare equipment as a standby.

Entertainment utilities like TV with Cable connection, newspapers and magazines are provided for the comfort of the citizens visiting the centers so that they can idle their time until their turn comes for the transaction. Citizen comfort is the focal point in the setting up of this system and a lot of care is taken in providing comfort and convenience to the citizens. Suggestions from the citizens are regularly incorporated for making improvement to the existing level of comfort and citizen-friendly service.

Hardware and Software for FRIENDS project of Kerala : FRIENDS project differs from eSeva project both in Hardware and software architectures.

Hardware:

FRIENDS use server client architecture, consisting, a network of a powerful server and 10-20 clients. The server will hold the database and the computer terminals installed in each of the counters will have equal access to the database. All processing is done at the server. A printer is attached to each of the computer terminals. Receipts of the transactions in a particular counter will be printed in the printer attached to the terminal. The printer will use pre-printed stationery, so that the volume of online printing can be reduced. The details of transaction are saved in the server of FRIENDS centre and also on the back-up Server and also served in each of the computers. In addition to this, data of transactions are also saved on a DAT Tapes, which have a storage capacity of 8 GB. The transactions are saved department wise. On a daily basis a printout comprising of `scrolls' of the transaction of each department is generated and handed over to the designated `kadumbaserry unit". (Kadumanbassery unit is basically a Self Help Group set up for Women with the help of resources from the Central Government). The Primary function of this unit, with regard to FRIENDS is to collect the scrolls from the FRIENDS centers and take it to respective departments. The FRIENDS centers pay the unit a fee of Rs. 2/- odd per kilometer to transport the scrolls. The present mode of payment is Cash. Provisions have been incorporated in the software to accept payments by demand draft and credit cards.

Software:

FRIENDS Software is a customized package with a strong and effective database as the back end and an appropriate user-friendly front end to expedite transactions. The software uses ASP, Windows 2000 and SQL RDBMS. There is provision for adding up of modules and the easiness of operation even for a naïve user. Adequate provisions have been incorporated even at the user level to roll back the incorrect entries without affecting the database. Program is capable of checking redundancies and there by can avoid the duplication of records. Search and retrieval capability of the package also ensures the validity of claims and is also helpful in the identification and correction if some error occurs. Reports can be generated in any form, which is statutory with the various requirements of the MIS divisions of the participating departments.

Results of the Study: The results of the study are discussed under two separate heads as a) Comparison of Hardware and software architectures of eSeva of A.P and FRIENDS of Kerala b) Discussion on the primary data analysis.

a) Comparative analysis of the architectures of the projects: The main purpose of this study is to cross check whether the so-called citizen friendly services are giving what they are intended to. How far the governments are utilizing the IT for delivering better services besides looking after their comfort and convenience? The comparative analysis of the architectures highlights that the eSeva project is technically superior, with unquestionable integrity of accounts and a fool proof mechanism for ensuring flawless operations. In addition, the eSeva project of Andhra Pradesh accounts for all the aspects which claim to contribute to citizens comfort such as Basic utility payments at the convenience of the citizen, working during the hours when the citizens are free from their regular duties, real time transactions and instant updating of records against their payments for satisfying the customers, location of the centers within a short distance from their dwellings thereby eliminating the need to travel long distances and hence saving their time and money, any service at any counter in any center, any service at any center at any place, location of Integrated Citizen Service Centers in all major areas of the state ICSCs including the district head quarters and all the major municipalities of the districts with the service delivery being totally free of cost.

With only one center per district at the district head quarters FRIENDS project has to be geared up a lot to be brought on par with eSeva project. With the necessicity to meet the demand of increasing the network connectivity, FRIENDS project also must bear in mind the following facts. "Working time of the centers to be extended by a few hours more, to suit the working people's convenience. Efforts must be made to convert off-line transactions into on-line transactions. Offline transactions have their own set of problems. If the offline transactions are not updated in time due to some reason, then the bills generated for the next cycle are not accurate leading to a lot of inconvenience to the citizens, who, even after having paid the bills (in offline), are subjected to disconnection of services, merely due to delays in updating of the previous records. Updating of the offline records is also a tedious process, done, manually, thus eliminating the benefits of computerization. Moreover, as the transactions are done offline, they have to be saved in the servers of the respective centers and the reports are manually taken to the respective departments on paper. This type of arrangement with the autonomous manual labor is time consuming and not reliable. It also costs the exchequer some of the income. On-line transactions eliminate this problem and give instant reports to the respective departments in real time". Adoption of the model Andhra Pradesh besides not being required to supply manpower by the government, opportunity will be created to generate more jobs for talented, young and unemployed.

b) Discussion on the primary data analysis: The primary data collected was used to measure the perceptions of e-services customers about the government on-line services and their implications. Efforts were made to measure their perceptions about the nature and the existing facilities offered by the present e-services. Besides, attention was also drawn to the satisfaction and comfort levels of citizens with the e-services with reference to infrastructure, manpower, legal validity of e-certificates, security aspects, accessibility, efficiency, cost-saving aspect, technical knowledge etc. Finally, an attempt was made to measure the future expectations of the citizens with regard to the on-going e-services with special reference to two factors i.e. infrastructure and efficiency.

- The comparative weighted averages in table 1 (Annex 1) which are used for measuring the perceptions of e-service customers about government e-services, revealed that all the e-service customers of both the states have agreed that e-services a) provide easy access to pay the bill, b) cost-effective and time-saving method to access government services, d) bring about transparency in government functioning d) eliminates corruption by limiting direct interaction with either government personnel/middlemen (statements 1,

4, 5, 8, table 1, Annex I). However, the e-service customers of Kerala do not agree that these services represent easy access of govt. machinery to people (Statement 2), easy interaction between govt. and people (Statement 3), a mechanism to popularize govt. programmes hitherto not known to people (Statement 6), ensure equality of citizens (statement 7), while these views are accepted by their counterparts in A.P. Comparison of Co-efficient of Variation revealed that the responses of e-service customers of Kerala are more consistent for statements 1,4,5,6,8 of Table 1 (Annex I), as against their counterparts in Andhra Pradesh.

- The weighted averages as per table 2 (Annex I) highlighted that all the e-service customers of Kerala in common disagreed with all the statements from 9 to 14 in the table while their counterparts in A.P agree with them only with statements 9, 11,14 (Hyderabad) 9,11,13,14 (Anantapur). As far as consistency in responses is concerned, Kerala customers score higher grade, than that of A.P. (C.V being 0 for Trivendrum and very less for Kozhikode compared to both places of A.P). The e-service customers of both the states expressed their absolute agreement that very few people are aware about the existing e-services, implying more publicity is needed for the services in both the states. (Statement 15, tables 2, Annex I). The essence of the statements in the above table is that the e-customers of all four areas unanimously agree that introduction of e-services is not only for rich and literate or people with computer literacy or for people with credit or debit cards, but also is possible to be introduced even in rural areas.

- The study relating to the perceptions of e-service customers of the states highlighted that the e-service customers of both the states agree in general that the current e-services available is comprehensive, available at free of cost, information about services availability is clearly stated in the service centers, systems are user friendly even for a layman use and manual system is not easier compared to on-line services. (Statements 16, 17,18,19,21, Table 3, Annex I) services is not aimed at It should also be noticed from the study that the customers of e-services of Kerala do not agree that the e-service have reduced corruption in many ways and that the centers are equipped with fast and efficient equipment while the same point is agreeable to the e-service customers of A.P (statements 20, 22). However the responses of Kerala e-service customers are more consistent compared to the same of A.P. (C.V of Kerala < C.V of A.P, Annex I- Table 3)

<u>Measure of Satisfaction and Comfort levels of e-service customers</u>:

Infrastructure: The weighted average score for the statements 24,26,30 in table 4, (Annex 1 proved that the e-service customers of both the states are satisfied with the user friendly systems at the centers, multi-lingual facilities of the systems and the convenient working schedule of the centers. While the e-customers of Anantapur appear to be totally satisfied(W.A positive for all Statements) by absolutely agreeing with all the statements in the above table, the customers of Hyderabad, the capital city of A.P do not agree that the systems are fast and efficient (State. 23, table 4). This is because the city people are exposed to more efficient systems than the ones at the e-services centers.

The situation in the state of Kerala throws light on the issue that while the e-services customers of the capital city of Kerala, Trivendrum agree with all the statements in table 4 (W.A positive) and appear to be satisfied with the infrastructure facilities of their centers. On the other hand the e-service customers of the Kozhikode, expressed their disagreement with the statements 25, 27, 28 and 29 (table 4, Annex I). This testifies the fact that the customers at the district level in Kerala are not yet exposed to systems with screen touch

facility, with comfortable seating arrangement at the centers, guide posts indicating the physical location of the centers and sufficient number of counters at the centers. The general comparison of the C.V reveals that the responses of e-service customers of the capital city of Kerala are more consistent. (C.V. least). (Annex I- Table 4)

Manpower: The study also highlighted through the results in table 5, (Annex I) that the manpower aspect of the centers in both the states pleased the e-service customers, where they agree in common that all centers are manned (state. 31); the personnel manning the centers are smart fully conversant with issues (32), with good communication skill in English and the respective local language (State. 33), with helping attitude towards customers (State. 34). Besides it is noteworthy that customers of A.P. are aware of the existence of unmanned kiosks which are functioning at Karnataka (state. 35, W.A positive), while the situation is not the same with Kerala customers at the district level (State. 35, W.A negative), while the same at the city level is different and positive, indicating that the customers at the district level at Kerala need greater exposure to not only more services but also to more facilities.

However, there is greater consistency in the responses of Kerala customers than their counterparts in A.P. (C.V < C.V. of A.P. Annex I- Table 5)

Legal validity of the receipt: The study has brought to light the fact that all the customers of e-services in both the states trust the legal validity and universal applicability of the receipts obtained at the centers, with greater consistency in the responses of city customers in Kerala. (C.V. least) (W.A positive for statement 36, Annex I- Table 6)

Security: The responses of the customers of e-services of A.P (W.A positive for State. 37, 38, 39) indicated that the network connectivity is widespread in the State of A.P., making the access of e- services universal at any center, by any customer, irrespective of where they reside. These customers are also aware that use of credit cards for making payments at the e-centers has been safe and the systems also are capacitated for finger-print biometrics, which is not known to their counterparts of Kerala (W.A. zero). However in general, the customers of e-services of all the four areas have expressed that no misuse of any cash payment has been experienced and all the payments made are immediately registered (W.A. positive for all). (Annex I- Table 7)

Accessibility: The results depicted in table 8 (Annex I) indicate that the e-service customers of Kerala state in total do not agree that all services offered are accessible from any center and that all the cities and town in the state have network connectivity. (W.A negative for State. 41, 42) The customers of A.P in general accept all the statements (W.A. positive for state 40, 41, and 42) and agree that the network connectivity is good and the e-services are aimed at universally accessibility. Here too, the consistency of the responses is more in Kerala customers than that of A.P (C.V. least). (Annex I- Table 8)

Efficiency: All the e-service customers expressed the view that e-services are very efficient and fast with negligible response time taken by the system for processing the transactions, though they do not accept that the receipts are error-free (W.A. positive for state. 43, 44 and 46). Only the e-service customers of the capital city of A.P do not agree that there is periodic up dating of records. (W.A. negative for State. 45) the consistency is high among the responses of Kerala customers. (C.V. is less) (Annex I- Table 9)

Cost-saving aspect: All the e-service customers of both the States agree that the introduction of on-line services enabled them to reduce their time for a task by 75%, which has also resulted in reduction of bribes because of reduction in the number of middlemen, between government and citizens, with greater consistency in the responses by Kerala customers. (W.A positive for state. 47 and C.V. least for Kerala) (Annex I- Table 10)

Technical knowledge: E--service customers of Andhra Pradesh have more technical Awareness about the functioning of e-services (W.A. positive for state. 50-53) as against the customers of Kerala, who are neutral to acquisition of technical knowledge, as is revealed by the study. (W.A. either zero or negative) (Annex I- Table 11)

Willingness to pay for the services: Table 12 (Annex-I) proved that even if it meant paying some amount for the e-services, the customers of A.P State are willing (W.A positive for state. 54 and 55) while the responses of Kerala customers are neutral. (W.A negative and C. V.zero)

Overall Satisfaction: The e-service customers agree on the whole that with the introduction of these services, middlemen are eliminated (State. 57), past records are easily accessible (State 58) and have resulted in increased awareness among the public about the government programmes. (State. 59) (Annex I-table 13)

Future expectations of the e-service customers: The statement 61 to 66, tables 14 and 15, focus on the future anticipation of customers with regard to e-services. All the e-service customers agree that more services need to be added, only manned kiosks should be introduced to avoid confusion and for the services to be used even by laymen and that the systems should be multi-lingual to help the minority groups. They also agree that grievance redressal mechanism should be incorporated into the system, along with the facilities for regular up-gradation of the system, with sufficient backup for any expected and unexpected machinery breakdown. (Annex I- Table 14, 15)

Conclusion:

The hardware and software comparison revealed that the technical setup of e-services in the state of Andhra Pradesh is commendable, which is not only contributing to the achievement of the State's objective in taking the benefits of administration to the doorstep of citizens but also has kept in thought the future expansion plans that 'every citizen of the state has the right to share the benefits of administration'.

Therefore, on the technical front the state of Andhra Pradesh has proved to be far ahead, by incorporating the state-of-the-art infrastructure in providing the maximum benefits and comfort to the citizen, with free service delivery, less installation cost and good cost-recovery procedure. Application of PPP model as is followed in the state of A.P. in general increases the efficiency in service delivery, creates more job opportunities, aims at customers satisfaction, works for the constant improvement in the system as there will be a competitive spirit between government and private employees. This will enhance the working interests and skills of even government employees.

The results of the study indicated that incorporation IT in governance is serving the government in taking the fruits of development to the doorstep of citizens. Introduction of e-services have taken citizens closer to government by reducing the long chain of middlemen. Since the electronically delivered services are meeting the aspirations of all categories of

customers irrespective of factors like computer literacy, technical knowledge, literary skills etc, e-service customers of both the states have unanimously agreed that the usage of e-services/on-line services is more satisfying, convenient and comfortable than the manual system. E-service customers also agree that the concept of equality of citizens can be easily and quickly brought about, with the incorporation of IT in the administration process of government, ignoring the differences based on money, caste, age and knowledge and anticipate that these facilities will be extended so that the joy of enjoying the benefits can be experienced by all the citizens.

Further Scope of the Study: The set of factors framed by the author and their statistical analysis w.r.t. A.P and Kerala is analyzed using student's t test and conclusions are drawn accordingly. However, this work is considered for presentation in the next paper since inclusion of that discussion in the present paper will make the paper voluminous.

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ANNEXURE-I

Table 1: Perceptions of A.P. and Kerala e-service customers about the government e-services

			Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
Basis of measurement	Nature of the statement	Statement Number	W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
SECTION II A	Easy access to pay bills	1	1.52	39.997	1.39	50.76405	1.72	27.369	1.6	30.61862
Perception of citizen's on the issue of e-government- part I	Easy Access of Govt. machinery to people	2	1.34	49.749	0.79	123.1106	0.27	415.26	-0.71	-98.1782
	Easy interaction between govt. & people and promote people's participation in decision making	3	0.87	92.89	0.38	308.6473	0.29	387.97	-0.71	-98.1782
	cost effective and time saving ways to access govt. services	4	1.41	51.236	1.15	66.65091	1.7	28.211	1.6	30.61862
	Bringing about transparency in Govt. functioning	5	1	77.46	0.46	248.6637	1.71	27.795	1.6	30.61862
	popularizing Govt. programmes Hitherto not known to people	6	0.7	146.39	0.56	179.1419	0.09	1187.3	-0.71	-98.1782
	Ensuring equality of citizens	7	1.19	70.001	0.76	127.7333	0.51	224.41	-0.71	-102.139
	Eliminating corruption by limiting direct interaction with either govt. personnel or middle men	8	1.1	98.333	0.95	114.7079	1.71	26.536	1.6	30.61862

Table 2: Perceptions of A.P. and Kerala e-service customers about the implication of government e-services

Basis of measurement	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
SECTION II B	For the rich and the literate	9	-0.19	-776	-0.19	-647.582	-1.82	-19.63	-2	0
Perception of citizen's on the issue of e-government-part II	possible only in urban areas	10	0.11	1198.4	0.05	2372.762	-1.82	-19.63	-2	0
	For people who are familiar with computers	11	-0.37	-336.8	-0.1	-1253	-1.82	-19.63	-2	0
	Useful for people living in small towns	12	0.43	296.46	0.51	198.9882	-1.63	-44.79	-2	0
	Equality may be a myth, since non-literates may continue to use the manual system	13	-0.02	-5744	0.17	622.8354	-1.82	-19.63	-2	0
	e-services is possible only for people with credit cards/debit cards etc.	14	-0.43	-362.2	-0.67	-162.207	-1.82	-19.63	-2	0
	very few people are aware of e-services.	15	0.98	106.02	0.74	134.6206	1.3	78.823	1.28	35.07804

Table 3: Perceptions of A.P. and Kerala e-service customers about the existing government e-services

Basis of measurement	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
SECTION III A	The current services available on-line is comprehensive	16	0.07	1581.2	0.16	677.3109	1.53	36.338	1	0
e-government services - usage services - usage patterns of citizen's	One-stop services are available at nominal costs	17	0.39	287.58	0.22	512.5693	1.57	32.795	1	0
	Information about services available are very clearly stated in the service centre/ Kiosk	18	0.92	69.904	0.42	213.4375	1.53	36.338	1	0
	System is completely user friendly and even a layman can easily use the system	19	0.98	62.869	0.72	136.1961	1.53	36.338	1	0
	The e-services have reduced corruption in many ways	20	0.96	64.077	0.68	126.2995	-0.62	-149.2	-1.22	-33.9546
	Though a number of services are being provided on-line, the manual system is easier	21	-1.12	-62.219	-0.4	-289.39	-0.93	-174.8	-1	0
	Centres/Kisoks are equipped with equipment that are fast and efficient	22	0.34	355.92	0.27	398.4022	-0.7	-136.3	-1.22	-33.9546

Table 4: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t Infrastructure

Basis of measurement	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
SECTION III B	Centres/Kisoks are equipped with equipment that are fast and efficient	23	0.65	175.92	-0.52	-209.748	0.83	183.56	1.14	30.43746
measurement of satisfaction and comfortable levels of citizen's w.r.t infrastructure	The system in the centres are user friendly	24	1.11	62.28	0.62	143.8652	1.45	36.979	1.14	30.43746
	Systems have screen touch facility and are easy to operate, while computers have user friendly, instructive screens	25	1.17	58.038	0.64	153.9201	-0.16	-339.1	1.14	30.43746
	equipment/computers are multi-lingual (English, Hindi, Local Language, Urdu)	26	0.51	220.96	0.24	464.4292	0.68	163.6	1.14	30.43746
	Centre/Kisoks have comfortable seating and other arrangements for users.	27	0.19	503.15	0.05	2123.676	-0.1	-888.8	1.14	30.43746
	Guide posts indicating the location of centers are installed in all areas.	28	1.28	60.596	0.71	129.5392	-0.78	-119.7	1.14	30.43746
	Sufficient number of counters/system are installed in each centre to reduce waiting time	29	0.65	148.16	0.19	584.6371	-0.02	-5656	1.14	30.43746
	The timings of the centers are convenient	30	1.03	80.594	0.55	204.6969	1.49	72.592	1.88	17.28519

Table 5: Satisfaction and comfort levels of e-service customers of A.P and Kerala w.r.t. Manpower at the centers

			Andhra Pradesh				Kerala			
	Nature of the statement	Statements Numbers	Anantapur		Hyderabad		Kozhikode		Trivendrum	
II			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Man power	All centers are manned by personnel/s	31	1.4	58.902	0.89	95.2011	1.92	14.13	2	0
	Personnel manning the centers are smart and are fully conversant with issues	32	0.98	82.873	0.81	121.835	1.92	14.13	2	0
	Personnel manning the centers are able to communicate in English, Hindi, or local language	33	0.96	75	0.62	154.3339	1.92	14.13	2	0
	personnel manning the centre are helpful	34	1.08	63.721	0.67	136.8828	1.92	14.13	2	0
	Kiosks are un-manned but instructions on the screen is sufficient	35	1.09	60.987	0.73	120.7579	-0.12	-395.8	1.14	30.43746

Table 6: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t legal validity of e- certificate

Basis of measurement			Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
III	Nature of the statement	Statement Numbers	W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Legal validity of e-certificates	In my experience, there is no problem in using certificates/documents obtained on-line	36	0.47	219.99	0.17	600.2018	0.12	690.01	0.66	71.77406

Table 7: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t Security aspect of e-transactions

Basis of measurement			Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
IV	Nature of the statement	Statement Number	W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Security issue	use of Credit card for making payments have been safe	37	0.83	113.09	0.2	504.9752	0	0	0	0
	There has been no misuse of cash payment made by me in the system so far and all payments have been registered/recorded	38	0.4	226.38	0.27	369.8329	0.66	74.904	0.74	59.2749
	Systems have been capacitated for finger-print biometrics	39	0.94	83.522	0.73	142.1691	0	0	0	0

Table 8: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t accessibility of government online - services

Basis of measurement	Nature of the statement	Statements Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
V			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Accessibility	Centers are situated at vantage points and are easily accessible to most localities in the city	40	0.17	691.3	0.2	474.3416	0.69	117.19	0.86	52.05356
	All services offered are accessible from any centre and from any city	41	1.02	86.564	0.39	273.519	-0.52	-157.4	-0.94	-68.6479
	All cities/towns/villages in my state are connected in the network making universal access within the state	42	1.25	56.991	0.46	226.796	-1.01	-63.39	-0.94	-68.6479

Table 9: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t Efficiency of service delivery

Basis	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
VI			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Efficiency	on-line services are very efficient and systems are very fast	43	0.67	162.21	0.21	514.1755	1.02	146.72	1.55	32.09637
	response time for processing is very negligible	44	1.1	62.324	0.19	508.6237	1.57	32.795	1.55	32.09637
	There is periodic updating of information/records etc	45	0.22	532.34	-0.05	-1884.14	1.57	32.795	1.55	32.09637
	Receipts/Certificates issued are normally error free and even in case of errors, rectification is done immediately.	46	0.67	126.74	0.14	685.2677	1.57	32.795	1.55	32.09637

Table 10: Satisfaction and comfort levels of e-services customers of A.P and Kerala w.r.t Cost aspect of online-services

Basis of measurement	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
VII			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Assessment of cost saving	The usage of on-line service helps in reducing the time for a task by 75%.	47	1.02	77.171	0.19	486.3511	1.44	35.843	1.55	32.09637
	All services cannot be used simultaneously because of differing billing cycles and hence the number of trips made to the center is not reduced	48	0.98	85.349	0.39	278.2849	1.13	89.073	-0.97	-60.912
	Bribes are avoided.	49	0.57	157.42	0.06	1760.997	1.35	54.81	0	0

Table 11: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t technical knowledge of e-services customers

Basis of measurement	Nature of the statement	Statements Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
VIII			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Technical	Connectivity problems occur occasionally	50	0.29	293.79	0.63	150.0063	0.29	184.38	0	0
knowledge	The system is not able to accept all services.	51	0.51	195.09	0.4	271.5695	0.05	866.03	0	0
	Power failure leads to break down of work	52	0.05	2233.8	0.29	345.8433	0.37	165.09	0	0
	While some kiosks are supposed to work for 24 hours, there is frequent disruption of services after office hours.	53	0.34	363.14	0.23	447.0233	-0.04	-489.9	0	0

Table 12: Satisfaction and comfort levels of e-services customers' of A.P and Kerala w.r.t willingness of e-services customers to pay for the services.

Basis of measurement	Nature of the statement	Statements Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
IX			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Willingness to for the services	Services provided on line are charged	54	0.66	144.09	0.45	178.8164	-2	0	2	0
	I am satisfied with the amount charged	55	-0.2	-758.3	0.22	512.5693	-2	0	2	0

Table 13: Satisfaction and comfort levels of e-services customers of A.P and Kerala w.r.t overall satisfaction about online-services

Bais of measurement	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
X			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Overall satisfaction	More convenient than manual	56	-0.07	-1854	0.5	173.2051	-0.14	-1015	0.34	386.2247
	No middlemen are involved	57	1.1	88.607	0.95	101.3756	1.44	39.675	1.23	49.92558
	past records are easily accessible	58	1.2	79.931	1.13	63.39026	1.44	39.675	1.24	47.18948
	Increased awareness of Govt. programmes.	59	0.94	108.3	0.9	103.6375	1.44	39.675	1.24	47.18948
	Miss interaction with officers as on-line system does not provide for grievance redressal.	60	1.12	77.097	0.73	129.7471	-1.02	-60.4	-1.22	-33.9546

Table 14: Future expectations of citizens' of A.P and Kerala w.r.t Infrastructure

Basis of measurement	Nature of the statement	Statement Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
SECTION IV			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V
Future expectation of citizens - Infrastructure	More services to be added	61	0.73	166.49	0.44	221.0979	1.17	69.494	1.58	31.23788
	Kiosks to be manned, if they are not so,	62	1.37	66.624	1.24	51.15726	1.12	77.097	1.38	46.71525
	Systems to be multi-lingual to help minority groups also.	63	0.9	114.93	0.78	108.1492	1.12	77.097	1.37	52.2854

Table 15: Future expectations of citizens' of A.P and Kerala w.r.t efficiency of service delivery

Basis of measurement	Nature of the statement	Statements Numbers	Andhra Pradesh				Kerala			
			Anantapur		Hyderabad		Kozhikode		Trivendrum	
II			W.A	C.V	W.A	C.V	W.A	C.V	W.A	C.V.
Efficiency	Grievance redressal mechanism to be incorporated in the system.	64	0.61	193.82	1.02	90.89668	1.1	77.673	1.46	41.57258
	System up gradation to be done on a regular basis.	65	0.47	228.08	0.74	134.6206	1.07	85.915	1.6	30.61862
	Breakdown of Machinery/System should be announced in leading dailies to prevent people from coming to the center only to see that system is down.	66	1.03	97.528	1.17	65.15377	1.19	64.76	1.61	30.29503

ANNEXURE-II:

Questionnaire For Customers/Users of on-line Services offered by the Government

Assessment of Perception & Satisfaction Levels of the Existing System of E-Government in the state of Karnataka, Andhra Pradesh & Kerala

Important Note
This questionnaire is part of an academic study being conducted with an aid from the University Grants Commission as part of the project
Work of
Dr. Radha Kumari, Lecturer (Sr. Scale), Department of Commerce, Sri Sathya Sai Institute of Higher Learning, Anantapur, Andhra Pradesh. The information obtained by administering these questionnaires will be used SOLELY FOR ACADEMIC PURPOSES.

About the Questionnaire

The Questionnaire has 4 sections.
Section I is primarily `Personal Information' Section.

Section II is designed to gauge the opinion of the citizens on their perception on the whole issue e-government / services provided by the government on-line or through internet

Section III A has been structured to assess citizens views on the existing system of government services provided on-line or through the internet and to determine their usage pattern of the said services provided.

Section III B has been designed to determine the level of satisfaction of the users of on-line government services being provided.

Section IV has been structured to arrive at possible expectations of the citizens of the 3 states on their expectation of e-services, given the current provisions or programmes available

SECTION II-A
(Please tick appropriate column)

In your Opinion, Government services Provided on-line or through internet is	Absolutely Disagree	Disagree	Not Sure/ Not aware	Agree	Absolutely Agree
1. Easy access to pay bills					
2. Easy Access of Govt. machinery to People					
3. Easy interaction between Govt. & people and Promote people's participation in decision making					
4. Cost effective and time saving Ways to access govt. services					
5. Bringing about transparency in Govt. functioning					
6. Popularising Govt. programmes Hitherto not known to people					
7. Ensuring equality of citizens					
8. Eliminating corruption by limiting direct interaction With either government personnel or middle men					

Section II B
(Please tick appropriate column)

In your Opinion, Government services Provided on-line or through internet is	Absolutely Disagree	Disagree	Not Sure/ Not aware	Agree	Absolutely Agree
1. For the rich and the literate					
2. Possible only in urban areas					
3. For people who are familiar with computers					
4. Useful for people living in small towns					
5. Equality may be a myth, since non-literates may continue to use the manual system					
6. e-services is possible only for people with credit cards/debit cards etc					
7. Very few people are aware of e-services					

Section III A

About the Existing System of e-services/government services provided on-line or through internet

(Please tick appropriate column)

	Absolutely Disagree	Disagree	Not Sure/ Not aware	Agree	Absolutely Agree
1. The current services available on-line is comprehensive					
2. One-Stop services are available at nominal costs					
3. Information about services available are very clearly stated in the service centre/Kiosk					
4. System is completely user friendly and even a layman can easily use the system					
5. Some services being provided benefit only a limited section of the society.					
6. The e-services have reduced corruption in many ways.					
7. Though a number of services are being provided on-line, the manual system is easier					

Section III B

Measurement of Satisfaction and comfort levels with the government services being provided on-line or through internet

In your Opinion, Government services Provided on-line or through internet	Absolutely Disagree	Disagree	Not Sure/ Not aware	Agree	Absolutely Agree
I. Infrastructure					
1. Centres/kisoks are equipped with equipment that are fast and efficient					
2. The system in the centers are user friendly					
3. Systems have screen touch facility and are easy to operate, while computers have user friendly, instructive screens					
4. Equipment/computers are multi-lingual (English, Hindi, Local Language, Urdu)					
5. Centre/Kiosks have comfortable seating and other arrangements for users.					
6. Guide posts indicating the location of centers are installed in all areas					
7. Sufficient number of counters/ system are installed in each centre to reduce waiting time					
8. The Timings of the centers are convenient					
II. Man Power					
9. All centers are manned by personnel/s					
10. Personnel manning the centers are smart and are fully conversant with issues					
11. Personnel manning the centers are able to communicate in English/Hindi/local language					
12. Personnel manning the centre are helpful					
13. Kiosks are un-manned but instructions on the screen is sufficient					
III. legal Validity/Universal acceptability					
14. In my experience, there is no problem in using certificates / documents obtained on-line					

IV. Fire-Wall/Protection					
15. Use of Credit card for making payments have been safe					
16. There has been no misuse of cash payment made by me in the system so far and all payments have been registered/recorded					
17. Systems have been capacitated for finger-print biometrics					
V. Accessibility/Network					
18. Centers are situated at vantage points and are easily accessible to most localities in the city					
19. All services offered are accessible from any centre and from any city.					
20. All cities/towns/villages in my state are connected in the network making universal access within the state					
VI. Efficiency					
21. On-line services are very efficient and systems are very fast					
22. Response time for processing is very negligible					
23. There is periodic updating of information/records etc by all the service providers					
24. Receipts/certificates issues are normally error free and even in case of errors, they are rectified immediately with no additional processing cost or time					
VII. Assessment of Cost-Saving through usage of e-services					
25. The usage of on-line service helps me reduce the time for a task by 75%					
26. All services cannot be used simultaneously because of differing billing cycles and hence the number of trips made to the centre is not reduced at all					
27. In my opinion bribes ranging from ----- to ------ is avoided					

VIII. Technical Aspects					
28. Connectivity problems do occur occasionally					
29. The system some times is not able to accept or provide all services. For ex: in a kiosk where telephone, water, electricity bills may be paid, some times, the system is not in a position to accept payments of all utilities.					
30. Power failure leads to systems getting switched off. There does not seem to be any back up power					
31. While some kiosks are supposed to work 24 hours, there is frequent disruption of services after office hours (6-7 PM to 9 AM)					
IX. Willingness to Pay for the services					
32. Services provided by the on-line system charged					
33. I am satisfied with the amount charged (If no, please state the reason at the end of this page)++					
X. Overall Satisfaction/dissatisfaction in a nutshell					
34. More convenient than manual system					
35. No middle men involved					
36. Past records easily accessible					
37. Increased awareness of Government programmes					
38. Miss interaction with officers as on-line system do not provide for grievance redressal					

Section IV

Future Expectations/Systemic Improvements Required? If Any

In your Opinion, Government services Provided on-line or through internet requires	Absolutely Disagree	Disagree	Not Sure/ Not aware	Agree	Absolutely Agree
I. Infrastructure					
1. More services to be added					
2. Kiosks to be manned (if they are not so)					
3. Systems to be multi-lingual to help minority groups also.					
II. Efficiency					
4. Grievance redressal mechanism to be incorporated in the system					
5. System upgradation to be done on an regular basis					
6. Breakdown of machinery/systems should be announced in leading dailies to prevent people from coming to the centre only to see that systems are down					

* Any other comments on any issue above may be made in the space provided here or in any free space in this questionnaire.

Thank you very much for your time and Co-operation. We are indeed grateful to you for this effort.

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Research Paper -2

Presented at the International Conference on E-governance, (ICEG 2005) held at Lahore University, Pakistan, 9th to 11th, December, 2005

E-procurement - A continuing e-governance journey of the State of Andhra Pradesh - towards cost-saving & transparency in government's procurement

Dr. Ch. Radhakumari, Reader, Faculty of Commerce, Sri Sathya Sai Institute of Higher Learning,
Anantapur Campus, Anantapur A.P, India—515001 ---- radhakumari_c@yahoo.com

Abstract:

Procurement is usually regarded as a sensitive function in the government environment and is handled in a closely guarded and controlled manner. It is for this reason; procurement is also one of the sectors that remains insulated against any process improvements. Presently, it is being realized world over, that Information and Communication Technology (ICT) can remove the existing administrative barriers and make the government's functioning more efficient, accessible and transparent, besides being cost-effective. E-procurement is one of the attractive quick-wins in e-government plans of the countries which have taken the initiative of introducing the e-governance. E-procurement is starting to grow in most European Union countries and is being driven by a renewed focus on cost cutting, different sourcing practices, and quantifiable benefits of implementations. E-procurement is related to different aspects of the procurement function supported by various forms of electronic communication. There is a little history of extensive use of e-procurement in the public sector except perhaps in certain entities in the military and public health sectors. The present paper highlights the successful implementation of e-procurement solution in the State of Andhra Pradesh and the contribution it has made to, the suppliers and government directly, and the society, indirectly.

Key words: e-procurement, SMART government, Self service zone, IT awareness, Dynamic Pricing Engine.

1. Introduction

Information Technology (IT) is the fastest growing sector in the world. The fast evolving sphere of IT has created tremendous opportunities for all the sectors of the country. This has helped in the increased speed of processing, increased storage capacity of the system and an increased availability of new software to perform wide variety of tasks and operations. Internet has transformed the world we live in. The envisioned global communication is becoming increasingly a reality. One of the major areas of societal relevance for use of Information Technology is E-governance. E-governance enables good governance which is Simple, Moral, Accountable, Responsive and Transparent (SMART). E-governance is the latest trend in the governance process all over the world. All the developed nations of the world such as U.S.A, U.K, Canada, Australia and Singapore have gone in a big way into e-governance [1]. Even the developing nations like India, China, Sri Lanka, Philippines, and Brazil, have also progressed well in e-governance implementation.

1.1 E-procurement

It is being realized world over that ICT can effectively make government more accessible and remove existing administrative and commercial barriers across the nation. Public procurement is one of the key areas where these new technologies can improve and simplify the way government operates and helps remove existing commercial obstacles. Electronic public procurement not only makes it easier for enterprises to identify contract opportunities and to supply their goods and services across borders, but

can also save money and time for both businesses and administrations, decrease the potential risk of corruption and contribute to the strengthening of competitiveness, transparency and finally, the economic growth.

The e-procurement exchange is built on an Internet architecture i.e. the exchange can be accessed by anyone from anywhere through internet. E-procurement is one of the attractive quick-wins in e-government plans of countries [2]. Electronic Public Procurement is starting to grow in most European Union countries. Procurement is not an event. It is a process and signifies a continuing relationship between the government and its suppliers. E-procurement is a system that manages these relationships efficiently [3]. The procurement procedures are therefore, archaic, long-winded and opaque. The biggest first step, therefore, is to undertake procurement reform exercise to precede the e-procurement effort. Some countries like Philippines and Chile have brought in a special legislation to govern and regulate e-procurement [3]. E-procurement is being driven by a renewed focus on cost cutting, different sourcing practices, maturing Internet commerce and quantifiable benefits of implementations. According to a survey conducted by the US-based Aberdeen group [4], the main benefits cited by early users of e-procurement include double digit percentage reductions in procurement costs, shortened sourcing cycles, faster time to market, improved product quality, enterprise-wide standardization of sourcing practices, improved supplier and market knowledge, enhanced sourcing skills, and the ability to apply strategic sourcing to a greater portion of spending. The basic function of e-procurement is to use the Internet to purchase goods and services. E-procurement is related to different aspects of procurement function supported by various forms of electronic communication [5]. Its use in both the public and private sectors takes many forms[6], such as Electronic Data Interchange, e-MRO (Mechanism for ordering indirect items from an on-line catalogue, Enterprise resource planning, e-sourcing, e-tendering, e-service auctioning, e-reverse auctioning, e-auction for disposals, e-informing, e-collaboration and so on .

2. Review of Literature

The earliest literature on e-procurement is that relating to electronic data interchange - a technology that has been in use in organizations since the 1960s, [7]. One of the earliest articles on this subject was a paper in 1967, extolling the benefits of electronic data interchange for buyers and sellers in the hospital environment. There are many references concerning the use of e-procurement in the hospital environment. Examples include, [8], [9], [10], [11], [12]. Similarly, the automotive industry, retail industry and the travel industry have a relatively long history in the use of inter-organizational electronic systems in procurement, [13].

There is a little history of extensive use of e-procurement in the public sector except perhaps in certain entities in the military and public health sectors. [14], [15]. Information about public procurement initiative is most commonly elicited through relevant conferences or through unpublished reports, [16], [17], [18]. The European Public Procurement Group sponsored a conference in Brussels in October 2001 at which information about various European electronic public

procurement initiatives was presented, [16]. What ever may be the source and availability of information, there is insufficient, systematic research relating to the adoption of e-procurement in the public sector. The impact of the significant investment of public resources in e-procurement deserves careful investigation. The present paper is an effort in this direction. The paper, besides highlighting the implementation of e-procurement in India, with special reference to the State of Andhra Pradesh, makes an attempt to statistically prove the impact of its functioning on the society.

3. Significance and need of the study

While there is literature describing the forms of e-procurement and its implementation, specific cases of functioning of e-procurement and the efficacy of various applications of this technology, particularly in government, have not emerged much in the academic literature [19]. There are very few studies that systematically evaluate the actual cost and benefit movements associated with the use of various forms of e-procurement in the public sector, and there are even fewer of these published. There are many reports that assert savings and benefits but many such assertions are only theoretical [20]. E-procurement initiatives are implemented in many jurisdictions even in the absence of sufficient information to allow a realistic assessment of their associated cost and benefit movements. The connection between optimal procurement strategy and the use of electronic commerce remains an area in which there is considerable scope for further systematic research, especially, in public sector. There are also very few examples where beliefs about the efficacy of e-procurement are tested. Since considerable public resources are applied to potentially high risk projects such as e-procurement, there is an imperative need to highlight the outcomes. In the light of the above, the present paper assumes its relevance and significance.

4. Objectives of the study

The present study was undertaken with the following objectives.

1. To discuss the pre-e-procurement environment and the associated problems which constituted the platform for initiating the e-procurement project,

2. To highlight the functioning of e-procurement project in the State of Andhra Pradesh with special reference to its functional architectures such as technical, logical and physical.

3. To focus on the visible benefits the project has brought, to different parties in the society in terms of reduced inventory costs to the government, increased scope of participation to suppliers, increased adaptability and transparency, speed in tender processing, reduction in cartel formations by suppliers/contractors, and so on.

5. Methodology

The government of Andhra Pradesh (GoAP) has initiated e-procurement implementation with the objective of developing an integrated approach to attain best procurement practices across the government departments. A need was felt for wide ranging reforms that would simplify the tender procedures, bring about greater transparency, better quality of work, and fair competition, in dealing

with public departments, goods and services. The GoAP identified e-procurement as one of the key initiatives with the objective of implementing the project with a view to sustain the reforms and to bring in new channels of auctions and reverse auctions as part of its e-governance projects.

At a time when the procurement is still regarded as a sensitive function in the government environment and is handled in a closely guarded and controlled manner in many States and Countries, the successful implementation of the e-procurement project in the State is the reason for this study. Accordingly, the State of A.P was selected as an area of study, to bring about an understanding as to how e-procurement can be implemented to convert the conventional procurement into a dynamic, efficient, transparent, automated function. The e-procurement solution was initially implemented in six government departments in the State. Hence these six departments were chosen for collection of the data, to study the impact of e-procurement implementation. These departments are a). APHMHIDC – Andhra Pradesh Health and Medical Infrastructure Development Corporation. b). I & CAD – Irrigation and Command Area Development, c) PHMED, d). PRED – Public Health and Municipal Engineering Department, e). R & B – Road and Buildings, f). TWED – Tribal Welfare Engineering Department.

To measure the impact of the implementation of the e-procurement solution, various variables such as adaptability, relationship with suppliers, change in the range of suppliers, participation of suppliers, impact on small and medium suppliers, change in transparency, human interface factor, change in cost-savings to both government and suppliers, speed of implementation of the projects, impact on the IT awareness of citizens in the State, and so on, were chosen [21]. The reports prepared by, C1 India Ltd., the Private Partner to the implementation of e-procurement solution, and the ICT dept. of the State of A.P. constituted the basis for data collection [21, 22]. Accordingly, the data pertaining to two years i.e. 2003-04 and 2004-05, was collected, classified, tabulated and analyzed. The number of transactions completed, value of the transactions i.e. Estimated Contract Value (ECV), percentage of discount given to the government, average bids per tender, average tender evaluation time, number and value of electronic tenders completed in all the departments, and son on, were studied. To assess the change, comparative figures, both absolute and relative, were depicted in the form of charts. To highlight the e-procurement implementation, different architectures involved, such as technical, logical and physical, were also described, and diagrammatically depicted (Annex- I and II).

6. Results and discussion

The results of the study are discussed under the following three different heads:

1. Pre-e-procurement environment and the associated problems.
2. Implementation of e-procurement solution.
3. Post e-procurement environment and the associated benefits to different parties in the society.

6.1 Pre-e-procurement environment and the associated problems

Procurement in Government departments and organizations, in the State of A.P, till recently, was characterized by manual tendering process, involving internal approval of the project, publishing Notices Inviting Tender (NIT) in several medias, bid submission (voluminous packets of paper) by suppliers, several visits by suppliers to departments, preparing comparative statements, tender evaluation reports, bid evaluation by buyers, award of order and signing of agreement, and so on. The complete process required a long chain of internal authorizations and scrutiny, (at times involving several departments), resulting in time consumption of about 6 months, for completion of the entire process. Deficiencies in the manual procurement process were analyzed and are enumerated below.

I. Delays in issue of tender schedules to suppliers: There were delays in preparation of tender schedules in physical forms due to constraints like shortage of paper and related stationery items in the government departments. As a result the tender documents were not issued to the bidders on the announced dates putting some of the bidders in disadvantageous position.

II. Cartel formation suppresses competition: The participating bidders could gather the information about their competitors from the departments. This information was encouraging the participating bidders to lobby for formation of Syndicates or Cartels and bid for the tender for higher quotations to the disadvantage of government departments.

III. Physical threats to bidders: In some regions plagued by factions and mafia, the genuine bidders were physically threatened and prevented from submitting their bids. The bidder or his agent had to risk their physical safety for submitting the bids in the tender box placed in the office of the tender inviting authority. These incidents were drawing the attention of media, affecting the reputation of government's functioning.

IV. Tender Boxes at Multiple locations: To counter the menace of physical threats to bidders by the Contractor's Cartels, the government departments had resorted to keeping the tender boxes at multiple locations: One tender box at the office of the Tender Inviting authority, second tender box at the office of District Police Chief and the third tender box at the Head of department's office. This concept, instead of yielding desired results was contributing to problems related to the management of tender boxes.

V. Manual movement of tender files: For the purposes of evaluation, the bid documents are manually transported across the administrative hierarchy. The transportation of bid documents manually and using surface mail is a time consuming activity. Additionally, the possibility of bid details being tampered or lost, while the documents are physically transported across the administrative hierarchy, could not be avoided.

VI. Delays in finalization of tenders: Red tapism, lack of transparency, manual movement of files across the administrative hierarchies involved in the tender process, were all resulting in inordinate delay in finalization of tenders.

Typically, tenders for major projects used to take longer tender process time ranging from 90 days to 150 days and these delays were contributing to cost and time overruns for the projects.

VII. Human interface at every stage: The manual system exposed the departmental personnel to the bidders at every stage of the process beginning with the Sale of tender schedules, Issue clarifications, bid submission, bid evaluation and so on. This continued human interface has introduced subjectivity, favoritism and other undesirable elements in tender processes.

VIII. Lack of Transparency: Often times, a tender may have two or three bidders. But only one of them would be the real bidder the rest two being dummies, leading to forceful acceptance of the bid by the government. Lack of transparency is seen in the manual procurement process, right from tender publication, sale of tender schedules, and issue of clarifications to bidders, bid evaluation. Besides, even the departments were unwilling to share the information, which became the main cause for the bidders, media, and citizens, to loose confidence in the system.

6.2 Implementation of the e-procurement solution in the State of Andhra Pradesh

The Government of Andhra Pradesh has decided to implement the e-procurement solution across all government departments under Public Private Partnership (PPP) model [21], as one of the core e-governance initiatives. The basic objective of this project is to use the tools of IT to introduce best practices in electronic procurement across government departments, local bodies and municipal corporations along with their vendors

M/s PricewaterCoopers was engaged as the consultant to the GoAP for assisting in drawing project requirements, developing 'Request For Proposal' (RFP) document to select a partner and to advise in the selection process. Only vendors with an existing e-procurement software or platform were considered for the project. Ground-up development of the exchange was avoided to expedite the implementation and also to benefit from the experience that the vendor was expected to bring from earlier implementations of similar projects. A consortium, lead by M/s C1 India Pvt. Ltd. was selected as the private partner based on the competitive bidding to implement the assignment on the PPP model. In this model the selected private partner is expected to invest upfront in setting up the exchange and recover the costs by charging the user departments for completed transactions.

C1 India Pvt. Ltd. carried out the design, customization and implementation of the e-procurement solution as per the requirements of the GoAP. C1 India has put in place the required hardware, networking and communications equipment to operate the market place by investing upfront in the project. Though the ultimate objective of the initiative is to have a government-wide e-procurement solution, considering the complexities involved, the GoAP planned to approach it in a phased manner. Getting launched on the 29th January 2003, the e-procurement project entered into a two phase implementation, in the State of Andhra Pradesh. Phase 1: Pilot-study-covered a period of nine months from 1st April 2003; Phase 2: Roll-Out stage: After the successful completion of

pilot study, the project, which was initiated into six departments, originally, was taken to all the departments, where the value of purchases exceed Rs. 10 lakhs, w.e.f. 6th July 2004 [21].

Core Capabilities of Marketplace: The Marketplace would include the following core capabilities:

- Publication of Notice inviting tenders (NIT) / Invitation for bids (IFB)
- Issue of tender documents to prospective tenderer.
- Submission of tenders
- Evaluation of tenders
- Approval of tender
- Issue of Purchase order
- Contract management
- Rate contract based procurement
- Dynamic pricing engine (Auction, Reverse Auctions and Negotiations)
- Self service zones for vendors

Objectives of implementation of e-procurement solution:

Demand aggregation: Aggregating the government department's demand to match the buying power with the supply market.

Reduction in inventory costs: Reducing the inventory costs by lowering the levels of inventory

Internal Arbitrage – Ensuring consistency across all departments with respect to goods purchased and their costs of purchase consistent and sustainable vendor development – Enabling pre-qualified vendors an opportunity to access other government departments.

Transactional effectiveness – Eliminating or automating non-value adding steps within the procurement to enable efficient and effective processes.

Total Cost of Ownership – Understanding the supply chain and life cycle costs in the procurement

Process to establish value adding supply relationships leading to reduced cost of doing business for both government and industry.

Effective Tender processing - Use of different types of e-auctions to get better deals.

Open Platform – Creating Level playing field and "fair" competitive platform for the suppliers.

Wider customer base – Accessing a wider customer base when disposing of redundant assets.

Technology and Logical Architecture (Annex-1, A1 and A2): The e-procurement solution was created with 3-tier architecture, including:

- Presentation Tier—the presentation tier is supported by two load-balanced Web servers running the Microsoft Windows® 2000 Advanced Server operating system and Internet Information Services (IIS) version 5.0. The Web servers are hosted on two HP ProLiant DL 580 dual-processor computers with 2 gigabytes (GB) of RAM and RAID 5 features. The Web servers are isolated by external and internal firewalls creating a DMZ.

- Business Logic Tier—the business logic is encapsulated using Microsoft COM+ technology, and handles a range of tasks including authentication, authorization, and workflow management. The business

logic tier is co-hosted on the same servers supporting the presentation tier.

- XML Data Layer Tier—the XML data layer handles communication with Web services. The XML data layer is co-hosted on the business logic tier.

Database Tier—the 60 GB relational database runs on Microsoft SQL Server™ 2000 Enterprise Edition, part of Microsoft Windows Server System™ integrated server software, and Windows 2000 Advanced Server. The database is hosted on two HP Proliant DL 580 dual-processor computers with 2 GB of RAM and RAID 5 features. The servers are configured in a two-node active\passive cluster to ensure high availability. Storage is on a system area network. The Hyderabad production site is backed by a disaster recovery site in Delhi. Physical architectures of the e-procurement is presented in Annexure III A3.

Security and Authentication

The e-procurement solution was designed with an extensive security features to help ensure that all activities are logged, no unauthorized person has access to data, all sensitive data is encrypted, and that the system can be restored in a minimal time in case of a disaster or system crash. The security features of the e-procurement solution of A.P have gained recognition from other organizations. The e-procurement software has been audited for security by PricewaterhouseCoopers.

6.3 Post e-procurement environment and the associated benefits to different parties in the society

The Government of Andhra Pradesh (GoAP) has desired to set up an e-procurement marketplace, where all the government departments and local bodies could perform procurement transactions with their vendors. GoAP has an estimated expenditure of around Rs. 8000 crores for procurement of goods and services [21]. The e-procurement marketplace enables government departments to procure a wide variety of goods and services with additional benefits, which were otherwise not achievable under conventional procurement.

The end-to-end e-procurement solution ensures that the complete procurement happens online. This, immediately eliminates lot of non-value adding activities like manual sale of tender documents, manual opening & reading of bids, preparation of comparative statements (as they are automatically available), audit/cross check of comparative statements, time spent in movement of files from one person to another, manual creation of purchase order & delivery schedule and so on. Presently the task of e-procurement in the State is being driven by a renewed focus on cost cutting aspect, curtailing cartel formations by the bidders and there by creating a room for fair and open competition for all the suppliers, improving the transparency in functioning, besides aiming at enhancing the quality of procurement to the government. The following discussion enumerates some of the visible and quantifiable benefits; the implementation of e-procurement solution has brought, to different parties in the State including the government.

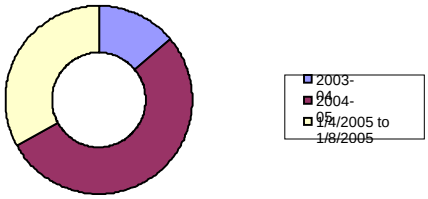
- Increased Transparency:

All the information on the transactions and their evaluation is available on the portal and is easily accessible. The bids are opened online and bid opening is visible to all the suppliers online. The system has also reduced subjectivity in tender evaluation, since smart forms are built for undertaking preliminary technical evaluation of bids. At any time in the procurement cycle, the bidder associated with the transaction can check and know the status of the transaction. The citizen/supplier/contractor now has the assurance that procurement projects are being routed in the most transparent manner. Growth in the volume and the number of tenders, number of bids per tender, stands as a proof to this (Figures 2&3).

- Wider range of suppliers and good relationship with suppliers

E-procurement is helping to build up good relationship with suppliers and contributing to efficient enforcement of government policies. The implementation of e-procurement project is also making the GoAP move ahead, both in terms of getting better prices for tenders and a wider range of suppliers. Figure-1, indicates the constant increase in the number of suppliers to government department's purchases, since the implementation of e-procurement in the State.

Figure – 1 Number of e-tenders completed



- Elimination of human interface

The entire e-procurement process has been designed to eliminate human interface i.e., supplier-buyer interaction, during pre-bidding and post-bidding processes. Tender documents are hosted on the web site from the day of publication of tenders, for free down loading by the suppliers. The application ensures total anonymity of the participating suppliers till the bids are opened on the platform. The e-procurement application provides for automatic bid evaluation, based on the evaluation parameters incorporated in the solution. These improved processes have eliminated subjectivity in receipt and evaluation of bids and has reduced corruption to a significant extent.

- Management Information System (MIS):

Installation of MIS is supplying instant information pertaining to all the tenders, supplier participation and the results, online to all the departments and the Government.

- Elimination of paper and paperwork:

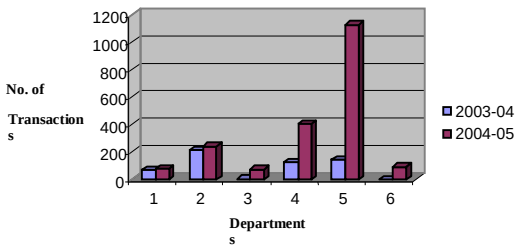
As the bids are submitted online and the files or documents move in electronic form for authorizations, there is elimination of enormous paper work.

Increased adaptability

E-procurement has shortened the buying process. It was discovered that under manual procurement much of the time was wasted in juggling with numerous suppliers of the same product, which is now avoided under electronic procurement. The possibility of the same vendor being paid radically different prices for different

tenders is also avoided under e-procurement, because of the openness of the on-line tender processing. The following (Figure 2) demonstrates the increase in the number of transactions completed through e-procurement during the two years of its implementation in the State of Andhra Pradesh. The volume of finished transactions indicates the increased adaptability of the project in the State.

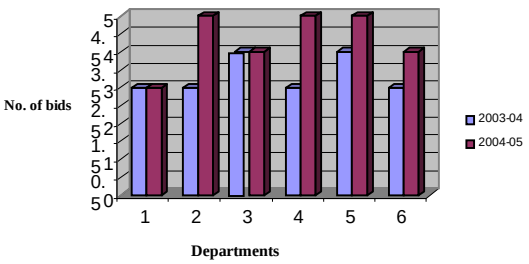
Figure-2 Number of transactions completed



- Increased participation by the suppliers

Earlier the suppliers had to physically scan several newspapers to keep track of tenders called for, by various departments. Now, the e-procurement exchange centrally makes available all the procurement requests emanating from the departments. It allows the suppliers to access the tender document and submit their bids online, by paying transaction fee to the service provider. The number of bids received per tender has increased on an average, by about 30% during the past two years of its implementation (Figure-3), which testifies that the supplier's participation in the e-procurement process has increased.

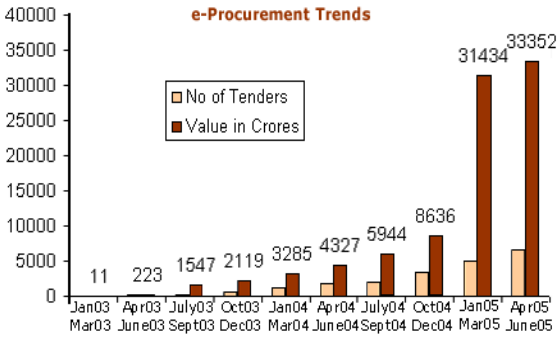
Figure-3-Number of bids per tender



- Empowerment of small & medium suppliers:

Earlier, the small and medium suppliers were harassed and physically prevented from participating in the tendering process. They were either not allowed to purchase the tender document or submit their bids against a tender. However, through the e-procurement exchange, presently they can easily participate in the government's procurement process remotely. They are thus, provided with an equal opportunity to participate in government tenders, which has led to increase in the number of tenders and value of tenders, wide ref. [22], shown in (Figure 4).

Figure 4: e-procurement Trends



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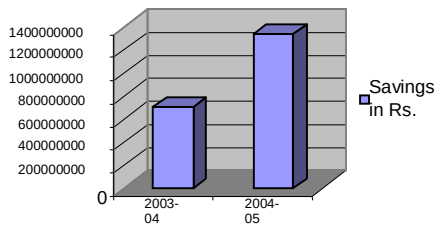
- Significant cost savings to government and suppliers:

By encouraging increased number of bidders to a single tender, e-procurement has contributed to cost savings to the government, in the form of reduction in Tender Contract Value (TCV) as compared to the Estimated Contract Value (ECV). An average reduction of around 15% in the cost of all tenders that are called online was realized during the year 2003-04 and 2004-05 (Figure-5). This has resulted in reduced overhead

expenditure to the government [21]. Availability of tender forms on line has reduced the visits of suppliers to the departments to purchase the tender documents or submit their bids. Participation in e-procurement portal has even resulted in reduction of bid preparation costs to suppliers.

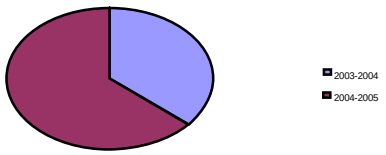
Figure 5- Savings in Total Contract Costs to government



- Faster implementation of projects:

The citizen is benefited in the form of faster implementation of government funded projects. This has been possible because the tender processing time has been reduced by approx. 20%, resulting in completion of more tenders (Figure-6). The projects see the light of the day, under e-procurement faster than before.

Figure 6 - Value of e-tenders Completed



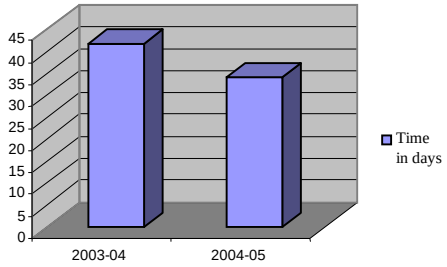
- Increased IT awareness in the State:

The Government has made mandatory that the transactions above certain value must be transacted only through e-procurement. This has resulted in increased use of IT not only within the government departments, but also among the users, across the entire state. The exchange is accessed by the supplier's through cyber-cafes all over the State. The need for using the e-procurement portal has brought about increased IT awareness in the State.

- Standardization of Processes and economic efficiency:

At the outset, an effort was made to standardize the procurement processes and forms followed by various departments for works tenders. Today, all the departments follow common tender process and forms for all the works. A similar exercise is underway for products as well. The initiative has transformed the way the procurement process is taken up in government departments, especially, the engineering departments. With time delays being cut down there is greater efficiency in finalizing the tenders (Figure -7). With greater transparency, more fair competition in filing tenders, the government has been able to ensure economic efficiency as well.

Figure 7-Average Tender Evaluation Time



Savings in Taxpayers money:

The citizen is satisfied that the tax money is being spent wisely. The contracts have been awarded in the most transparent manner. The cost of the projects has come down significantly. Cost reduction of approx. 12%-16% has been achieved.

Out-standing achievements of the e-procurement solution of A.P:

The e-procurement project of Andhra Pradesh, going live in Six departments (Roads & Buildings, Irrigation & CAD, APHMHIDC, PRED, APTS and APSRTC) during the Pilot phase, has achieved most of the objectives. Within a short period of less than two years, the project has been rolled out to 7 Government departments, 9 PSUs, 8 Municipal corporations, 23 Municipalities, spread across the state [22].

The e-procurement project has won "The Gold Icon award 2003" for exemplary implementation of e-governance initiative category, from the Ministry of Administrative reforms, government of India; and the PCQUEST'S "best IT implementation award 2005", under Maximum positive Social Impact category, [21].

Conclusion:

Implementation of e-procurement across departments, PSUs, Local agencies in Andhra Pradesh was instrumental in reducing cartel formations amongst contractors and suppliers since all the bidding is done online through the portal. It has actually increased the participation from the supplier community since anybody can bid for a tender. This helps empower even the small and medium-sized suppliers. Efforts are now being made by the government to broaden the existing e-procurement functionality so as to include supplier performance measurement, sourcing collaboration, contract management and process and commodity specific templates.

Demand aggregation and centralized tender inviting policy, which are the project's special features, are contributing to enhancement in the buying power of the government, leading to better discounts in the estimated cost of the tenders. Departments are able to get goods at the best possible prices, and are thus able to minimize the costs associated with inventory management. The user departments are benefited by cost savings to a tune of 12-16% because of the open competition leading to good bargaining power and time saving of more than 50%, due to reduction in average tender processing time, compared to conventional tender process. The e-procurement solution of the State also is using various types of e-auctions for getting better deals. The centralized platforms help pre-qualified vendors to access other government departments as well, giving them more business opportunities. Implementation of e-procurement solution has increased transparency in the system, allowing for better monitoring and control over the procurement function in general, which was a delicate issue under conventional system. The citizen is also satisfied that the tender process is done fairly and efficiently, and that the taxes they pay, are being spent wisely.

The e-procurement project of GoAP, which cuts across the geographical boundaries of the state, and traverse along multiple departments, has been implemented successfully. The geographical scope of the e-procurement exchange is not limited to Andhra Pradesh but covers the entire country. Any government or government organization can join the e-procurement exchange and use its services. The infrastructure that has been created for

the government of A.P can be shared by all the government departments in the country, without the need for creation of parallel infrastructure. The e-procurement software is continuously upgraded to suit the changes in government and legal requirements. Besides, even the technology architecture is updated regularly so that the platform is not subjected to obsolescence at any point of time.

The Government of Andhra Pradesh envisions providing good governance by establishing a COMMITTED, ACCOUNTABLE, RESPONSIVE, INSPIRING, NATIONALIST, and GENUINE Government i.e. 'CARING' government. E-procurement is one of the vehicles that has been gainfully used by the State of Andhra Pradesh in India, in achieving the goal of 'CARING' governance.

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15